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Stored, Forgotten and Unrecycled

A Pilot Study of Hidden Household E-Waste in Urban Gurgaon

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Abstract: Electronic-waste statistics usually become visible when equipment enters a collection or treatment stream. Devices retained inside homes can therefore remain environmentally and economically relevant while being absent from collection records. This pilot study examines the quantity and composition of unused electronics reported by 66 urban households in Gurgaon (officially Gurugram), together with the barriers that respondents associated with responsible disposal. Device counts were collected in ranges and converted using declared representative values: None = 0, 1–2 = 1.5, 3–5 = 4, and More than 5 = 6. On that basis, the sample contained an estimated 717 stored items, or 10.9 items per household. Awareness was high: 62 of 66 respondents (94%) knew that e-waste requires specialised disposal. Access knowledge was much lower: 42 (64%) did not know of a formal facility or official drop-off point in Gurgaon. In addition, 46 (70%) said they would definitely join a trusted neighbourhood collection drive, while 63 (95%) answered Yes or Maybe when asked whether secure data wiping would increase their willingness to recycle old phones or laptops. The results describe this convenience sample only and do not establish causal effects or a Gurgaon-wide total. They suggest an awareness–access gap shaped by convenience, retained utility, privacy concerns, and uncertainty about future use. A proposed Residents' Welfare Association (RWA) pilot is therefore designed around verified formal-channel collection, close-to-home access, clear data-handling procedures, and auditable reporting. No collection, partnership, data wiping, diversion, or behaviour change is claimed to have occurred.

Keywords: *Electronic Waste; Household Storage; E-Waste Hibernation; Recycling Behaviour; Data Privacy; Residents' Welfare Association; Gurgaon; Gurugram.*

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I. INTRODUCTION

Electrical and electronic equipment has become embedded in everyday household life, but the end of a device's first use does not necessarily produce an immediate disposal decision. A replaced phone may become a backup; cables and earphones may be kept because they might fit a future device; a laptop may contain personal files; and an appliance may appear too valuable to discard but too inconvenient to sell. These objects occupy an ambiguous stage between use and waste. This paper calls that stage *hidden household e-waste* while recognising an important legal and conceptual qualification: an item that its owner still intends to reuse is not necessarily waste. The study therefore measures *reported unused or stored electronics*, not weighed, inspected, or legally classified ewaste.

The global scale makes this household-level problem significant. The *Global E-waste Monitor 2024* estimated that the world generated 62 billion kg of e-waste in 2022, but only 22.3% was documented as formally collected and recycled in an environmentally sound manner (Baldé et al., 2024). These massflow statistics are essential, yet they do not directly show how many devices remain in drawers and cupboards before reaching any collection channel. A household survey can investigate that earlier decision point.

Gurgaon is the name used in the survey and title; Gurugram is the current official district name. The official district page reports a 2011 population of 1,514,085 (District Administration Gurugram, n.d.), but that figure is deliberately *not* used to extrapolate the survey. The present sample was recruited by convenience, is concentrated in apartment and RWA households, and has no population weights or current household denominator. Its value is exploratory: it documents a local pattern, tests a transparent counting method, and uses the resulting evidence to design a feasible community pilot.

The paper first places the study in India's e-waste policy context and relevant literature. It then presents the research question, methodology, data audit, results, discussion, and a proposed RWA intervention. Throughout, primary survey findings are labelled separately from external national or international evidence.

- *India Policy and E-Waste Context*

India's E-Waste (Management) Rules, 2022 were notified as G.S.R. 801(E) on 2 November 2022 and came into force on 1 April 2023 (Ministry of Environment, Forest and

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Climate Change [MoEFCC], 2022). The Rules establish an extended producer responsibility (EPR) framework in which relevant manufacturers, producers, refurbishers, and recyclers register through a Central Pollution Control Board (CPCB) portal. Producers meet recycling obligations through registered recyclers and EPR certificates. The framework also assigns responsibilities to government bodies and requires e-waste found mixed with municipal solid waste to be separated and channelled to registered recyclers or refurbishers. The official rules pages list later amendments, so any real collection activity should check the current consolidated requirements rather than rely only on the original notification (CPCB, 2024; MoEFCC, 2026).

This regulatory structure matters for the proposed RWA model. An RWA can make collection more convenient, but it should not present itself as the recycler or make unverified claims about downstream treatment. Its appropriate role is to aggregate demand, communicate accepted categories, confirm the registration status of the downstream entity, keep a chain-of-custody record, and obtain documentary acknowledgement. The 2022 Rules exclude waste batteries covered by the Battery Waste Management Rules, 2022 (MoEFCC, 2022). Because the survey combines chargers, cables, and power banks in one category, a future drive would need the recycler to specify how devices containing batteries and loose batteries should be segregated.

National estimates require careful reading because different systems use different scopes and methods. The Global E-waste Monitor estimated 4.137 billion kg of e-waste generation for India in 2022 (Baldé et al., 2024). A later Indian parliamentary response, citing CPCB's method based on registered-producer sales and assumed equipment lifetimes, reported 1,397,955.59 metric tonnes generated in financial year 2024–25 and stated that 70.71% was collected, dismantled, and recycled or disposed (Press Information Bureau [PIB], 2025). These figures should not be merged into a single trend because their categories, reference periods, and estimation systems differ. They nevertheless agree on the policy importance of collection and traceable processing.

E-waste is not only a resource-efficiency issue. Unsafe dismantling, burning, and material recovery can expose workers and communities to hazardous substances. The World Health Organization (2021) summarises evidence connecting informal e-waste recycling environments with risks to health, particularly for children and pregnant women. This study did not measure exposure, pollution, or health outcomes. The health evidence provides a reason for formal channelisation; it is not a finding about the surveyed households.

Finally, the circular-economy perspective shifts attention from disposal alone to repair, reuse, refurbishment, and material recovery. India's urban circular-economy guidance emphasises systems that retain value and improve recovery rather than treating all discarded material as undifferentiated waste (Ministry of Housing and Urban Affairs [MoHUA], 2021). For household electronics, this means that a collection model should distinguish working devices suitable for verified reuse from non-working items requiring recycling, while protecting data and avoiding false environmental claims.

II. LITERATURE REVIEW

Research on e-waste behaviour repeatedly shows that awareness does not automatically become formal disposal. Borthakur and Govind's (2017) international review, with special attention to India, identifies consumer awareness and disposal behaviour as central components of effective e-waste management. Their later conceptual work on urban India argues that attitude, social expectations, and perceived control—including whether disposal is convenient—help shape intention (Borthakur & Govind, 2018). An empirical study by the same authors also demonstrates the importance of examining public perception, consumption, and disposal together rather than assuming that knowledge alone predicts action (Borthakur & Govind, 2019).

This distinction can be framed as an intention–behaviour or awareness–access gap. A person may believe that specialised disposal is correct but still lack a known drop-off point, transport, trusted information, or assurance about what happens next. Dwivedy and Mittal's (2013) Indian study of willingness to participate in e-waste recycling found that participation is shaped by several practical and attitudinal factors. Although the present pilot does not replicate their model or estimate predictors, it adopts the same basic insight: willingness is meaningful only when a usable channel exists.

The literature also describes hibernation: the retention of devices after their primary use has ended. Wilson et al. (2017), studying young mobile-phone owners in the United Kingdom, identify primary, secondary, and redundant ownership states and describe dead storage as a barrier to material recovery. Their setting and population differ from Gurgaon, so their numerical findings are not transferred here. The concept is useful because it distinguishes storage from careless disposal. A retained device may be kept for backup use, residual value, memories, uncertainty, or lack of a satisfactory exit route.

Data-bearing devices add a trust problem. Patrao and Karnik's (2023) study of mobile-phone behaviour in the United Arab Emirates identifies privacy, backup use, sentimental content, effort, and collection logistics among relevant barriers. Again, this is comparative evidence rather than proof about Gurgaon. It supports asking whether secure data handling could remove one reported obstacle. In the present survey, the strong Yes/Maybe response to secure wiping is therefore interpreted as stated receptiveness, not evidence that wiping will cause recycling.

Together, these studies suggest four interacting dimensions. First, households may retain devices because they perceive continuing use or option value. Second, disposal has transaction costs: finding a facility, travelling, sorting, and verifying legitimacy. Third, phones and computers contain both personal data and memories. Fourth, willingness can remain hypothetical until infrastructure is

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close, trusted, and easy. The Gurgaon pilot contributes a small local description of these dimensions and extends the analysis beyond phones to accessories, wearables, displays, and other appliances.

➢ *Research Question and Objectives*

- *Research Question:*

How many unused electronic items are estimated to be stored by the surveyed urban households, what is their composition, and what reported factors are associated with delayed responsible disposal?

✓ *The Objectives are to:*

- Estimate the composition and number of unused electronics reported by the 66 sampled house-holds;
- Identify commonly selected behavioural and practical barriers;
- Compare general awareness of special disposal with knowledge of a local formal facility;
- Describe stated willingness to join a neighbourhood collection model and the possible importance of secure data wiping; and
- Translate the findings into a measurable, legally cautious RWA pilot proposal.

The study is descriptive. It does not test causal hypotheses, estimate a Gurgaon population total, or claim that stated willingness will become actual participation.

III. METHODOLOGY

➢ *Design, Sample, and Instrument*

The study used a cross-sectional online household survey. The supplied project summary records 66 valid responses collected in June and July 2026. Recruitment was by convenience rather than probability sampling. Most respondents lived in apartments or high-rise societies, and 57 of 66 reported belonging to an RWA or residential society. These characteristics make the sample relevant to an RWA pilot but also limit external validity.

The survey covered household context; types and ranges of unused devices; device condition and storage duration; past disposal practices; reasons for keeping devices; awareness of specialised disposal and local facilities; willingness to participate in a neighbourhood drive; and the possible influence of secure data wiping. Emails and timestamps were removed from the analytical dataset according to the supplied draft. Appendix A lists the survey domains.

➢ *Estimation Method*

Respondents selected categorical ranges rather than entering exact counts. The study preserved the pre-declared conversion rule:

$$0, \quad \text{None}, \quad 1.5, \quad 1\text{–}2,$$

$$f(r) =$$

$$6, \quad \text{More than } 5.$$

The first two non-zero values are category midpoints; 4 is the midpoint of 3–5; and 6 is a conservative fixed value for the open-ended upper category. Estimated items were summed across respondents and device categories. The reported mean is

$$\frac{717 \text{ estimated items}}{66 \text{ households}} = 10.8636 \approx 10.9.$$

The decimal totals do not indicate fractions of physical devices. They are mathematical consequences of midpoint coding. Because “More than 5” is top-coded at 6, the meth od may understate households with substantially more than six items in a category. Conversely, midpoint assignment may overstate or understate any individual household. The figures are therefore estimates of item counts, not observed exact counts or mass.

➢ *Analysis and Evidence Boundaries*

The analysis uses frequencies, sample percentages, and estimated category totals. Percentages use 66 as the denominator unless otherwise stated. Barriers were multi-select responses, so their percentages are not expected to sum to 100%. No confidence intervals, significance tests, regressions, or causal models were calculated. Secondary sources are used only to explain policy and compare concepts; they do not alter the primary values.

An important evidence boundary concerns the word e-waste. The Indian Rules define e -waste in relation to electrical or electronic equipment discarded as waste (MoEFCC, 2022). The survey includes devices retained for backup or possible future use. Accordingly, this paper does not claim that all 717 estimated items have reached legal end-of-life. It treats them as a potentially recoverable stored stock whose eventual route may be reuse, refurbishment, resale, donation, recycling, or continued storage.

➢ *Pre-Analysis Data Audit*

The supplied Word document contains the draft, summary tables, and preserved dashboard values, but the row-level anonymized workbook is not present in the pr oject upload. The audit was therefore arithmetic and logical rather than row-level. Four checks were completed.

- The seven category estimates sum exactly to 717.
- Dividing 717 by 66 gives 10.8636, correctly reported as 10.9 to one decimal place.

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- Every displayed percentage is consistent with its count after rounding to the nearest whole p ercentage point.
- The table structure is internally coherent: barrier counts can overlap, and half-item estimates are expected under midpoint coding.

No arithmetic inconsistency was found. However, raw-response duplicates, missing cells, contra- dictory answers, eligibility decisions, and exact handling of partially completed forms cannot be independently checked. A second conceptual inconsistency was flagged and corrected in the wording: "unused electronics" cannot automatically be equated with legally discarded e-waste. Appendix B records the audit status.

IV. RESULTS

All findings in this section come from the supplied primary survey summary and apply only to the 66 participating households.

➢ *Scale and Composition of Stored Electronics*

The midpoint conversion produced an estimated 717 stored items, equal to 10.9 per sampled household. Table 1 shows the composition. Chargers, cables, and power banks were the largest estimated category (194.0 items), followed by earphones or headphones (135.0) and phones (120.5).

Thus, a programme focused only on phones and laptops would miss a substantial share of the reported stock.

Table 1 Estimated Composition of Stored Electronics in the Sample

Device category	Households	Share	Estimated items
Phones	50	76%	120.5
Laptops/tablets	38	58%	69.5
Chargers/cables/power banks	59	89%	194.0
Earphones/headphones	52	79%	135.0
Smartwatches	36	55%	68.0
TVs/monitors	19	29%	35.5
Other electronic appliances	39	59%	94.5
Total	—	—	717.0

Note. Households could report multiple categories; shares therefore do not sum to 100%. Item totals are estimates produced by the declared range conversion, not exact observed counts.

Thirty-eight households (58%) reported items stored for more than one year. This duration is consistent with delayed disposal, but the summary data do not show whether storage time differs by device type or condition.

➢ *Reported Barriers*

Backup or possible future use was the most frequently selected barrier, reported by 37 households (56%). Inconvenience was selected by 25 (38%), and data or privacy concerns by 23 (35%). Table 2 reinforces the interpretation that storage cannot be reduced to a lack of environmental awareness. Respondents reported perceived utility, effort, risk, low value, and attachment.

➢ *Awareness, Access, and Stated Willingness*

The clearest contrast is between knowing that e-waste needs special handling and knowing where to take it. Sixty-two respondents (94%) reported special-disposal awareness, while 42 (64%) reported no awareness of a formal Gurgaon facility or official drop-off point. Only four respondents lacked the first form of awareness, but more than ten times as many lacked local access knowledge.

The willingness measures are encouraging but hypothetical. Forty-six respondents (70%) selected.

Table 2 Reported Reasons for Retaining or Not Responsibly Disposing of Devices

Barrier	Households	Share
Backup/future use	37	56%
Inconvenience	25	38%
Data/privacy concerns	23	35%
Low perceived value	19	29%
Lack of awareness	11	17%
Emotional attachment	10	15%
Resale intent	6	9%

Note. Multi-select question; percentages can overlap and do not imply causal effects.

Table 3 Awareness–Access Gap and Stated Willingness

Indicator	Count	Share
Aware that e-waste requires specialised disposal	62/66	94%
Not aware of a formal Gurgaon facility/drop-off point	42/66	64%
Would definitely join a trusted local collection drive	46/66	70%
Secure wiping: Yes or Maybe more willing to recycle	63/66	95%

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"Definitely" for a neighbourhood drive, and 63 (95%) selected Yes or Maybe regarding secure wiping. These results identify features worth testing; they do not predict a 70% turnout or prove a wiping intervention will change behaviour.

V. DISCUSSIONS

➢ *A Diverse Hidden Stock*

The estimated 717 items indicate that the sampled households hold a broad stock rather than a single stream of obsolete phones. Accessories alone account for a large share. This matters operationally because low-value, high-count items can be easy to ignore in trade-in programmes that concentrate on valuable devices. At the same time, phones and computers require more careful data handling and may be candidates for reuse or refurbishment. A credible collection design must therefore combine simple aggregation for accessories with device-specific triage for data-bearing equipment.

The estimate should not be confused with environmental impact. Item counts give a useful measure of household accumulation, but a cable, phone, laptop, and monitor have very different masses and material profiles. Without weighing, condition grading, and downstream records, the study cannot estimate tonnes diverted, metals recovered, emissions avoided, or hazardous content managed.

➢ *Retained Utility Before Ignorance*

The leading reported barrier—backup or future use—suggests that many respondents do not see stored devices as valueless. This resembles the hibernation described by Wilson et al. (2017), although the present evidence covers households and multiple categories in a different country. The practical implication is not that every stored device should immediately be recycled. A better intervention should help households make a decision: retain for a defined purpose, securely reuse or donate if functional, repair or refurbish when worthwhile, and recycle when the item is genuinely unwanted or non-functional.

Only 11 households selected lack of awareness as a barrier, yet 42 did not know a formal local facility. These are not contradictory measures. A respondent can understand the principle of special disposal while lacking actionable local information. The contrast supports the term awareness–access gap: broad knowledge is present, but the final steps—where, when, through whom, and with what proof—remain unclear. This interpretation is consistent with Indian research emphasising perceived behavioural control and convenience (Borthakur & Govind, 2018; Dwivedy & Mittal, 2013), but it remains a descriptive inference from two survey items rather than a statistically tested relationship.

➢ *Trust, Privacy, and the Limits of Stated Willingness*

Data or privacy concerns were selected by 23 households, while almost the entire sample answered Yes or Maybe to secure wiping. The survey does not reveal whether the same respondents gave both answers, because row-level cross-tabulation is unavailable. It is therefore inappropriate to state that privacy concern caused willingness. The safer conclusion is that data assurance has broad stated relevance and should be included in a pilot.

"Secure wiping" must also be defined carefully. An RWA should not promise data destruction merely because devices are factory-reset or collected in sealed boxes. The partner should descri be its process, responsibility, treatment of locked or damaged devices, and form of confirmation. Households should receive pre-collection guidance on backup, account sign-out, removal of SIM and memory cards, and device reset, while recognising that recycler-side verification may still be needed. Patrao and Karnik's (2023) findings offer comparative support for treating privacy and backup use as serious barriers, not proof that one procedure is universally sufficient.

Finally, the 70% "definitely join" result measures intention under a described trusted local option. Actual participation can be lower because intentions compete with timing, inertia, household disagreement, or continued perceived value. A pilot is needed precisely to measure the conversion from stated willingness to observable handover.

➢ *Proposed RWA Intervention*

The evidence supports testing a small society-level model rather than claiming a completed solution. The proposed intervention is a one-day or weekend collection event organised by an RWA in partnership with a currently registered recycler or refurbisher. Its purpose is to reduce effort and uncertainty while generating verifiable records.

- *Stage 1: Verification and Scope*

Before publicity, organisers should verify the partner's current registration on the relevant CPCB system and document the legal entity name, registration identifier, accepted categories, transport arrangements, downstream facilities, and treatment of batteries. The RWA and partner should agree that reusable equipment will be separately assessed and that no item will be described as recycled until documentary confirmation exists. The accepted-items list should distinguish phones, computers, displays, wearables, accessories, and battery-containing products.

- *Stage 2: Household Decision Support*

A short pre-drive checklist should ask residents to sort items into: keep for a defined use; give to a family member; repair; sell/donate for verified reuse; or hand over for formal processing. This respects the survey's leading backup/future-use barrier rather than treating all storage as irrational. Publicity should answer four questions in plain language: what is accepted, where and when collection occurs, who receives the equipment, and what evidence will be provided.

- *Stage 3: Data Protection and Convenient Collection*

For phones, laptops, and tablets, residents should receive device-neutral preparation guidance: back up needed files, sign out of accounts, disable activation locks where appropriate, remove SIM and removable storage, and perform the manufacturer's reset procedure. The recycler should

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separately state whether it offers software-based sanitisation, physical destruction for failed drives,or another documented process. Collection should occur in a supervised lobby or through scheduled doorstep pickup for residents with mobility or transport constraints. Devices should not be left in an unattended open bin.

- *Stage 4: Chain of Custody and Reporting*

At handover, the team should record date, broad item category, count, optional condition, and a non-identifying household code. Data-bearing devices can receive a numbered receipt. The recycler should provide a collection acknowledgement, final category and weight statement, and any available data-destruction or recycling certificate. Public reporting should separate *collected*, *sent for reuse/refurbishment*, *sent for recycling*, and *residual disposal*. It should never convert collected weight directly into "mass recycled" without downstream evidence.

- *Evaluation Plan*

The pilot should be judged by observable indicators rather than promotional claims:

Table 4 Proposed Pilot Indicators

Dimension	Measure	Evidence
Reach	Households registered and households handing over at least one item	Registration and handover log
Conversion	Actual participating households divided by registered households	De-identified matched codes
Material flow	Counts and measured weight by category and route	Recycler acknowledgement/final report
Data assurance	Data-bearing devices receiving the agreed process	Device receipt and partner confirmation
Convenience	Post-drive rating of location, timing, and effort	Short anonymous survey
Trust	Share reporting that the process and downstream route were clear	Short anonymous survey
Equity/access	Doorstep pickups or assistance requests completed	Logistics log

A pre/post comparison could test whether residents' knowledge of a formal route improves, but any behavioural claim should be limited to observed participation in that society at that time. A single drive cannot establish lasting behaviour change.

VI. LIMITATIONS

This study has six main limitations. First, the convenience sample is small and not representative of Gurgaon. Apartment and RWA households are overrepresented, so results may be especially relevant to society-based interventions but less applicable to other housing types. Second, device counts are self-reported in ranges. Midpoint conversion creates transparent estimates, not exact inventories, and the open-ended category is top-coded at six.

Third, the study counts items, not mass, material value, toxicity, repairability, or working condition. No environmental benefit can be calculated from 717 alone. Fourth, responses are cross-sectional and self-reported. They can identify stated barriers and associations but cannot show that convenience, wiping, or awareness causes disposal. Fifth, willingness questions are hypothetical and may overpredict actual participation.

Sixth, the row-level anonymized workbook and dashboard were not included in the available project files. The reported summary could bechecked arithmetically, but duplicates, missingness, cross-variable consistency, and respondent-level relationships could not be re-analysed. This constraint is especially important for the privacy result: the paper cannot determine how many of the 23 privacy-concerned households are within the 63 Yes/Maybe wiping responses. Future work should preserve a de-identified row-level dataset, a codebook, exclusion log, and reproducible analysis sheet.

No collection drive, recycler partnership, secure wiping process, device refurbishment, recycling, mass diversion, or behaviour change has yet been verified. All such activities in this paper are proposed next steps.

VII. CONCLUSION

This pilot documents a substantial and varied stored-electronics stock within 66 surveyed Gurgaon households: an estimated 717 items, or 10.9 per household under the declared range conversion. The strongest result is not low general awareness. Ninety-four per cent knew that e-waste requires specialised disposal, yet 64% did not know of a formal local facility or drop-off point. Backup use, inconvenience, and privacy were the most frequently reported

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barriers, while neighbourhood collection and data assurance attracted high stated willingness.

The evidence supports a cautious practical conclusion. The next useful step is not another awareness message in isolation, nor a claim about all of Gurgaon. It is a documented RWA pilot that brings a verified formal route close to households, helps residents distinguish reuse from recycling, treats personal data seriously, and records what actually happens after collection. Such a pilot could test whether the awareness–access gap observed in this sample can be narrowed. Until it is conducted and audited, the intervention remains a proposal and the present findings remain a transparent description of a non-representative sample.

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➢ *Survey Domains*

The project summary indicates that the questionnaire covered the following domains. This appendix describes domains rather than reproducing question wording that was not available in the uploaded materials.

Domain	Variables or topics
Household context	Housing type; RWA or residential-society membership; other household characteristics collected by the instrument.
Stored-device inventory	Categorical ranges for phones; laptops/tablets; chargers/cables/power banks; earphones/headphones; smartwatches; TVs/monitors; and other electronic appliances.
Condition and duration	Whether devices were unused or stored; reported condition; duration of storage, including more than one year.
Past disposal behaviour	Previous routes used or considered for unwanted electronics.
Reported barriers	Backup/future use; inconvenience; data/privacy concerns; low perceived value; lack of awareness; emotional attachment; resale intent.
General awareness	Knowledge that e-waste requires specialised disposal rather than ordinary household-waste handling.
Local access knowledge	Awareness of a formal recycling facility or official drop-off point in Gurgaon.
Collection willingness	Stated likelihood of joining a trusted neighbourhood or RWA collection drive.
Data assurance	Whether certified or secure data wiping would make the respondent more willing, possibly more willing, or not more willing to recycle old phones and laptops.
Data protection	Removal of email addresses and timestamps from the analytical dataset, as stated in the project summary.

➢ *Data-Audit Record*

Check	Status	Finding
Category sum	Passed	120.5 + 69.5 + 194.0 + 135.0 + 68.0 + 35.5 + 94.5 = 717.0.
Mean calculation	Passed	717/66 = 10.8636, which rounds to 10.9.

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Check	Status	Finding
Headline percentages	Passed	62/66 = 93.94%; 42/66 = 63.64%; 46/66 = 69.70%; 63/66 = 95.45%.
Barrier percentages	Passed	All seven count/percentage pairs round correctly using *n* = 66.
Multiple-response logic	Passed	Barrier and device-category percentages may overlap; totals above 100% are expected.
Fractional devices	Explained	Half items are produced by coding 1–2 as 1.5 and do not represent physical fractions.
Open-ended range	Flagged	"More than 5" is assigned 6; high-count households may be understated.
Waste classification	Flagged/corrected	Stored devices retained for possible use are not automatically legally discarded e-waste.
Raw duplicate/missing-value audit	Not reproducible	The row-level anonymized workbook was not included in the available project upload.
Respondent-level cross-tabs	Not reproducible	Relationships among privacy concern, wiping willingness, facility awareness, and collection intention cannot be checked from summary totals alone.

➢ *Claim-to-Source Check and Source Verification*

Table 7 checks the principal factual and interpretive claims. "Supported with qualification" means the source supports the statement only within stated scope; it is not a weakness to be concealed but a boundary to preserve.

Table 7 Claim-to-Source Check

Claim	Source	Status	Qualification
Global generation was 62 billion kgin 2022; 22.3% formally collected/recycled	Baldé et al. (2024)	Verified	Global mass estimate; not comparable to this survey's item counts.
The 2022 Indian Rules took effect on 1 April 2023 and use an EPR framework	MoEFCC (2022)	Verified	Current activity must also check amendments.

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Claim	Source	Status	Qualification
India generated 1,397,955.59 tonnes in FY 2024–25; 70.71% was reported collected, dismantled, recycled, or disposed	PIB (2025), citing CPCB	Verified	Official method and wording preserved; not a Gurgaon estimate.
The sample contains an estimated 717 items and 10.9 per household	Primary survey summary (2026)	Supported with qualification	Arithmetic verified; row-level workbook unavailable.
Awareness, access, drive-willingness, and wiping values	Primary survey summary (2026)	Supported with qualification	Counts/percentages verified; self-reported and non-representative.
The sample displays an awareness–access gap	Primary survey summary plus literature	Analytical inference	Derived from two descriptive items; not a causal test.
Privacy and backup use can inhibit phone return	Patrao & Karnik (2023); Wilson et al. (2017)	Verified as comparative literature	Different national and demographic settings.
An RWA intervention will improve recycling behaviour	No completed intervention evidence	**Not claimed**	Presented only as a testable proposal.
Collection, wiping, recycling, and mass diversion have occurred	No completion evidence	**Not claimed**	Future reporting must require documentary proof.

➢ *Final Source-Verification Table*

Reference	Type	Verified URL or DOI
Baldé et al. (2024)	UN intergovernmental report	https://ewastemonitor.info/the-global-e-waste-monitor-2024/
Borthakur & Govind (2017)	Peer-reviewed review article	https://doi.org/10.1016/j.resconrec.2016.11.011
Borthakur & Govind (2018)	Peer-reviewed review/conceptual article	https://doi.org/10.1016/j.jclepro.2017.10.218
Borthakur & Govind (2019)	Peer-reviewed empirical article	https://doi.org/10.1080/09640568.2018.1429254
CPCB (2024)	Indian government regulatory webpage	https://cpcb.nic.in/rules-6/

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Reference	Type	Verified URL or DOI
District Administration Gurugram (n.d.)	Indian government district webpage	https://gurugram.gov.in/about-district/demography/
Dwivedy & Mittal (2013)	Peer-reviewed empirical article	https://doi.org/10.1016/j.envdev.2013.03.001
Hidden E-Waste survey (2026)	Unpublished primary dataset summary	No public URL/DOI; supplied private project document.
MoEFCC (2022)	Gazette notification / regulation	https://moef.gov.in/uploads/2022/11/E-Waste-Management-Rules-2022.pdf
MoEFCC (2026)	Indian government regulatory index	https://moef.gov.in/rules-regulations-3
MoHUA (2021)	Indian government policy report	https://mohua.gov.in/pdf/627b8318adf18Circular-Economy-in-waste-management-FINAL.pdf
Patrao & Karnik (2023)	Peer-reviewed empirical article	https://doi.org/10.1177/21582440231196757
PIB (2025)	Official parliamentary-answer release	https://www.pib.gov.in/PressReleasePage.aspx?PRID=2147876
Wilson et al. (2017)	Peer-reviewed empirical article	https://doi.org/10.1016/j.wasman.2016.12.023
World Health Organization (2021)	Intergovernmental health report	https://www.who.int/publications/i/item/9789240023901