

Circular Economy and E-Waste: A Consumer-Centric Investigation in the UAE

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ABSTRACT

The growing use of consumer electronics, combined with their increasingly short lifespans, has contributed to a significant rise in electronic waste (e-waste). This study examines how consumers' awareness of environmental consequences related to e-waste, together with perceived convenience factors such as the accessibility of nearby collection facilities, shapes their recycling intentions and actual behaviours. Drawing on prior literature, a conceptual framework and corresponding hypotheses were developed and empirically tested. Data were collected through a nationwide survey of consumers in the UAE, yielding 106 valid responses, and analysed using path analysis. The results indicate that both environmental awareness and perceived convenience positively affect individuals' intentions to recycle e-waste, although the effects are moderate. More importantly, recycling intention emerges as a strong predictor of actual recycling behaviour. These results highlight the importance of adopting a consumer-oriented perspective when designing policies and practical initiatives aimed at improving e-waste recycling outcomes.

KEYWORDS: E-waste recycling behaviour, Perceived convenience, Recycling intention, Intention–behaviour gap, UAE

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1. INTRODUCTION

Waste Electrical and Electronic Equipment (WEEE), generally referred to as e-waste, is now recognised as one of the fastest-growing waste streams globally (Forti et al., 2020; UNITAR, 2024). This growth is driven largely by the rapid diffusion of consumer electronics alongside increasingly short product lifecycles. As a result, the volume of discarded devices continues to rise at a pace that outstrips existing waste management systems. Recent estimates suggest that global e-waste generation has already surpassed 60 million tonnes annually, yet only a small proportion is formally collected and recycled (UNITAR, 2024). Projections indicate that this figure will continue to increase substantially over the coming decade, intensifying both environmental and economic pressures.

Improper disposal of e-waste presents serious environmental and public health concerns. Many electronic products contain hazardous substances

such as mercury, lead, cadmium, and arsenic, which can leach into soil and water systems when discarded in landfills (Parajuly et al., 2022; Garg et al., 2023). These toxic materials may subsequently enter food chains and water supplies, posing long-term health risks including neurological damage, respiratory issues, and cancer. Beyond these environmental impacts, inadequate recycling also results in the loss of valuable and finite resources, including gold, cobalt, and rare earth elements. Recent studies estimate that the economic value of recoverable resources embedded in global e-waste flows amounts to tens of billions of dollars annually (Forti et al., 2020; Parajuly et al., 2022). Consequently, improving e-waste management has become both an environmental requirement and an economic prospect.

Within this context, the circular economy has emerged as a key framework for addressing e-waste challenges. Unlike the conventional linear model of “take-make-dispose,” the circular economy advances resource

efficiency through reuse, repair, refurbishment, and recycling (Kirchherr et al., 2017; Gaur et al., 2023). Nonetheless, the successful operation of circular systems depends not only on technological innovation and regulatory frameworks but also on active participation from consumers. Individuals play a central role in determining how electronic products are used, stored, and ultimately disposed of. Their decisions directly influence whether materials are recovered or lost to landfill systems. Despite this, much of the existing literature has focused on technical and policy dimensions, with comparatively less attention given to consumer behaviour and its underlying drivers (Dhir et al., 2021; Parajuly et al., 2022).

Understanding consumer behaviour is therefore critical to improving e-waste management outcomes. Prior research suggests that factors such as environmental awareness, perceived convenience, and behavioural intentions are key determinants of recycling practices. However, empirical evidence remains fragmented, particularly in the context of high-income regions where consumption levels are high and waste generation is substantial. In the Middle East, and especially in the United Arab Emirates (UAE), e-waste generation per capita exceeds global averages, reflecting both high purchasing power and rapid technological adoption (Siddiqua et al., 2022). At the same time, the region has demonstrated a growing commitment to sustainability and circular economy initiatives, making it a relevant and timely context for investigation.

This study addresses these gaps by adopting a consumer-centric perspective to observe e-waste recycling behaviour in the UAE. Specifically, it investigates how environmental awareness and perceived convenience influence individuals' intentions to recycle, and how these intentions translate into actual behaviour. Based on this focus, the study pursues the following objectives:

- RO1: To assess consumers' environmental awareness related to e-waste.
- RO2: To examine the function of convenience in facilitating e-waste recycling.
- RO3: To analyse the relationship between recycling intention and actual behaviour.
- RO4: To develop and test a conceptual model linking awareness, convenience, intention, and behaviour.

By doing so, the study contributes to a more nuanced comprehension of the behavioural mechanisms underlying e-waste recycling. The findings are expected to support policymakers and practitioners in designing targeted interventions, particularly those aimed at reducing barriers to recycling and strengthening consumer engagement in circular economy practices.

2. LITERATURE REVIEW AND FRAMEWORK DEVELOPMENT

This section synthesises prior research to establish the theoretical and conceptual foundations of the study. It begins by examining the relationship between e-waste management and the circular economy, followed by a discussion of the consumer's role in recycling systems. Subsequently, established behavioural theories, including the Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), and Behavioural Reasoning Theory (BRT), are reviewed to explain recycling behaviour. These perspectives collectively inform the development of the conceptual framework and hypotheses.

2.1 Circular Economy and E-Waste Management

E-waste is no longer viewed solely as a waste stream but increasingly as a source of recoverable value that can be reintegrated into production systems. Contemporary research emphasises the role of recycling and material recovery in transforming e-waste into secondary resources, thereby reducing dependence on virgin materials (Forti et al., 2020; Parajuly et al., 2022; Harun et al., 2025). Within this setting, the circular economy provides a structured approach for closing material loops and minimising waste generation. Unlike the traditional linear model characterised by extraction, production, and disposal, the circular economy prioritises resource efficiency through strategies such as remanufacturing, repair, reuse, refurbishment, and recycling (Kirchherr et al., 2017; Gaur et al., 2023). These practices seek to extend product lifecycles and retain material value within the system. However, achieving this transition requires coordination across multiple stakeholders, including manufacturers, retailers, recyclers, and consumers. Recent industry examples demonstrate how firms are incorporating circular philosophy into product design and supply chains, particularly through repairability, modular design, and the use of recycled inputs (Gaur et al., 2023). Among available waste management strategies, recycling is widely recognised as the most viable option for e-waste, specifically when compared to landfill disposal, which poses significant environmental risks (Parajuly et al., 2022). Nevertheless, the effectiveness of these systems depends heavily on the consistent return of end-of-life products into formal recycling channels.

2.2 Consumers' Role in E-Waste Recycling

The transition towards a circular economy places increasing emphasis on the role of consumers as active participants in resource recovery systems. Unlike traditional waste management approaches, circular systems depend on consumers to return products after use, enabling materials to re-enter production cycles (Parajuly et al., 2022). As such, consumer behaviour becomes a critical determinant of whether recycling systems function effectively. Recent studies highlight

the need for consumer-centric approaches in e-waste management, particularly in identifying how individuals make decisions about disposal, storage, and recycling (Dhir et al., 2021). Awareness of environmental impacts, accessibility of recycling options, and motivational factors all influence participation in recycling activities. While earlier research established the importance of environmental concern, more recent work implies that awareness alone is inadequate without supporting infrastructure and incentives (Garg et al., 2023). Empirical studies have identified several key predictors of e-waste recycling behaviour. Among these, environmental awareness, perceived convenience, and behavioural intention consistently emerge as significant factors (Dhir et al., 2021; Parajuly et al., 2022). Environmental awareness reflects individuals' perception of the consequences of improper disposal, while perceived convenience relates to the ease of accessing recycling services. Behavioural intention, in turn, represents the immediate precursor to actual behaviour. Despite this, gaps remain in understanding how these factors interact, particularly in high-consumption contexts such as the Middle East.

2.3 Theoretical Foundations of Consumer Behaviour

E-waste recycling is not a passive activity but requires deliberate effort, including sorting, storing, and transporting discarded devices. Consequently, behavioural theories have been widely applied to explain why individuals choose not to engage or engage in recycling habits. The TRA provides one of the earliest bases for understanding behavioural intention, suggesting that behaviour is determined by attitudes and subjective norms (Ajzen & Fishbein, 1980). Its simplicity and predictive capability have made it a widely used model in environmental behaviour research. However, TRA assumes that individuals have full control over their actions, which may not always hold in the context of recycling.

To address this limitation, the TPB extends TRA by integrating perceived behavioural control, which reflects the perceived ease or difficulty of performing a behaviour (Ajzen, 1991). This addition is particularly relevant in recycling contexts, where external constraints such as lack of facilities or time may limit action. TPB has been extensively used in studies examining e-waste recycling behaviour across different populations (Islam et al., 2021; Mohamad et al., 2022). More recently, BRT has been introduced to provide a deeper understanding of the motivations underlying behaviour. Unlike TRA and TPB, BRT considers both "reasons for" and "reasons against" engaging in a behaviour, offering a more nuanced perspective on decision-making (Westaby, 2005; Sahu et al., 2020). This is particularly useful in explaining inconsistencies between intention and actual behaviour, a phenomenon frequently observed in recycling studies.

2.4 Hypotheses Development and Conceptual Framework

Drawing on the theoretical perspectives discussed above, this study focuses on three key constructs that affect e-waste recycling behaviour: environmental awareness, perceived convenience, and recycling intention, as shown in **Figure 1**. These constructs are integrated into a conceptual framework that explains how behavioural intention mediates the relationship between antecedent factors and actual behaviour.

2.4.1 Environmental Awareness and E-Waste Recycling Intention

Environmental awareness refers to the extent to which individuals understand the environmental and health consequences linked with improper e-waste disposal. This includes knowledge of toxic components in electronic devices, as well as recognition of the environmental benefits derived from recycling practices. From the perspective of e-waste, awareness functions as a cognitive trigger that shapes pro-environmental attitudes and influences decision-making. Prior studies generally report a positive relationship between environmental awareness and recycling intention. Individuals who are more informed about environmental risks are more likely to express willingness to engage in responsible disposal behaviours, including recycling (Dhir et al., 2021; Parajuly et al., 2022). This aligns with behavioural theories such as the TPB, which suggest that beliefs about outcomes influence behavioural intentions (Ajzen, 1991). Nevertheless, the empirical evidence is not completely consistent. Some studies indicate that awareness alone does not always translate into intention, particularly when structural obstacles or competing priorities are present (Ahanger et al., 2023). Despite these inconsistencies, environmental awareness remains a foundational factor in shaping pro-environmental intentions. It provides the informational basis upon which individuals evaluate the consequences of their actions. Therefore, it is reasonable to expect that higher levels of awareness will be associated with stronger intentions to recycle e-waste.

H1. Environmental awareness of e-waste consequences positively influences consumers' intention to recycle e-waste.

2.4.2 Perceived Convenience and E-Waste Recycling Intention

Perceived convenience reflects an individual's assessment of how easy it is to take part in e-waste recycling activities. It encompasses practical considerations such as the availability of collection points, proximity to recycling facilities, access to relevant information, and the time and effort required to dispose of electronic waste. In behavioural terms, convenience represents a situational factor that can either facilitate or constrain action. Existing research consistently highlights convenience as a key

determinant of recycling behaviour. When recycling systems are accessible and require minimal effort, individuals are more likely to form positive intentions and participate in recycling activities (Sidique et al., 2010; Parajuly et al., 2022). Conversely, limited infrastructure, long distances to drop-off points, and a lack of clear information can discourage participation, even among individuals with strong environmental concerns. This suggests that convenience plays a critical role in translating motivation into actionable intention. Nevertheless, findings across studies are not entirely uniform. Some research reports weaker or insignificant effects of convenience, indicating that its influence may vary depending on contextual factors such as local infrastructure and policy support (Garg et al., 2023). Despite this variation, the overall evidence supports the view that reducing effort and increasing accessibility can enhance recycling intentions.

H2. Perceived convenience of e-waste recycling positively influences consumers' intention to recycle e-waste.

2.4.3 E-waste Recycling Intention and Actual Recycling Behaviour

Recycling intention refers to an individual's readiness or willingness to participate in e-waste recycling in the future. Within established behavioural frameworks such as the TRA and the TPB, intention is positioned as the most immediate and significant predictor of actual behaviour (Ajzen, 1991). In this context, intention exhibits the extent to which individuals are committed to performing recycling actions, such as returning, donating, or properly disposing of electronic devices. Empirical research consistently demonstrates a positive relationship between intention and behaviour in environmental contexts. Individuals who express strong intentions to recycle are generally more likely to translate those intentions into actual recycling practices (Islam et al., 2021; Mohamad et al., 2022). However, this relationship is not always perfectly aligned. Prior studies have identified an "intention-behaviour gap," where individuals with positive intentions fail to act due to external barriers such as inconvenience, lack

of infrastructure, or competing priorities (Parajuly et al., 2022). Despite these limitations, intention remains the most robust predictor of behaviour within behavioural models. It captures both motivational and attitudinal readiness to act, making it a critical link between psychological factors and observable outcomes. Therefore, a positive relationship between recycling intention and actual behaviour is expected.

H3. Consumers' e-waste recycling intention will positively impact their actual e-waste recycling behaviour.

3. METHODOLOGY

This study employed a quantitative study to scrutinize the relationships among environmental awareness, perceived convenience, recycling intention, and actual e-waste recycling behaviour. The survey instrument was established based on established measures from prior studies to ensure content validity and consistency with existing literature (Kochan et al., 2016; Wang et al., 2016; Mohamad et al., 2022). The questionnaire consisted of four main constructs: environmental awareness (EA), perceived convenience (PC), recycling intention (EI), and recycling behaviour (EB). Each construct was measured using multiple items adapted from previous research, with minor modifications to reflect the context of e-waste recycling. **Table 1** summarises the scale items.

A five-point Likert scale was employed to capture respondents' opinions, ranging from 1 (strongly disagree) to 5 (strongly agree). On top of the structured items, the survey included demographic questions and a small number of open-ended questions to capture deeper insights into respondents' recycling practices and motivations. Data were collected through an online survey administered via Qualtrics using a convenience sampling approach. The survey was distributed across the UAE, targeting adult consumers with regular exposure to electronic products. A total of more than 150 responses were initially obtained. After screening for inadequate or invalid entries, 106 responses were retained for analysis.

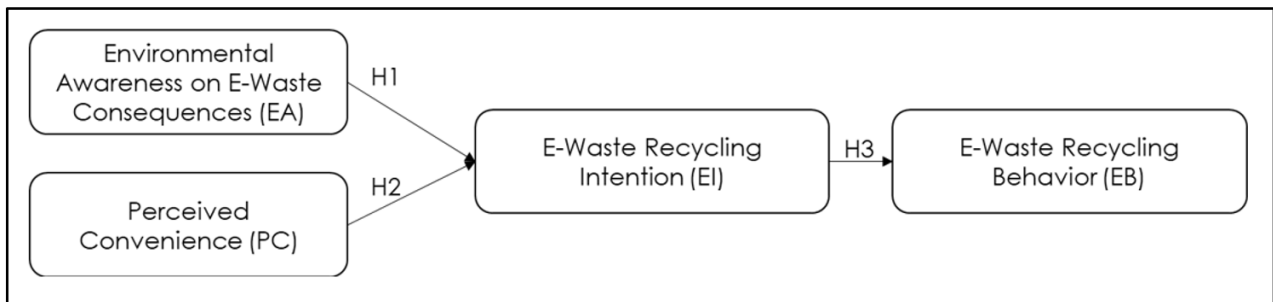


Figure 1: Research model

Table 1: Constructs and scale items

Measurement Items	Literature Source
<i>Environmental Awareness (EA)</i>	
E-waste recycling conserves energy	Mohamad et al. (2022)
E-waste recycling preserves natural resources	Kochan et al. (2016); Mohamad et al. (2022)
E-waste recycling reduces pollution	Kochan et al. (2016); Mohamad et al. (2022)
E-waste recycling reduces the use of landfills	Kochan et al. (2016); Mohamad et al. (2022)
E-waste protects human health	Mohamad et al. (2022)
<i>Perceived Convenience (PC)</i>	
It is easy for me to go to an e-waste recycling centre	Wang et al. (2016); Kumar et al. (2021)
It is easy for me to find information on e-waste recycling	Kumar et al. (2021)
It is easy for me to find time to recycle e-waste	Kumar et al. (2021)
I have enough space to store the materials for recycling	Kochan et al. (2016); Kumar et al. (2021)
<i>E-waste Recycling Intentions (EI)</i>	
I intend to recycle e-waste regularly	Kochan et al. (2016); Mohamad et al. (2022)
I intend to drop off e-waste at a nearby recycling station	Kochan et al. (2016); Mohamad et al. (2022)
I intend to return e-waste to the retailer or the manufacturer	Kochan et al. (2016); Mohamad et al. (2022)
<i>E-waste Recycling Behaviour (EB)</i>	
I donate e-waste	Kochan et al. (2016); Mohamad et al. (2022)
I resell e-waste	Kochan et al. (2016); Mohamad et al. (2022)
I store e-waste for recycling	Kochan et al. (2016); Mohamad et al. (2022)

Descriptive statistics were used to summarise the demographic profile of the respondents, as displayed in **Table 2**. The sample included a relatively balanced gender distribution, with a slight majority of female respondents, and a broad representation across age groups and educational backgrounds. Most participants held at least a bachelor's degree, and household sizes varied across the sample. For data analysis, SPSS was employed for preliminary analysis, containing descriptive statistics and reliability assessment, while AMOS was employed to test the hypothesised relationships using path analysis. This approach was selected due to the study's sample size and the need to examine the direct relationships between constructs within the proposed conceptual model.

4. FINDINGS AND DISCUSSION

The results are presented in accordance with the study objectives, beginning with measurement reliability and descriptive statistics, followed by construct-level insights and hypothesis testing. To evaluate internal consistency, Cronbach's alpha values were determined for all constructs. As reported in **Table 3**, all values exceed the suggested threshold of 0.70, indicating acceptable

reliability. Environmental awareness shows the highest reliability ($\alpha = 0.88$), followed by perceived convenience ($\alpha = 0.81$), recycling intention ($\alpha = 0.79$), and recycling behaviour ($\alpha = 0.78$). The mean scores in **Table 3** also provide an initial indication of respondents' perceptions across the constructs, revealing noticeable variation between intention and actual behaviour.

Table 2: Respondent profile

Variable		Responses = 106	Percentage
Gender	Male	44	41.5%
	Female	62	58.5%
Age Group	18–24 years old	20	18.9%
	25–29 years old	28	26.4%
	30–39 years old	35	33.0%
	40–49 years old	14	13.2%
	Above 50 years old	9	8.5%
Education Level	High School / Diploma	21	19.8%
	Bachelor's Degree	49	46.2%
	Master's degree or above	31	29.3%
	Others	5	4.7%
Size of Household (Persons)	1–2	46	43.4%
	2–5	43	40.6%
	6–10	12	11.3%
	Above 10	5	4.7%

Table 3: Reliability and descriptive statistics

Construct	No. of items	Cronbach's Alpha	Mean ($\bar{x}$)	Standard Deviation (SD)
Environmental awareness (EA)	5	0.88	3.30	0.83
Perceived convenience (PC)	4	0.81	2.83	1.10
E-waste recycling intention (EI)	3	0.79	4.28	0.78
E-waste recycling behaviour (EB)	3	0.78	2.75	1.00

4.1 Environmental Awareness

As shown in **Table 3**, environmental awareness among respondents is moderate (mean = 3.30), suggesting that while participants possess some understanding of e-waste issues, this awareness is not particularly strong. This is notable given that a large proportion of respondents hold at least a bachelor's degree, indicating that general education does not necessarily translate into specific awareness of e-waste impacts. The qualitative responses presented in **Table 4** provide further insight into this finding. Respondents repeatedly highlighted a lack of knowledge about recycling processes, insufficient public information, and limited government guidance. Several comments emphasise the need for awareness campaigns and clearer

communication channels, particularly through digital platforms.

Table 4: Select respondents' insights on environmental awareness

Respondents Insight	Description
Insight 1	Increase awareness of the effects of e-waste on the environment and humans
Insight 2	Few people understand how to recycle electronic devices
Insight 3	There is an absence of guidelines and rules from the government on how to recycle e-waste
Insight 4	Need to advertise or educate people on how to recycle electronics properly
Insight 5	Spread awareness and educate consumers on how and why they should dispose of electronics properly
Insight 6	Make social media announcements on e-waste recycling because many people do not know that we can recycle electronic devices

These findings reinforce earlier research suggesting that awareness gaps remain a key issue in e-waste management. More importantly, they indicate that awareness is not only about understanding environmental harm but also about knowing how and where to recycle.

4.2 Perceived Convenience

Perceived convenience records the lowest mean among the constructs (mean = 2.83), as shown in **Table 3**, indicating that respondents generally find e-waste recycling inconvenient. This result signals the presence of practical barriers that limit participation. The qualitative evidence in **Table 5** supports this interpretation. Respondents frequently mentioned the absence of nearby drop-off points, limited infrastructure, and the effort required to access recycling facilities. Some also pointed out the lack of repair and service centres, suggesting that disposal often becomes the default option when devices are no longer functional.

Taken together, these findings highlight that convenience is closely tied to infrastructure availability. When recycling systems are not embedded within daily routines, even motivated individuals may choose not to participate.

4.3 E-Waste Recycling Intentions

In contrast to awareness and convenience, recycling intention is relatively high (mean = 4.28), as indicated in **Table 3**. This suggests that respondents are generally willing to engage in recycling activities. Participants reported several intended behaviours, including donating functional devices, reselling electronics, and participating in trade-in programs. These preferences indicate that respondents favour options that either extend product life or provide some form of return value. The high level of intention suggests that motivational

factors are not the primary constraint. Instead, it points to a disconnect between willingness and actual behaviour, which becomes more evident in the following section.

Table 5: Select respondents' insights on perceived convenience

Respondents Insight	Description
Insight 1	Build a convenient way for people to dispose of them without taking a huge effort
Insight 2	Provide a more accessible area to drop off damaged devices
Insight 3	Recycling locations should be in every area, like the building I live in right now, which does not have a recycling bin. It should be implemented in all areas
Insight 4	There must be reliable repair shops and service centres for all electronic devices
Insight 5	There are not enough nominated locations for dropping off electronic waste
Insight 6	E-waste drop-off points are extremely far from my home

4.4 E-Waste Recycling Behaviour

Despite strong intentions, actual recycling behaviour remains low (mean = 2.75), as shown in **Table 3**. This contrast highlights a clear intention-behaviour gap. Rather than disposing of e-waste immediately, many respondents reported storing unused devices at home. This behaviour suggests that individuals are waiting for more convenient or beneficial opportunities to recycle. The barriers contributing to this gap are further illustrated in **Table 6**. Respondents identified several key issues, including the lack of financial incentives, limited trade-in benefits, and concerns regarding data security. In particular, fears about personal data misuse appear to discourage participation in formal recycling channels.

Table 6: Select respondents' insights on impediments to recycling behaviour

Respondents Insight	Description
Insight 1	If companies offer deductions on new products in exchange for old ones, this encourages people to return their devices to manufacturers
Insight 2	Tech companies should pay more for trade-in options when a customer wants to buy a new device
Insight 3	More rewards from retailers when exchanging old devices for new ones
Insight 4	I am not convinced how recycling companies will ensure my data is not misused

These findings indicate that behavioural constraints are largely structural rather than attitudinal. Consumers are willing to recycle, but existing systems do not sufficiently support action.

4.5 Hypotheses Test Results

Path analysis was conducted to scrutinise the relationships

between the constructs, with the results summarised in **Table 7**. All three hypotheses are supported, indicating statistically significant relationships among the variables.

Table 7: Hypotheses results

Hypothesis	Standardized Coefficients (β)	t-statistic	p-value	Result
H1: EA→EI	0.382	3.782	0.000***	Supported
H2: PC→EI	0.402	3.808	0.000***	Supported
H3: EI→EB	0.671	3.315	0.001**	Supported

4.5.1 Environmental Awareness and E-Waste Recycling Intention (H1)

The outcome indicates that environmental awareness has a positive and statistically significant effect on recycling intention ($\beta = 0.382$, $p < 0.001$), as shown in **Table 7**, thereby supporting H1. This suggests that individuals who possess a clearer understanding of the environmental and health consequences correlated with improper e-waste disposal are more likely to express a willingness to engage in recycling practices. This finding is associated with a prior study, which consistently discovers environmental awareness as a key antecedent of pro-environmental intentions (Dhir et al., 2021; Parajuly et al., 2022). From a theoretical perspective, this relationship is upheld by the TPB, where beliefs about environmental outcomes shape attitudes and, subsequently, behavioural intentions (Ajzen, 1991). Individuals who recognise the risks of toxic substances and the benefits of resource recovery are more likely to evaluate recycling as a meaningful and necessary action. However, the strength of the relationship is moderate rather than strong. This indicates that awareness alone does not fully account for variations in intention. Similar observations have been reported in recent studies, which suggest that awareness must be complemented by enabling conditions such as accessibility and incentives to translate into stronger behavioural commitment (Garg et al., 2023). In the present study, the moderate level of awareness observed in **Table 3** further reinforces this point, highlighting the need for targeted educational efforts that move beyond general environmental messaging towards practical and actionable knowledge.

4.5.2 Perceived Convenience and E-Waste Recycling Intention (H2)

Perceived convenience demonstrates a positive and significant relationship with recycling intention ($\beta = 0.402$, $p < 0.001$), as reported in **Table 7**, supporting H2. The coefficient is slightly higher than that of environmental awareness, suggesting that convenience plays a comparatively stronger role in affecting individuals' intentions to recycle e-waste. This finding is coherent with existing literature, which emphasises the importance of situational factors in influencing pro-environmental behaviour (Sidique et al., 2010; Parajuly et al., 2022). When recycling processes are perceived

as accessible, time-efficient, and easy to perform, individuals are more likely to form positive intentions. Conversely, when barriers such as distance to collection points, lack of infrastructure, or unclear procedures are present, intention may weaken despite positive attitudes. The qualitative responses presented earlier in **Table 5** provide further support for this relationship. Respondents repeatedly indicated that increased availability of drop-off locations and more convenient systems would directly encourage their participation. This reflects the role of perceived behavioural control, as proposed in TPB, where individuals are more likely to intend to perform a behaviour if they believe it is within their capability (Ajzen, 1991). While some studies report mixed results regarding the influence of convenience, recent evidence suggests that its importance becomes more pronounced in contexts where infrastructure is underdeveloped (Garg et al., 2023). In such settings, improving convenience may serve as a critical lever for strengthening recycling intentions.

4.5.3 E-Waste Recycling Intention and Actual Behaviour (H3)

The relationship between recycling intention and actual behaviour is found to be convincing and statistically significant ($\beta = 0.671$, $p < 0.001$), as shown in **Table 7**, thereby supporting H3. This indicates that individuals who express a higher intention to recycle are substantially more likely to participate in actual recycling behaviour. This result is consistent with established behavioural theories, particularly the TRA and the TPB, which identify intention as the most immediate predictor of behaviour (Ajzen, 1991). Empirical studies from the perspective of e-waste and general recycling behaviour have similarly reported strong intention-behaviour links, reinforcing the central role of intention in behavioural models (Islam et al., 2021; Mohamad et al., 2022). However, when considered alongside the descriptive findings in **Table 3**, an important nuance emerges. Despite the strong relationship, the overall level of actual recycling behaviour remains relatively low compared to intention. This suggests the existence of an intention-behaviour gap, where individuals fail to act on their intentions due to external constraints. Previous research has identified factors such as lack of infrastructure, insufficient incentives, and concerns about data security as key barriers preventing behavioural execution (Parajuly et al., 2022). In the present study, these barriers are also reflected in the qualitative responses presented in **Table 6**. Therefore, while intention remains a strong predictor, it is not adequate on its own. Addressing structural and contextual constraints is essential to ensure that positive intentions are effectively translated into actual recycling behaviour.

5. CONCLUSION

The rapid growth of e-waste continues to pose significant

economic, environmental, and social challenges on a global scale. Recent estimates indicate that global e-waste may exceed 70 million tonnes annually within the next decade, intensifying pressures on existing waste management systems. Beyond environmental degradation, improper disposal leads to the loss of valuable materials and exposes communities to hazardous substances. Despite these risks, formal recycling rates remain low, highlighting a persistent gap between the scale of the problem and the effectiveness of current solutions. This study adds to the e-waste literature by adopting a consumer-centric perspective to examine recycling behaviour in the UAE. In doing so, it responds to the limited empirical attention given to consumer decision-making in high-income Middle Eastern contexts. The findings demonstrate that both environmental awareness and perceived convenience play important roles in shaping recycling intention, while intention itself serves as a strong predictor of actual behaviour. However, the results also reveal a clear intention-behaviour gap, where high willingness to recycle does not translate into consistent action. This gap suggests that structural constraints, rather than attitudinal factors alone, remain the primary barrier to effective e-waste management.

From a theoretical standpoint, the study integrates constructs derived from TRA, TPB, and BRT to explain the relationships between awareness, convenience, intention, and behaviour. The empirical support for all proposed hypotheses reinforces the relevance of behavioural models in understanding recycling practices. At the same time, the findings highlight the limitations of intention-based models when external barriers are present, suggesting the need to incorporate contextual and infrastructural factors into future frameworks. The policy implications are particularly relevant for the UAE, where sustainability initiatives have gained increasing prominence. While raising public awareness remains important, the findings indicate that awareness alone is insufficient. Greater emphasis should be placed on improving the accessibility and convenience of recycling systems. This includes expanding collection infrastructure, integrating recycling points into residential and public spaces, and ensuring that recycling processes are straightforward and visible. In addition, concerns related to data security should be addressed through clear communication and secure handling practices, as these concerns were identified as a barrier to participation.

For industry practitioners, the results point to tangible opportunities to enhance consumer participation through incentive-based mechanisms. Trade-in programs, financial rewards, and buy-back schemes can encourage consumers to return end-of-life devices rather than store or discard them. Retailers and manufacturers also play a key role in providing

information on proper disposal and in facilitating circular practices such as repair, refurbishment, and reuse. The findings further suggest that digital platforms, particularly social media, can be leveraged to increase awareness and engagement. Notwithstanding its contributions, this study has some limitations. The use of a relatively small sample limits the generalisability of the findings, and the focus on a single country context may not capture variations across regions. In addition, the model considers only two antecedents of recycling intention, potentially overlooking other relevant factors such as subjective norms, attitudes, and economic considerations. Future research could extend this work by incorporating additional variables, examining demographic influences, and conducting comparative studies across different countries.

Overall, this study provides a clearer interpretation of the behavioural dynamics underlying e-waste recycling. The findings imply that advancing infrastructure and reducing practical obstacles may be more helpful than focusing solely on awareness. Addressing these structural challenges will be essential for translating consumer intention into sustained recycling behaviour and advancing circular economy objectives.

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