Cleaner and Responsible Consumption 17 (2025) 100264

Contents lists available at ScienceDirect

Cleaner and Responsible Consumption

journal homepage: www.journals.elsevier.com/cleaner-and-responsible-consumption

What propels the transition? Understanding push-pull-mooring influences on switching from improper E-waste handling to formal recycling

Muhammed Sajid [a,b], Myriam Ertz [b,*]

[a] Department of Economics and Finance, Birla Institute of Technology and Science, Pilani – Hyderabad Campus, Hyderabad, India
[b] LaboNFC, Canada Research Chair in Technology Sustainability and Society, Department of Economics and Administrative Sciences, University of Quebec at Chicoutimi, Saguenay, Quebec, Canada

ARTICLE INFO

Keywords:
Recycling
E-waste
Pro-environmental behavior
Government initiatives
Switching intention

ABSTRACT

This study investigates the factors influencing consumers' intentions to switch from improper handling to e-waste recycling. Utilizing the theoretical framework of Push-Pull-Mooring (PPM) theory, this research adopts a mixed-methods design. Initially, a qualitative study identifies the push, pull, and mooring factors affecting consumers' switching intentions. Subsequently, the second phase of the research develops and quantitatively tests a framework based on these findings using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicate that perceived environmental risk and climate change-related health risk perception are push factors in this context. Additionally, government initiatives are identified as pull factors, while perceived convenience is a mooring factor. This research significantly enriches the literature on e-waste recycling and offers practical insights for enhancing e-waste recycling initiatives in developing countries. The study's comprehensive approach provides a robust basis for understanding and promoting better e-waste management practices in similar contexts.

1. Introduction

E-waste differs markedly from conventional waste; it neither decomposes nor emits odors. Nonetheless, it poses significant environmental hazards due to its composition, which includes toxic substances such as lead, mercury, and cadmium (Arain and Neitzel, 2019). These elements can leach into the environment if not managed correctly, posing severe health and ecological risks. Recycling e-waste is essential as it prevents the release of these toxins and facilitates the recovery of valuable materials, such as precious metals and plastics (Ahirwar and Tripathi, 2021). Effective e-waste management requires stringent regulatory frameworks and significant behavioral changes among consumers to ensure high recycling rates and minimize the environmental impact of electronic waste (M. T. Islam et al., 2021a; Rene et al., 2021).

Due to the importance that effective e-waste management holds, research on e-waste recycling behavior is extensive, covering a range of influences from cognitive to affective variables (Bhutto and Ertz, 2023; Haj-Salem and Al-Hawari, 2021; Vijayan et al., 2023). Additionally, studies have investigated various other aspects such as situational factors (M. T. Islam et al., 2021b), barriers to adopting e-waste recycling (Sajid and Zakkariya, 2022), policy effectiveness (Pham et al., 2023), economic incentives (Shevchenko et al., 2019), and habitual influences (Aboelmaged, 2021). While these studies extensively explore motivators and inhibitors, they differ from inquiries into what specifically drives consumers to switch from improper handling of e-waste to adopting formal e-waste recycling methods. To date, no study has directly addressed these switching intentions.

Studying switching intentions provides a distinct perspective beyond just examining motivators and barriers (Tang et al., 2023; Tsai and Tang, 2023). This approach delves into the decision-making process that leads to actual behavioral change, focusing on why individuals shift from one specific behavior to another (Tang et al., 2023). This is particularly crucial in understanding how established behaviors are abandoned for new ones, capturing the complex interplay of psychological, social, and structural factors involved in making deliberate changes (Menidjel et al., 2023). In the context of e-waste recycling, studying switching intentions reveals what specifically prompts individuals to transition from improper disposal to formal recycling practices. Unlike traditional research focusing on why recycling is appealing or what obstacles prevent it (Dhir et al., 2021; Sajid and Zakkariya, 2022), this study pinpoints the triggers and processes necessary for a significant behavioral shift. For example, despite recognizing the benefits of e-waste recycling

* Corresponding author.
E-mail address: Myriam_Ertz@uqac.ca (M. Ertz).

https://doi.org/10.1016/j.clrc.2025.100264
Received 28 August 2024; Received in revised form 17 February 2025; Accepted 6 March 2025
Available online 7 March 2025

and understanding the barriers, an individual might persist with improper disposal due to inertia or convenience. Researching switching intentions can identify specific interventions (Tsai and Tang, 2023), such as convenient drop-off points or immediate rewards, that catalyze this change, offering actionable insights for designing successful e-waste management strategies.

To address this notable gap in the existing literature, this study employs the push-pull-mooring (PPM) framework (Kim, 2024), which is renowned for effectively examining switching intentions across various contexts (Nugroho and Wang, 2023; Yusfiarto et al., 2023a; Zhu et al., 2023). The PPM framework identifies three types of factors influencing an individual's decision to switch from one state to another. 'Push' factors are those negative aspects within the current situation that compel individuals to seek alternatives, such as dissatisfaction or deficiencies that drive them away (Kim, 2024). 'Pull' factors, on the other hand, are the appealing attributes of another option that attract individuals towards it, such as enhanced benefits or improved conditions (Nugroho and Wang, 2023). Distinctly, 'mooring' factors are the situational and personal constraints or facilitators affecting the decision to switch. These factors do not inherently drive or attract but instead stabilize or resist the movement between states (Kim, 2024; Nugroho and Wang, 2023).

Given the unexplored nature of switching intentions from improper handling of e-waste to formal e-waste recycling, this study adopts a mixed-method approach (Sajid et al., 2023). Furthermore, the adaptable nature of the PPM framework, which does not restrict constructs to a fixed set, further justifies the necessity of a mixed-methods approach for this investigation. In Phase 1, we identify the specific push, pull, and mooring factors through a focus group. Then, using the insights gained from this focus group, we develop a conceptual framework. In Phase 2, we test this framework quantitatively to validate the findings and enhance our understanding of the underlying processes.

This study offers significant theoretical and practical insights into e-waste management. By employing a mixed-method approach and the PPM framework, it provides a detailed understanding of the factors that influence the shift from improper e-waste handling to formal recycling. This methodology not only builds on traditional approaches but also introduces critical variables such as perceived environmental risk, perceptions of climate change-related health risks, government initiatives, incentive measures, and perceived convenience, enhancing the study's comprehensiveness.

Furthermore, the research broadens the application of the PPM framework in studies of pro-environmental behaviors, demonstrating its efficacy and adaptability. It also refines the conceptualization of mooring factors, particularly highlighting perceived convenience as a significant barrier to adopting e-waste recycling. These theoretical advancements contribute to a deeper understanding of the dynamics at play and inform the development of focused interventions aimed at promoting responsible e-waste management. Finally, the study delineates actionable steps that could improve e-waste recycling adoption, laying a robust groundwork for future initiatives in this vital field. These practical implications underscore the relevance of the PPM factors in fostering the uptake of e-waste recycling, marking a pivotal contribution to both academic research and environmental policy.

2. Theoretical background

2.1. Push-pull-mooring framework

The Push-Pull-Mooring (PPM) framework is a sophisticated theoretical model initially developed to understand human migration but has since been extensively validated in diverse domains such as hospitality (Chi et al., 2021), fintech (Yusfiarto et al., 2023a), retailing (Frasquet and Miquel-Romero, 2021), renewable energy technologies (Kushwah et al., 2024) and cloud computing (Mohd-Any et al., 2024). This model categorizes the factors influencing decisions into three groups—push factors, pull factors, and mooring effects—each playing a distinct role in the decision-making process (Mohd-Any et al., 2024). Unlike simpler binary decision models, the PPM framework introduces a third dimension, mooring effects, providing a deeper understanding of why decisions are or are not executed despite strong push and pull influences (Kushwah et al., 2024). This addition enriches the model, making it a robust tool for analyzing complex behavioral changes across various contexts.

2.1.1. Push effects

Push effects embody the negative aspects or pressures within the current condition that compel an individual to consider change (Chi et al., 2021). These are primarily dissatisfaction-driven factors that urge individuals away from their current state. For example, in the context of switching to mobile payments (m-payment), push factors might include perceived inefficiency, high perceived risk, and inadequate monetary value offered by current payment methods. These factors can drive consumers to consider m-payment alternatives (Yusfiarto et al., 2023a).

2.1.2. Pull effects

Conversely, pull effects are characterized by the attractive attributes of an alternative situation that draw individuals towards it. These factors are about the perceived benefits and advantages of a new opportunity, which make a change desirable (Frasquet and Miquel-Romero, 2021). For example, economic benefits and independence benefits can serve as pull factors in the context of adopting renewable energy technologies (Kushwah et al., 2024). These pull factors are crucial not just in attracting users to renewable energy solutions but also in sustaining their interest and commitment towards making a transition to more sustainable energy sources. Pull factors often reflect the perceived improvements in quality or value that a new option offers over the current state.

2.1.3. Mooring effects

Mooring effects play a distinct and critical role, setting them apart from push and pull effects (Zhou et al., 2024). Push effects are negative drivers that create dissatisfaction or discomfort with the current situation, motivating individuals to move away from it. Pull effects, on the other hand, are positive attractions that draw individuals toward a new opportunity or behavior. In contrast, mooring effects are neither inherently positive nor negative; instead, they act as contextual factors that either facilitate or hinder the transition between the current and new situations (Yusfiarto et al., 2023a). These effects do not directly motivate or dissuade individuals but rather influence their ability to act on the motivations created by push and pull factors. For example, mooring effects might include personal, social, or structural factors—such as perceived convenience, social norms, or access to resources—that determine how easily individuals can transition to the new behavior.

3. Research methods

3.1. Research design

In light of recent studies employing the PPM model (Kushwah et al., 2024; Perez-Castillo and Vera-Martinez, 2020) and considering the exploratory objectives of this research, the present study adopts a mixed methods design. Specifically, the investigation proceeds in two distinct phases. Phase 1 involves identifying the specific push, pull, and mooring factors through a focus group to unearth deep insights into these determinants. These insights then guide the development of a conceptual framework that encapsulates the dynamics observed. Subsequently, Phase 2 quantitatively examines this framework to validate the preliminary findings and deepen the understanding of the underlying processes. Detailed descriptions of each phase are provided in the subsequent sections, outlining the methodologies and analytical

strategies employed.

3.2. Phase 1: qualitative study

We initiated the qualitative study by engaging consumers directly outside major shopping malls in Cochin, an emerging city in India grappling with significant e-waste challenges. After securing participation from twenty-seven consumers, we scheduled individual interviews at times convenient for them, ensuring their willingness and availability to partake in the study.

Utilizing the responsive interviewing methodology (Rubin and Rubin, 2011), each session lasted between 19 and 24 min, and all interviews were recorded with the participants' explicit consent. The interviews were conducted non-evaluatively, encouraging a broad range of uninhibited responses from the participants. We concluded the interview phase by achieving data saturation after 21 interviews (Glaser and Strauss, 2017). We then conducted a detailed thematic analysis (Sajid et al., 2023). This analysis began with the transcription of recordings, followed by an in-depth engagement with the data to develop initial codes and identify emergent themes. Subsequently, these themes were reviewed, refined, defined, and named. The participant demographic included 12 males and 9 females, with an average age of 42.

To ensure coding reliability, we conducted a peer review of randomly selected transcripts among the researchers involved, achieving a high consensus (Galvin et al., 2015). Further validation was sought through consultations with seasoned academics and professionals in the field to assess the credibility of our findings. This analysis identified perceived environmental and climate change-related health risks as the key push factors. Government initiatives and incentive measures were recognized as the primary pull factors, with perceived convenience emerging as a significant mooring factor (See Table 1).

Table 1
Sample responses from in-depth interviews.

Category	Sample Responses
Perceived Environmental Risk	*"After watching a documentary about how discarded electronics can contaminate our rivers, I couldn't just throw away my gadgets anymore … "* *"Our neighbourhood lake has been deteriorating from pollution, and realizing that e-waste contributes was a wake-up call for me to act … "* *"I decided to start recycling when I learned about the toxic chemicals in electronics and their impact on our soil and water … "* *"Seeing electronics waste dumped near our community park made me feel responsible for the mess. It prompted me to recycle more conscientiously … "*
Climate Change-Related Health Risk Perception	*"The extreme heat last summer made me think about the impact of my old appliances, pushing me to look for a recycling center … "* *"I came across a study linking improper e-waste disposal to increasing health issues like respiratory problems, which made me reconsider my disposal habits … "* *"When my nephew started having breathing difficulties, I traced it back to environmental toxins, including those from improperly disposed electronics … "* *"Learning that e-waste contributes to global warming and health risks made me anxious about the future environment for my children … "*
Government Initiatives	*"A local government recycling drive at the community center really inspired me to participate and spread the word … "* *"The municipal corporation launched an awareness campaign on their website about e-waste management, which helped me understand its importance … "* *"At the annual city fair, volunteers at the e-waste booth explained how simple recycling electronics could be, motivating me to start … "* *"Our mayor highlighted the importance of e-waste recycling in her Independence Day speech, which encouraged me to take immediate action … "*
Incentive Measures	*"Finding out that I could exchange my old smartphone for a discount on a new one made recycling an obvious choice … "* *"The local recycling centre introduced a rewards program where you collect points for every device you bring in—it's turned into a useful savings option for family shopping … "* *"Recycling electronics at the designated centre now comes with a small cash reward, which feels like a win-win for doing the right thing … "* *"A new rebate initiative for recycling old gadgets was introduced in our area, which motivated me to actively participate … "*
Perceived Convenience	*"Dropping off my old batteries and phones at the recycling bin at the nearby metro station is so convenient on workdays, but on weekends it's out of my way, which sometimes makes me postpone recycling … "* *"Having an e-waste collection unit right within our apartment complex is great when I'm decluttering, but it's often so full that I can't always dispose of items promptly … "* *"The local NGO offers a home collection service for e-waste which is a lifesaver, but their pickup schedules are often irregular, making it hard to plan my disposals … "* *"The e-waste collection van that visits our locality every month is handy, but if you miss it, you have to wait another month, which can be a deterrent for those who want to dispose of their waste immediately … "*

3.3. Quantitative study

After the thematic analysis and review of existing literature, factors influencing behavior were organized under push, pull, and mooring categories based on the PPM framework. This classification underpins the development of hypotheses concerning the interactions among the constructs in the study's framework.

3.3.1. Hypotheses development

3.3.1.1. Push factors. Push factors motivate individuals to abandon existing practices (Yusfiarto et al., 2023a). In this study, these factors are associated with elements that discourage the improper handling of e-waste.

3.3.1.1.1. Perceived environmental risk. Perceived environmental risk refers to an individual's assessment of the potential harm their actions may cause to the environment (Weber et al., 2000). This perception is critical in influencing behaviors towards more sustainable practices (Yoon et al., 2021), such as formal e-waste recycling. The psychological mechanism starts with cognitive recognition of environmental hazards associated with improper e-waste disposal, such as contamination and resource scarcity. This awareness heightens the perceived severity and proximity of environmental risks, compelling individuals to reconsider their current practices (Sajid et al., 2023).

As individuals acknowledge these environmental risks, they become motivated to mitigate harm and protect environmental health (Kácha and Ruggeri, 2019; Mullins-Jaime and Wachter, 2023). This motivation often translates into a shift toward behaviors perceived as environmentally beneficial (Yoon et al., 2021). In the context of e-waste, individuals who perceive higher environmental risks are more likely to be driven to adopt recycling behaviors as a direct response to their concerns. This process indicates that the perception of a potential

environmental risk does not just raise awareness but actively propels individuals towards adopting pro-environmental behaviors, such as switching from improper disposal to formal e-waste recycling. This shift is necessary to reduce personal contributions to environmental degradation, fulfilling a self-directed role in environmental stewardship. Thus, we propose:

H1. Perceived environmental risk (push factor) is positively related to switching intention from improper handling of e-waste to the recycling of e-waste.

3.3.1.1.2. Climate change-related health risks. Climate change-related health risk perception is an individual's awareness and assessment of the potential adverse health outcomes associated with the impacts of climate change (Shen et al., 2024). This includes recognizing the increased risks of respiratory ailments, heat-related illnesses, and vector-borne diseases due to changing environmental conditions. These risks are perceived at both individual and community levels and can significantly influence behavioral intentions, including adopting sustainable practices like e-waste recycling (Berberian et al., 2022). The psychological mechanism driving this influence begins with an individual recognizing the link between climate change and its health implications. This awareness heightens perceived vulnerability—a personal sense of susceptibility to harm—which in turn elevates concern for personal and public health (Sun and Han, 2018).

As individuals connect these health risks to broader environmental issues, including those exacerbated by improper disposal of electronic waste, their motivation to engage in protective behaviors increases (Sajid et al., 2022). When improperly handled, E-waste contains hazardous substances that contribute to pollution and greenhouse gas emissions, further fueling climate change and its associated health risks (Beula & Sureshkumar, 2021; A. Islam et al., 2020). Thus, the perception of climate change-related health risks serves as a powerful motivator for individuals to switch from harmful disposal practices to formal recycling methods. This shift is driven by the desire to mitigate personal health risks and contribute to broader efforts to curb environmental impacts that influence public health. Therefore, it is proposed that:

H2. Climate change-related health risk perception (push factor) is positively related to switching intention from improper handling of e-waste to the recycling of e-waste.

3.3.1.2. Pull factors. Pull effects consist of elements that draw users towards alternative solutions (Yusfiarto et al., 2023a). For this study, such factors are linked to elements that encourage consumers to adopt e-waste recycling.

3.3.1.2.1. Government initiatives. Government initiatives such as community campaigns are crucial in educating the public about the importance and benefits of pro-environmental behaviors (Lin et al., 2022), such as recycling e-waste. These campaigns effectively increase awareness and knowledge (Sajid et al., 2023). By enhancing understanding, these initiatives help shift attitudes and intentions towards e-waste recycling. The campaigns underscore the direct benefits of recycling, such as environmental preservation and health safety, making the behavior more personally relevant and increasing motivational incentives for individuals to switch to proper e-waste management practices. Collectively, these government-driven strategies utilize regulatory pressure and informational outreach to facilitate a transition towards environmentally responsible behaviors, specifically in e-waste recycling. Hence, we postulate the following hypothesis:

H3. Government initiatives (pull factor) are positively related to switching intention from improper handling of e-waste to the recycling of e-waste.

3.3.1.2.2. Incentive measures. Incentive measures consist of strategies used to encourage individuals or organizations to participate in environmentally friendly activities by offering various rewards or benefits (Sajid et al., 2023). These interventions are designed to promote pro-environmental behavior, such as e-waste recycling. Monetary rewards directly appeal to extrinsic motivations (Liu, 2022), making the act of recycling financially beneficial. This principle of operant conditioning suggests that behaviors increase in frequency when followed by positive reinforcement, in this case, monetary gain (McLeod, 2015). Similarly, bonus points that can be exchanged for products tap into the reward system, providing a tangible return on the effort of recycling. This not only makes the process rewarding but also creates a habitual behavior as individuals associate e-waste recycling with immediate personal gain.

Furthermore, receiving an honorary title or environmental certificate appeals to intrinsic motivations by offering social recognition and self-fulfillment (Ezzine de Blas, 2021; Kácha and Ruggeri, 2019). Such acknowledgments enhance personal and social identity related to being environmentally responsible (Van der Werff et al., 2013), fostering a more profound, internalized commitment to recycling. Collectively, these incentives transform perceptions and behaviors by rendering recycling a more attractive, beneficial, and socially respected endeavor (Ertz et al., 2023). As such, they successfully promote a transition from improper disposal to proactive recycling of e-waste. Hence, we propose the following hypothesis:

H4. Incentive measures (pull factor) are positively related to switching intention from improper handling of e-waste to the recycling of e-waste.

3.3.1.3. Mooring factors. Mooring effects include factors that keep users attached to their existing solutions, even when push and pull factors are present (Yusfiarto et al., 2023a). We propose a direct negative link between the mooring factor (perceived convenience) and the intention to switch, as well as a negative moderating effect of the mooring factor on the relationship between push and pull factors and switching intention, consistent with prior studies using the PPM framework (Mohd-Any et al., 2024; Yusfiarto et al., 2023b).

3.3.1.3.1. Perceived convenience. Perceived convenience is the individual's belief about how easy and effortless a particular behavior is (Nadarajan et al., 2023), such as the disposal of e-waste. When improper disposal methods are perceived as more convenient than formal recycling options, this perception can significantly impede an individual's intention to switch to recycling (Sajid and Zakkariya, 2022). This deterrent arises because people naturally gravitate towards behaviors that minimize effort and maximize comfort, a tendency rooted in behavioral economics' concept of 'loss aversion'—the idea that individuals prefer avoiding losses (in this case, extra effort) over acquiring equivalent gains (such as the environmental benefits of recycling) (Novemsky and Kahneman, 2005).

The psychological mechanism is that perceived convenience creates a mental barrier to behavior change. According to cognitive dissonance theory, when there's a conflict between what people know they should do (recycle e-waste due to its environmental benefits) and what they find easiest to do (continue disposing of e-waste improperly due to convenience), they experience psychological discomfort (Harmon-Jones and Mills, 2004). To resolve this discomfort, individuals often justify their continued engagement in the more convenient behavior by downplaying the benefits of the alternative (recycling) or overestimating the effort involved in switching (DiGiacomo et al., 2018).

Moreover, perceived convenience may also moderate the influences of push and pull factors. For push factors like perceived environmental risk and climate change-related health risks, even high levels of risk perception can be overshadowed by the convenience of current practices. The urgent need prompted by these risks is mentally downgraded if switching behaviors are considered inconvenient (Sajid and Zakkariya, 2022). Similarly, pull factors such as incentive measures or government initiatives might offer rewards or simplify recycling. However, if these new methods are still seen as less convenient than existing practices, their effectiveness is significantly reduced.

Fundamentally, the easier and more comfortable the improper

disposal of e-waste is perceived to be, the stronger the psychological resistance to adopting more environmentally responsible but less convenient recycling methods (Sajid and Zakkariya, 2022). This psychological inertia thus plays a critical role in environmental behavior, showing how deeply embedded habits influenced by perceived convenience can override even well-recognized risks and rewards. Therefore, we put forward the following hypotheses:

H5. Perceived convenience (mooring factor) is negatively related to switching intention from improper handling of e-waste to the recycling of e-waste.

H6a. Perceived convenience negatively influences the positive relationship between perceived environmental risk and switching intention from improper handling of e-waste to the recycling of e-waste.

H6b. Perceived convenience negatively influences the positive relationship between climate change-related health risk perception and switching intention from improper handling of e-waste to the recycling of e-waste.

H6c. Perceived convenience negatively influences the positive relationship between government initiatives and switching intention from improper handling of e-waste to the recycling of e-waste.

H6d. Perceived convenience negatively influences the positive relationship between incentive measures and switching intention from improper handling of e-waste to the recycling of e-waste.

Drawing on earlier discussions and a thorough review of the literature, the conceptual framework for this study is outlined as follows (Fig. 1):

3.3.2. Measures

This study employed pre-validated scales, ensuring their psychometric properties were already well-established. We measured perceived environmental risk and climate change-related health risk perception using scales from Yoon et al. (2021) and Shen et al. (2024), respectively. We utilized scales from Sabbir et al. (2023) and Sajid et al. (2023c) to assess government initiatives and incentive measures. The scale for perceived convenience was derived from Nadarajan et al. (2023), and the scale for switching intention was taken from Yusfiarto et al. (2023b). After finalizing these scales, we consulted six domain experts—four academicians and two practitioners—to evaluate the clarity of the scales. Based on their feedback, we made minor adjustments to the questionnaire. Subsequently, we conducted a pilot study with 67 university students to further validate the psychometric properties of the scales, which yielded satisfactory results. The lowest Cronbach's alpha obtained in the pilot study was 0.752, significantly exceeding the conventional threshold.

3.3.3. Data collection

The target population for this study comprised Indian consumers, with data collected via Clickworkers.com, a micro-tasking platform widely used in consumer research (Sajid et al., 2023). Convenience sampling was employed to gather responses, a method commonly used in studies leveraging online platforms for data collection. The selection of Indian consumers as the target population is particularly relevant, as India faces significant challenges related to e-waste recycling, making it a critical context for understanding consumer behavior in this domain. Regarding generalizability, Clickworkers.com has been utilized in numerous recent Indian studies (Sajid et al., 2023; Surira et al., 2023, 2025), and its ability to provide a representative sample of the Indian population has been acknowledged in the literature.

Data collection occurred in July 2024. To enhance data quality, we implemented two attention-check questions and assured respondents that their responses would be used solely for academic purposes, maintaining confidentiality. Participants were also informed that there were no right or wrong answers. Out of 407 total responses, 31 were excluded due to incorrect answers to the attention check questions. Of the remaining 376 responses, 23 were removed due to extreme values or inappropriate responses.

The final sample included 353 respondents, with a median age of 38. The gender distribution was nearly even, with 51.3% male and 48.7% female. The educational level of most respondents was high, with 91.2% holding at least an undergraduate degree. Additionally, a significant portion of the sample, 67.9%, reported an annual income ranging from

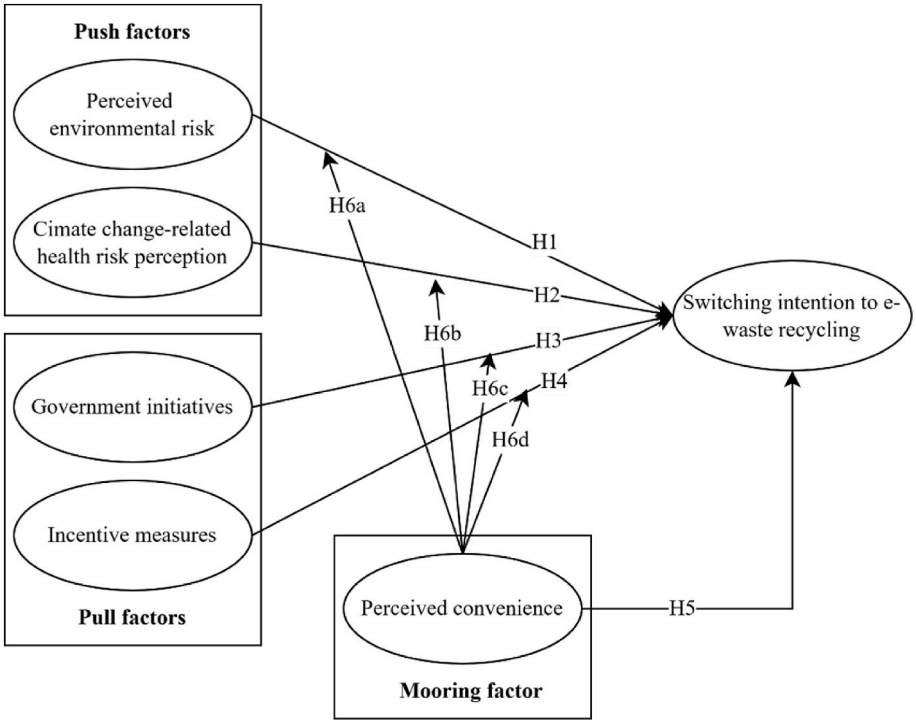

Fig. 1. Conceptual framework.

USD 2400 (INR 200,000) to USD 12,000 (INR 1,000,000).

3.3.4. Data analysis strategy

We utilized Partial Least Squares – Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0 for the analysis. This method was chosen due to its suitability for smaller sample sizes and flexibility concerning data normality (Hair et al., 2019). Since our sampling approach did not involve probability sampling, we could not ensure data normality. Consequently, PLS-SEM was deemed the most appropriate analytical technique for our study's conditions.

4. Results

4.1. Common method bias

The common latent factor method was implemented to address potential common method bias (CMB) (Afthanorhan et al., 2021). A new latent construct with a fixed variance of '1' was introduced into the confirmatory factor analysis model, encompassing all observed variables in the measurement model. To evaluate the impact of CMB, a comparative analysis of the standardized regression weights between models with and without the constraint was conducted. According to Afthanorhan et al. (2021), a deviation greater than 0.2 in these weights suggests the likelihood of CMB. The findings indicated that all observed differences were below this threshold, confirming the absence of significant CMB in the study.

4.2. Measurement model

The assessment of the measurement model adhered to the guidelines (Hair et al., 2019). Initially, indicator reliability was verified by examining item loadings, which should ideally exceed 0.70 (Hair et al., 2019). According to the results presented in Table 1, all item loadings surpass this threshold, confirming indicator reliability. Subsequently, internal consistency reliability was evaluated using Cronbach's alpha values, which are conventionally required to be greater than 0.60 for affirming internal consistency (Hair et al., 2019). As depicted in Table 2, these criteria are satisfied, indicating robust internal consistency reliability within the model.

Further analysis involved assessing the average variance extracted (AVE) to ascertain convergent validity. The AVE values should exceed 0.50 to confirm convergent validity (Hair et al., 2019), a condition that is met as shown in Table 2. Lastly, to evaluate discriminant validity, the HTMT ratio was analyzed. For robust discriminant validity, HTMT ratios must be below 0.85 (Henseler et al., 2015). The results, indicated in Table 3, confirm that all HTMT ratios fall below this threshold, substantiating the discriminant validity of the constructs.

Table 2
Reliability and convergent validity.

Construct	Items	Loadings	Alpha	AVE
Perceived environmental risk	PER1	0.849	0.771	0.682
	PER2	0.793		
	PER3	0.835		
Government initiatives	GI1	0.862	0.841	0.759
	GI2	0.893		
	GI3	0.857		
Climate change-related health risk perception	CHP1	0.831	0.743	0.661
	CHP2	0.822		
	CHP3	0.785		
Incentive measures	IM1	0.788	0.746	0.579
	IM2	0.657		
	IM3	0.828		
Perceived convenience	PC1	0.788	0.806	0.634
	PC2	0.854		
	PC3	0.816		
	PC4	0.721		
Switching intention to e-waste recycling	SI1	0.812	0.845	0.683
	SI2	0.795		
	SI3	0.849		
	SI4	0.848		

4.3. Structural model

The study tested five direct hypotheses using PLS-SEM and found support for four (Table 4). The analysis confirmed positive associations between perceived environmental risk and the intention to switch to e-waste recycling (H1), climate change-related health risk perception and this intention (H2), and government initiatives promoting the same (H3). A negative relationship between perceived convenience and the switching intention was also supported. However, the hypothesized negative impact of incentive measures on the intention to switch to e-waste recycling was not supported (H4; See Table 3). This lack of support for Hypothesis 4 could be attributed to the distinct socio-economic conditions prevalent in developing countries. Here, immediate economic needs and priorities may overshadow the potential effectiveness of incentive-based strategies. Typically, such strategies have shown more success in developed economies, where fundamental needs are generally already met. Moreover, the independent variables explain 61.40% variance in the dependent variable.

4.4. Moderating effects

The study explored four moderating hypotheses, focusing on two push factors and two pull factors regarding the intention to switch to formal e-waste recycling. The findings, illustrated in Table 5, Figs. 2 and 3, confirmed these hypotheses. Specifically, perceived convenience was found to reduce the strength of the positive effects of perceived environmental risk and climate change-related health risk perceptions on the intention to switch from improper handling of e-waste to formal recycling. These results are visually represented in Figs. 2 and 3, where the steepness of the slopes indicates that higher levels of perceived convenience weaken the positive relationship between these risks and recycling intentions. On the other hand, the hypotheses that perceived convenience would moderate the impact of pull factors on the intention to switch were not supported (Table 5).

5. Discussion

The primary objective of the present study was to identify factors influencing consumers' intention to switch from improper handling to e-waste recycling. Researchers developed and tested a research framework grounded in the PPM theory to achieve this. Conducted among Indian consumers, the study provided valuable insights into the behavioral drivers of e-waste recycling. In total, five direct hypotheses and four moderating hypotheses were examined.

H1 posited a positive relationship between perceived environmental risk (push factor) and the intention to switch to e-waste recycling. The results confirmed this hypothesis. A possible explanation for these findings is that heightened awareness of environmental risks associated with improper e-waste disposal motivates individuals to adopt recycling behaviors (Sajid et al., 2022). This shift likely occurs as individuals seek to mitigate the negative impacts their actions have on the environment,

Table 3
Discriminant validity (HTMT Ratios).

	CHP	GI	IM	SI	PC	PER
CHP						
GI	0.729					
IM	0.675	0.815				
SI	0.82	0.766	0.739			
PC	0.815	0.798	0.812	0.821		
PER	0.725	0.647	0.753	0.718	0.816	

Table 4
Results of hypothesis testing.

Hypotheses	Path	Beta	SD	T Statistics	P Values	Decision
H1	PER > SI	0.120	0.051	2.347	0.019	Supported
H2	CHP > SI	0.225	0.049	4.584	0.000	Supported
H3	GI > SI	0.187	0.049	3.825	0.000	Supported
H4	IM > SI	0.007	0.046	0.163	0.871	Unsupported
H5	PC > SI	−0.375	0.052	−7.200	0.000	Supported

Table 5
Results of moderation analysis.

Hypotheses	Path	Beta	SD	T Statistics	P Values	Decision
H6a	PER X PC > SI	−0.186	0.055	3.405	0.001	Supported
H6b	CHP X PC > SI	−0.134	0.058	2.301	0.022	Supported
H6c	GI X PC > SI	0.038	0.056	0.680	0.497	Unsupported
H6d	IM X PC > SI	0.065	0.054	1.203	0.229	Unsupported

aligning their behaviors with their environmental concerns (George et al., 2022; Surira et al., 2023).

Similarly, the second push factor, climate change-related health risk perception, also demonstrated a positive relationship with the switching intention (H2). A plausible explanation for this result is that as individuals become more aware of the health risks associated with climate change, such as increased respiratory issues or vector-borne diseases, their motivation to engage in pro-environmental behaviors like e-waste recycling intensifies (Berberian et al., 2022; Sun and Han, 2018). This awareness will likely compel them to take actionable steps to mitigate these health risks, thus fostering a stronger inclination towards environmentally responsible behaviors (EA et al., 2021; Su et al., 2021).

The third hypothesis, which proposed a positive relationship between the first pull factor, government initiatives, and the switching intention, was also upheld (H3). This outcome can be attributed to effective government campaigns and regulations that help establish and reinforce social norms around e-waste recycling (Galbiati et al., 2020; Sabbir et al., 2023). Such initiatives often raise public awareness about the environmental impacts of improper e-waste disposal, thereby cultivating a collective sense of responsibility and normative pressure to engage in environmentally friendly practices. As these norms become more entrenched in society, individuals are more likely to adopt recycling behaviors to align with perceived societal expectations (Sabbir et al., 2023; Sajid et al., 2023).

However, H4, which posited a relationship between incentive measures and switching intention, did not find support, contrary to Sajid et al. (2023). This discrepancy could be attributed to the distinct socio-economic context of the population in developing countries. In these regions, immediate economic needs and priorities might overshadow the effectiveness of incentive-based approaches (Spiteri and Nepal, 2006), which are often more successful in developed economies where basic needs are already met. Additionally, the infrastructure and logistical support for recycling in developing countries may not be as robust, reducing the perceived utility and attractiveness of incentives (Sajid and Zakkariya, 2022; Yigitcanlar et al., 2017). This context limits the direct impact of incentives on behavior change, as the incentives might not sufficiently address the more pressing barriers to adopting new behaviors like e-waste recycling.

Furthermore, H5, which suggested a negative relationship between perceived convenience and switching intention, was also supported. This outcome may be explained by the fact that when individuals perceive improper handling of e-waste as more convenient than formal recycling methods, their motivation to switch is diminished. Typically, convenience drives behavior, and if recycling processes are seen as less convenient compared to current practices, individuals are less likely to adopt them (Dhir et al., 2021; Sajid and Zakkariya, 2022). This resistance to change is particularly strong where recycling options are not readily accessible or require additional effort, leading to a preference for the more straightforward, albeit less environmentally friendly, disposal methods.

Moreover, H6a - H6d explored the moderating effect of the mooring factor, namely perceived convenience, on various push and pull factors. The results indicate that perceived convenience only negatively moderates the relationship between push factors (perceived environmental risk and climate change-related health risk perception) and switching

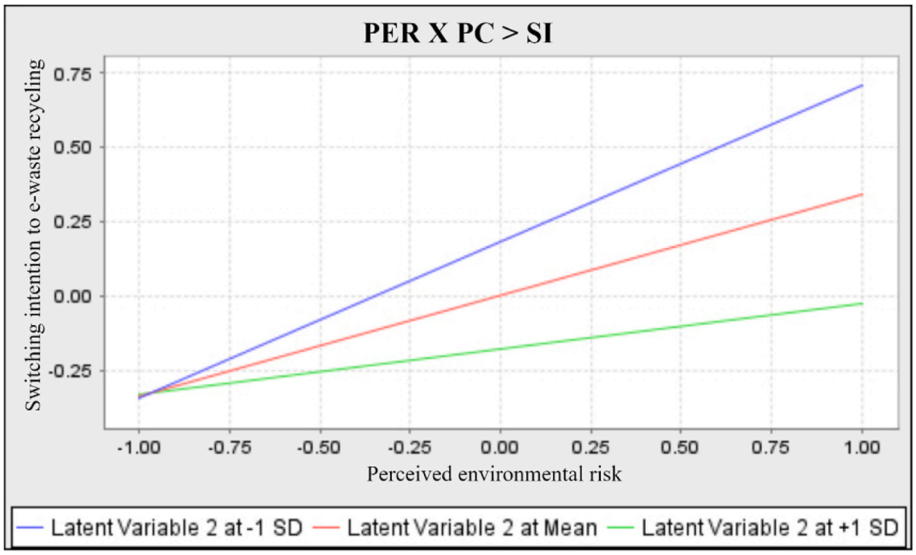

Fig. 2. Simple slope analysis for H6a.

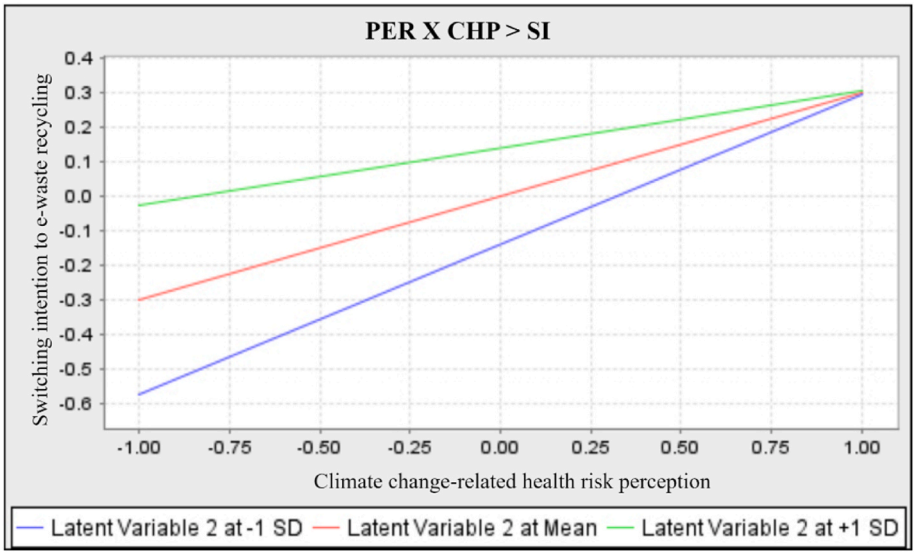

Fig. 3. Simple slope analysis for H6b.

intention. It does not moderate the relationship between pull factors (government initiatives and incentive measures) and switching intention. This outcome can be attributed to the inherent nature of convenience as a barrier to adopting behaviors that are perceived as more demanding or less accessible (Nadarajan et al., 2023; Vijayan et al., 2023). In the case of push factors, the urgency of environmental and health risks might compel action, but if recycling processes are seen as inconvenient, this urgency is dampened, reducing the likelihood of a behavior switch. Conversely, the pull factors, although beneficial, may not be compelling enough to overcome the convenience barrier if they do not directly address or alleviate the perceived inconvenience associated with recycling.

5.1. Theoretical contributions

This study represents a significant advancement in the field of e-waste recycling behavior research. Utilizing a mixed-method approach, it comprehensively examines the push, pull, and mooring factors affecting this specific behavioral change, thereby providing a more nuanced understanding of the dynamics within this domain. The application of the PPM framework in this study not only adheres to traditional methodologies but also innovates by incorporating distinct variables that are critical for understanding the transition from improper handling to recycling of e-waste.

Integrating unique factors such as perceived environmental risk, climate change-related health risk perception, government initiatives, incentive measures, and perceived convenience deepens the existing literature on consumer behavior regarding e-waste. These elements help elucidate the complex interplay of motivations and barriers influencing an individual's decision to adopt e-waste recycling. Particularly, the broadened application of the PPM framework in this research underscores its versatility and effectiveness in exploring pro-environmental behaviors, serving as a robust model for future studies in this area.

Moreover, this study enhances the conceptualization of mooring factors within the PPM framework by specifically addressing perceived convenience. We highlight the pivotal role of this factor—an external barrier—in adopting e-waste recycling. This finding emphasizes that perceived convenience, or the lack thereof, forms a significant hurdle in behavioral change. By extending the framework to include such mooring factors, this research offers valuable insights into the obstacles that deter individuals from engaging in environmentally responsible behaviors, thereby contributing to a richer theoretical understanding and providing a foundation for targeted interventions in e-waste management.

5.2. Practical implications

This study offers several practical implications that are critical for promoting effective e-waste recycling and for transitioning consumers from improper handling of e-waste to more sustainable practices. One of the pivotal findings is identifying perceived environmental risk and climate change-related health risk perception as significant push factors. This highlights the potential of targeted educational campaigns to motivate consumers to recycle e-waste. By effectively communicating the direct and indirect consequences of e-waste, including its impact on health and the environment, these campaigns can heighten awareness and foster a sense of urgency among the public. Implementing widespread educational initiatives illustrating the tangible benefits of proper e-waste disposal could significantly influence consumer behavior.

Moreover, the role of government initiatives as a pull factor underscores the importance of robust governmental involvement in e-waste management. This could manifest in several ways, such as developing more stringent e-waste management policies or establishing partnerships with the private sector to enhance recycling infrastructure. Such efforts could facilitate more accessible recycling options, thereby encouraging more consumers to participate. Government-led initiatives could also include public endorsements and promotions that help normalize and valorize e-waste recycling as a community practice, contributing to a cultural shift towards environmental responsibility.

Interestingly, the finding that incentive measures—traditionally considered effective pull factors—did not significantly influence switching intentions suggests that incentives alone may be insufficient to change consumer behavior in the context of e-waste recycling. This outcome indicates a need for a more nuanced approach, where incentives are economically appealing, contextually relevant, and aligned with consumers' values and immediate benefits. For example, incentives offering direct reductions in household waste disposal costs or providing tangible recycling rewards could be more compelling than generic incentives.

The study also illuminated the significant impact of perceived convenience on recycling behavior. Perceived inconvenience in the recycling process was found to be a substantial barrier, negatively influencing switching intentions and moderating the effect of push factors. This finding is crucial for designing interventions that aim to make recycling processes more user-friendly and integrated into daily routines. Strategies could include increasing the availability of local

recycling bins, simplifying the recycling process through clearer labeling and instructions, and perhaps incorporating recycling within community events and programs. Reducing the effort required to recycle and enhancing the convenience of engaging in this behavior can mitigate the negative impact of perceived inconvenience.

Finally, this research emphasizes the importance of considering the interplay between various behavioral factors when designing and implementing recycling programs. The interactions between perceived risks, government initiatives, incentive measures, and convenience reveal a complex web of influences that must be navigated to promote e-waste recycling effectively. Strategic, multi-faceted approaches collectively addressing these factors are likely more successful than initiatives focusing on single aspects.

5.3. Limitations and future research avenues

The study's limitations have implications for the validity of its findings, necessitating a careful consideration of how they might affect the interpretations made. While efficient for capturing data at a specific point in time, the use of a cross-sectional design limits our ability to infer causal relationships. This constraint may affect the internal validity as it prevents confirmation that one variable directly influences another. Future research employing longitudinal or experimental designs could provide more conclusive evidence of causality, thereby enhancing the study's internal validity.

Additionally, conducting the study within a developing country's context raises questions about external validity, particularly the generalizability of the findings to developed economies. Differences in infrastructure, consumer behavior, and regulatory frameworks between developing and developed countries could mean that the results may not be applicable elsewhere without modifications or additional contextual consideration. Future studies replicating this research in different settings could help verify the universality of the findings and extend its external validity.

Lastly, the omission of emotional factors in decision-making related to e-waste recycling overlooks potential psychological drivers that could influence behaviors significantly. This oversight might skew the understanding of consumer behavior dynamics, affecting the construct validity of the study. Including these emotional aspects in future research could provide a more comprehensive view of the factors that drive e-waste recycling, thus enriching the study's construct validity by ensuring that all relevant variables are considered.

CRediT authorship contribution statement

Muhammed Sajid: Writing – original draft, Visualization, Validation, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Myriam Ertz:** Writing – review & editing, Visualization, Supervision, Resources, Project administration, Investigation, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available upon request.

References

Aboelmaged, M., 2021. E-waste recycling behaviour: an integration of recycling habits into the theory of planned behaviour. J. Clean. Prod. 278 (124182). https://doi.org/10.1016/j.jclepro.2020.124182.

Afthanorhan, A., Awang, Z., Majid, N.A., Foziah, H., Ismail, I., Halbusi, H.Al, Tehseen, S., Afthanorhan, A., 2021. Gain more insight from common latent factor in structural equation modeling. J. Phys. Conf. 1793 (1). https://doi.org/10.1088/1742-6596/1793/1/012030.

Ahirwar, R., Tripathi, A.K., 2021. E-waste management: a review of recycling process, environmental and occupational health hazards, and potential solutions. Environ. Nanotechnol. Monit. Manag. 15. https://doi.org/10.1016/j.enmm.2020.100409.

Arain, A.L., Neitzel, R.L., 2019. A review of biomarkers used for assessing human exposure to metals from E-waste. Int. J. Environ. Res. Publ. Health 16 (10). https://doi.org/10.3390/ijerph16101802.

Berberian, A.G., Gonzalez, D.J.X., Cushing, L.J., 2022. Racial disparities in climate change-related health effects in the United States. Curr. Environ. Health Rep. 9 (3), 451–464. https://doi.org/10.1007/s40572-022-00360-w.

Beula, D., Sureshkumar, M., 2021. A review on the toxic E-waste killing health and environment-Today's global scenario. Mater. Today Proc. 47, 2168–2174. https://doi.org/10.1016/j.matpr.2021.05.516.

Bhutto, M.Y., Ertz, M., 2023. Exploring factors of e-waste recycling intention: the case of generation Y in Lithuania. PLoS One 18 (10).

Chi, M., Wang, J., Luo, X. Robert, Li, H., 2021. Why travelers switch to the sharing accommodation platforms? A push-pull-mooring framework. Int. J. Contemp. Hospit. Manag. 33 (12), 4286–4310. https://doi.org/10.1108/IJCHM-02-2021-0253.

Dhir, A., Koshta, N., Goyal, R.K., Sakashita, M., Almotairi, M., 2021. Behavioral reasoning theory (BRT) perspectives on E-waste recycling and management. J. Clean. Prod. 280 (124269). https://doi.org/10.1016/j.jclepro.2020.124269.

DiGiacomo, A., Wu, D.W.L., Lenkic, P., Fraser, B., Zhao, J., Kingstone, A., 2018. Convenience improves composting and recycling rates in high-density residential buildings. J. Environ. Plann. Manag. 61 (2), 309–331. https://doi.org/10.1080/09640568.2017.1305332.

EA, S., JCF, D.G., Ml, D., 2021. Impact of the COVID-19 pandemic on environmental awareness, sustainable consumption and social responsibility: evidence from generations in Brazil and Portugal. J. Clean. Prod. 286, 124947.

Ertz, M., Addar, W., Ouerghemmi, C., Takaffoli, M., 2023. Overview of factors influencing consumer engagement with plastic recycling. WIREs Energy Environ. 12 (6), e493.

Ezzine de Blas, D., 2021. Activating the intrinsic motivations of beneficiaries for longer lasting conservation and development projects. Perspective 56, 1–4. https://doi.org/10.19182/perspective/36389.

Frasquet, M., Miquel-Romero, M.J., 2021. Competitive (versus loyal) showrooming: an application of the push-pull-mooring framework. J. Retailing Consum. Serv. 62. https://doi.org/10.1016/j.jretconser.2021.102639.

Galbiati, R., Henry, E., Jacquemet, N., Lobeck, M., 2020. How laws affect the perception of norms: empirical evidence from the lockdown. SSRN Electron. J. https://doi.org/10.2139/ssrn.3684710.

Galvin, J., Suominen, E., Morgan, C., O'Connell, E.J., Smith, A.P., 2015. Mental health nursing students' experiences of stress during training: a thematic analysis of qualitative interviews. J. Psychiatr. Ment. Health Nurs. 22 (10), 773–783. https://doi.org/10.1111/jpm.12273.

George, A., Joy, M.M., Sajid, Muhammed, Muhammed Nowfal, S., 2022. Understanding the intention to use virtual currency in a gamified E-commerce context. Int. J. Online Market. 12 (1), 1–14. https://doi.org/10.4018/ijom.288425.

Glaser, B.G., Strauss, A.L., 2017. The Discovery of Grounded Theory: Strategies for Qualitative Research. Routledge.

Hair, J.F., Risher, J.J., Sarstedt, M., Ringle, C.M., 2019. When to use and how to report the results of PLS-SEM. Eur. Bus. Rev. 31 (1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203.

Haj-Salem, N., Al-Hawari, M.D.A., 2021. Predictors of recycling behavior: the role of self-conscious emotions. J. Soc. Market. 11 (3), 204–223. https://doi.org/10.1108/JSOCM-06-2020-0110.

Harmon-Jones, E., Mills, J., 2004. An introduction to cognitive dissonance theory and an overview of current perspectives on the theory. Cogn. Disson.: Progr. Pivotal Theor. Soc. Psychol. 3–21. https://doi.org/10.1037/10318-001.

Henseler, J., Ringle, C.M., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J. Acad. Market. Sci. 36 (1). , iii–xiv.

Islam, A., Ahmed, T., Awual, M.R., Rahman, A., Sultana, M., Aziz, A.A., Monir, M.U., Teo, S.H., Hasan, M., 2020. Advances in sustainable approaches to recover metals from e-waste-A review. J. Clean. Prod. 244 (118815). https://doi.org/10.1016/j.jclepro.2019.118815.

Islam, M.T., Huda, N., Baumber, A., Shumon, R., Zaman, A., Ali, F., Hossain, R., Sahajwalla, V., 2021a. A global review of consumer behavior towards e-waste and implications for the circular economy. J. Clean. Prod. 316. https://doi.org/10.1016/j.jclepro.2021.128297.

Islam, M.T., Huda, N., Baumber, A., Shumon, R., Zaman, A., Ali, F., Hossain, R., Sahajwalla, V., 2021b. A global review of consumer behavior towards e-waste and implications for the circular economy. J. Clean. Prod. 316. https://doi.org/10.1016/j.jclepro.2021.128297.

Kácha, O., Ruggeri, K., 2019. Nudging intrinsic motivation in environmental risk and social policy. J. Risk Res. 22 (5), 581–592. https://doi.org/10.1080/13669877.2018.1459799.

Kim, K., 2024. Conceptualization and examination of the push-pull-mooring framework in predicting fitness consumer switching behavior. J. Glob. Sport Manag. 9 (1), 39–61. https://doi.org/10.1080/24704067.2021.2013128.

Kushwah, S., Iyer, R., Agrawal, A., Korpal, S., 2024. Understanding switching intentions towards renewable energy technologies using push-pull-mooring framework. J. Clean. Prod. 465. https://doi.org/10.1016/j.jclepro.2024.142656.

Lin, Y., Li, J., Xiang, L., 2022. Exploring the role of green government publicity influencing people's pro-environmental behaviors. Front. Psychol. 13. https://doi.org/10.3389/fpsyg.2022.973160.
Liu, H., 2022. A preliminary research on monetary reward as extrinsic motivation in long term task-based learning. Adv. Educ. Humanit. Soc. Sci. Res. 1 (2), 47. https://doi.org/10.56028/aehssr.2.1.47.
McLeod, S., 2015. Operant conditioning: what it is, how it works, and examples. Simpl. Psychol. https://www.simplypsychology.org/operant-conditioning.html.
Menidjel, C., Hollebeek, L.D., Urbonavicius, S., Sigurdsson, V., 2023. Why switch? The role of customer variety-seeking and engagement in driving service switching intention. J. Serv. Market. 37 (5), 592–605. https://doi.org/10.1108/JSM-04-2022-0122.
Mohd-Any, A.A., Sarker, M., Hui, F.L.Z., 2024. Understanding users' switching intention of cloud storage services: a push-pull-mooring framework. J. Consum. Behav. 23 (2), 748–768. https://doi.org/10.1002/cb.2239.
Mullins-Jaime, C., Wachter, J.K., 2023. Motivating personal climate action through a safety and health risk management framework. Int. J. Environ. Res. Publ. Health 20 (1). https://doi.org/10.3390/ijerph20010007.
Nadarajan, P., Vafaei-Zadeh, A., Hanifah, H., Thurasamay, R., 2023. Sustaining the environment through e-waste recycling: an extended valence theory perspective. Aslib J. Inf. Manag. https://doi.org/10.1108/AJIM-10-2022-0475.
Novemsky, N., Kahneman, D., 2005. The boundaries of loss aversion. J. Mark. Res. 42 (2), 119–128. https://doi.org/10.1509/jmkr.42.2.119.62292.
Nugroho, A., Wang, W.T., 2023. Consumer switching behavior to an augmented reality (AR) beauty product application: push-pull mooring theory framework. Comput. Hum. Behav. 142. https://doi.org/10.1016/j.chb.2022.107646.
Perez-Castillo, D., Vera-Martinez, J., 2020. Green behaviour and switching intention towards remanufactured products in sustainable consumers as potential earlier adopters. Asia Pac. J. Mark. Logist. 33 (8), 1776–1797. https://doi.org/10.1108/APJML-10-2019-0611.
Pham, T.T., Lam, T.P.M., Le Dang, H., Pham, N.T., 2023. Consumers' willingness to pay an environmental fee for e-waste recycling in Vietnam: integrating the theory of planned behaviour and the norm activation model. J. Mater. Cycles Waste Manag. 25 (5), 2900–2914. https://doi.org/10.1007/s10163-023-01723-7.
Rene, E.R., Sethurajan, M., Kumar Ponnusamy, V., Kumar, G., Dung, Bao, N, T., Brindhadevi, K., Pugazhendhi, A., 2021. Electronic waste generation, recycling and resource recovery: technological perspectives and trends. J. Hazard Mater. 416. https://doi.org/10.1016/j.jhazmat.2021.125664.
Rubin, H., Rubin, I., 2011. In: Qualitative Interviewing: The Art of Hearing Data, vol. 18. Sage publications, pp. 90024–90029. https://doi.org/10.1016/s0740-8188(96. Issue 2).
Sabbir, M.M., Khan, T.T., Das, A., Akter, S., Hossain, M.A., 2023. Understanding the determinants of consumers' reverse exchange intention as an approach to e-waste recycling: a developing country perspective. Asia-Pac. J. Bus. Adm. 15 (3), 411–439. https://doi.org/10.1108/APJBA-11-2021-0565.
Sajid, M., Midhun, V., Zakkariya, K.A, Surira, M.D., Vishnu, K.P, 2023a. Pedaling towards sustainability: a mixed-method study of the drivers and barriers to bike-sharing adoption. Manag. Environ. Qua., ahead-of-p.
Sajid, M., Zakkariya, K.A., 2022. Reasons for resistance to e-waste recycling: evidence from an emerging economy. Asia Pac. J. Mark. Logist. 35 (6), 1330–1348. https://doi.org/10.1108/APJML-02-2022-0130.
Sajid, M., Zakkariya, K.A., Joy, H., 2022. Determinants of E-waste recycling intention in India: the influence of environmental concern, attitude and economic incentives. Colombo Busi. J. 13 (1). https://doi.org/10.4038/cbj.v13i1.91, 119.
Sajid, M., Zakkariya, K.A., Ertz, M., 2023b. Beyond the bin: overcoming the intention–behavior gap in zero-waste living. Manag. Environ. Qual. Int. J. https://doi.org/10.1108/MEQ-07-2023-0218.
Sajid, M., Zakkariya, K.A., Surira, M.D., Peethambaran, M., 2023c. Flipping the script: how awareness of positive consequences outweigh negative in encouraging tourists' environmentally responsible behavior? Journal of Sustainable Tourism. https://doi.org/10.1080/09669582.2023.2227776.
Sajid, M., Zakkariya, K.A., Surira, M.D., Thomas, L., 2023d. Why are Indian digital natives resisting telemedicine? Innovation resistance theory perspective. Int. J. Bus. Inf. Syst.
Shen, T., Rasdi, I.B., Ezani, N.E.B., San, O.T., 2024. The mediating role of pro-environmental attitude and intention on the translation from climate change health risk perception to pro-environmental behavior. Sci. Rep. 14 (1). https://doi.org/10.1038/s41598-024-60418-7.
Shevchenko, T., Laitala, K., Danko, Y., 2019. Understanding consumer e-waste recycling behavior: introducing a new economic incentive to increase the collection rates. Sustainability (Switzerland), 11(9). https://doi.org/10.3390/su11092656.
Spiteri, A., Nepal, S.K., 2006. Incentive-based conservation programs in developing countries: a review of some key issues and suggestions for improvements. Environ. Manag. 37 (1), 1–14. https://doi.org/10.1007/s00267-004-0311-7.
Su, F., Song, N., Shang, H., Wang, J., Xue, B., 2021. Effects of social capital, risk perception and awareness on environmental protection behavior. Ecosys. Health Sustain. 7 (1). https://doi.org/10.1080/20964129.2021.1942996.
Sun, Y., Han, Z., 2018. Climate change risk perception in Taiwan: correlation with individual and societal factors. Int. J. Environ. Res. Publ. Health 15 (1). https://doi.org/10.3390/ijerph15010091.
Surira, M.D., Zakkariya, K.A., Sajid, M., 2023. Breaking the mold with effective communication: how social initiatives enhance a brand's social perception and catalyze pro-environmental and purchase intentions. Asia Pac. J. Mark. Logist. https://doi.org/10.1108/APJML-04-2023-0323.
Surira, M.D., Zakkariya, K.A., Sajid, M., 2025. Shaping pro-environmental behavior through CSR messaging: insights from the norm activation model. J. Retailing Consum. Serv. 82, 104123. https://doi.org/10.1016/j.jretconser.2024.104123.
Tang, J., Yang, F., Yang, T., 2023. Perceived uncertainty and switching intention on e-commerce platforms: the moderating role of usage habit. Electron. Commer. Res. Appl. 61. https://doi.org/10.1016/j.elerap.2023.101302.
Tsai, P.H., Tang, J.W., 2023. Consumers' switching intention towards E-commerce platforms' store-to-store pickup services: the application of the extended PPM model. J. Retailing Consum. Serv. 75. https://doi.org/10.1016/j.jretconser.2023.103535.
Van der Werff, E., Steg, L., Keizer, K., 2013. It is a moral issue: the relationship between environmental self-identity, obligation-based intrinsic motivation and pro-environmental behaviour. Glob. Environ. Change 23 (5), 1258–1265. https://doi.org/10.1016/j.gloenvcha.2013.07.018.
Vijayan, R.V., Krishnan, M.M., Parayitam, S., Duraisami, Anantharaman, S, P., Saravanaselvan, N.R., 2023. Exploring e-waste recycling behaviour intention among the households: evidence from India. Clean. Mater. 7. https://doi.org/10.1016/j.clema.2023.100174.
Weber, J.M., Hair, J.F., Fowler, C.R., 2000. Developing a measure of perceived environmental risk. J. Environ. Educ. 32 (1), 28–35. https://doi.org/10.1080/00958960009598669.
Yigitcanlar, T., Sabatini-Marques, J., da-Costa, EM da-Costa, 2017. Stimulating Technological Innovation through Incentives: Perceptions of Australian and Brazilian Firms Forecasting and Social.
Yoon, A., Jeong, D., Chon, J., 2021. The impact of the risk perception of ocean microplastics on tourists' pro-environmental behavior intention. Sci. Total Environ. 774 (144782). https://doi.org/10.1016/j.scitotenv.2020.144782.
Yusfiarto, R., Sunarsih, S., Darmawan, D., 2023a. Understanding Muslim's switching from cash to m-payments: based on push-pull-mooring framework. J. Islam. Market. 14 (2), 342–365. https://doi.org/10.1108/JIMA-05-2021-0135.
Yusfiarto, R., Sunarsih, S., Darmawan, D., 2023b. Understanding Muslim's switching from cash to m-payments: based on push-pull-mooring framework. J. Islam. Market. 14 (2), 342–365. https://doi.org/10.1108/JIMA-05-2021-0135.
Zhou, Z., Pan, T., Zhao, Q., Cheng, X., Wang, D., 2024. Factors influencing seniors' switching to m-government services: a mixed-methods study through the lens of push-pull-mooring framework. Information and Management, 61(3). https://doi.org/10.1016/j.im.2024.103928.
Zhu, Z., Peng, Z., Yang, K., 2023. Utilizing the push–pull–mooring framework to explore university teachers' intention to switch from traditional classrooms to smart classrooms in China. Educ. Train. https://doi.org/10.1108/ET-12-2021-0461.