The Factors Influencing Gen Z's Behavioral Intention to Recycle E-Waste Using Motivation-Opportunity-Ability (MOA) Framework

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ABSTRACT

The rapid pace of technological innovation and shorter device lifespans have led to a sharp rise in electronic waste, or "e-waste", worldwide. Malaysia faces serious health and environmental hazards. Although Malaysians are very conscious, especially in the environmental aspect, their intention to recycle e-waste remains low. Technically, this generation (Gen Z) contributes more to e-waste. Reflecting on that, this research uses the Motivation Opportunity Ability (MOA) theoretical framework to investigate the factors that impact Malaysian Generation Z's behavioral intention to recycle electronic garbage, or "e-waste". This theoretical framework was adopted to find how Gen Z's recycling intentions are influenced by competence (knowledge and skills), opportunity (access to recycling facilities), and motivation (individual and collective). The expected findings are to offer insights for policymakers, academicians, and urban planners to design interventions that can stimulate e-waste recycling among Malaysian youth.

Keywords: E-waste Recycling, Behavioral Intention, Generation Z, Motivation-Opportunity-Ability (MOA)

INTRODUCTION

The World Health Organization (2022) reported that only 22.3% of the 62 million tons of electronic waste (e-waste) produced globally were formally collected and recycled. In Malaysia, 2,459 tons of household e-waste are generated daily (The Edge Malaysia, 2023), amounting to approximately 280,000 tons annually. Equivalent to 8.8kg per capita surpassing the weight of the iconic Petronas Twin Towers (The Edge Malaysia, 2024). This issue is exacerbated by the continuous increase in e-waste generation, driven by rapid technological advancements and decreasing average PC lifespan contribute to this surge (Geekom PC, 2025). It will lead to dangerous environmental and health risks, particularly in developing nations where a large portion of e-waste is exported. The presence of hazardous materials such as lead, mercury and cadmium in electronic components will contaminate soil and water also impact the ecological of the nature.

In the meantime, the awareness of e-waste recycling among Malaysians remains relatively low as compared to other general recycling items (Malay Mail, 2025). Although many individuals express concern for the environment and acknowledge the benefits of e-waste recycling, society often fail to translate these intentions into concrete actions (Izhar et al., 2022). Contributing factors may include limited access to e-waste recycling facilities, a lack of targeted educational campaigns and weak enforcement of e-waste management policies (Noor et al., 2023).

In order to tackle this problem, the generation Z must play their significant role to reduce this issue. Moreover, those people are the biggest e-waste contributor due to more exposure in current technology (Rosenberg, 2020). Without effective interaction, the escalating volume of e-waste will continue to pose serious

environmental issues and health challenges. This study will interpret the factors influencing Gen Z's behavioral intention to recycle e-waste using Motivation-Opportunity-Ability (MOA) framework.

LITERATURE REVIEW

Definition E-waste in the Malaysia Landscape

Etymologically, the term "waste" refers to something once valuable like energy, materials, or time that has been lost or has diminished in value (Thürer et al., 2016). The word itself use for variety of context such as environmental/industrial (exp. solid waste, biodegradable waste, hazardous waste, etc.) or medical/biological context (exp. medical waste, human waste, etc.). By definition, e-waste refers to the waste that are generated by all parts and items of electronic and electrical equipment (EEE) that actually been eliminated without any intention to being reused (Baldé et al., 2016). The waste item include computers, mobile phones, monitors, televisions and other electronic appliances

Theoretical Background and Hypothesis Development

This study discusses the application of a conceptual factors influencing Gen Z's behavioural intention, the MOA (Motivation, opportunity and ability) framework in the context of recycling e-waste. As a theoretical underpinning, the present research employed the MOA framework proposed by (Maclnnis et al., 1991) which claims that MOA will influences person's desire to any sort of certain behaviour. Despite that, this study demonstrate that Rothschild's MOA framework is applicable within the context of social, offering valuable insights into effective behavioural intervention strategies. Additionally, the framework serves as a useful tool for market segmentation, helping to identify target groups and lead to the influences in intention behaviour (Wayne et al., 2003).

Motivation

Motivation is an integral component of the MOA framework and the study of motivation has direct relevance and application in current social change research (Reeve, 2001). In certain cases, motivation influence behavior performance in the absence of ability or opportunity (Siemsen et al., 2008). It was a complex concept due to type of motivation involved also essential considerations (Petri & Govern, 2004). Previous study from Dhokhikah et al. (2012) reported that the respondents did not tend to recycle due to lack of time, apathy towards recycling initiative and lack of knowledge. Their study identifies self-expression (individual motivation) and social pessimism (collective motivation) as key for environmental concern. It also can predicts individual's engagement and recycling intentions. Similar with study by Zhang et al., (2021) found that intrinsic motivation (personal responsibility) and extrinsic motivation (social recognition) significantly increase e-waste recycling intentions among Gen Z in China. This statement also support research by Islam et al., (2022) that highlights the willingness of Gen Z to recycle is strongly tied to environmental self-identity and peer influence (collective motivation). Studies by Xiao et.al, 2022 in China found that environmental knowledge and social motivation gave significant effects towards the willingness to participate in waste management activities. Collectively, all of this discussions and findings validate that motivation whether individual or collective, influences as a catalyst for Gen Z's intention to recycle e-waste. In the light of this, the following hypothesis was developed.

H1: Motivation positively influences Gen Z's intention to recycle e-waste.

Opportunity

According to Guerric de Ternay, 2011, opportunity can be defined as a situation that allows you to create something valuable for others, offering the potential to earn a profitable return for the value provided. Previous studies found that the proximity to circular economy services such as recycling centers significantly can influenced the like hood of engaging in recycling (Piia et al., 2024). This study highlight that enhancing the availability of circular services and improving consumer skills are important for promoting sustainable waste behaviors. Gen Z's intention to recycle increase significantly when they had the good facilities as

geographically accessible and logistically feasible to recycle. When the individual had the required opportunities and resources, their behavior is expected to be positively align (Yvonne et., 2023). This study align with Lee et al. (2023) which found in-store takeback programs and reverse logistics systems increase the recycling rates due to existing of tangible opportunities. This researchers also highlight, 80% of the Gen Z consumers more tends to prioritize the sustainability in purchasing decisions. However, their intention depends on accessible systems like buyback incentives or e-waste drop-off points that integrated with mutual fair situation (Lee et al., 2023). Many suggestion from industry to deploy e-waste bins in high traffic areas and take advantage in social influencers to normalize the e-waste recycle behavior in the society (Yvonne S.M., Mohammad N., Shobri N.D.M, 2023). Collectively, these findings conclude that opportunity through infrastructure or social enablement will act as a catalyst for Gen Z more enthusiastic about e-waste recycling. This led to the development of the following hypothesis.

H2: Opportunity positively influences Gen Z's intention to recycle e-waste.

Ability

While opportunity is situational, ability involves the individual's capability to behave in a certain way including ability to adopt a knowledge, awareness and self-esteem (Tong et al., 2023). Other study defines ability as knowledge, skills and access to resources as essential driver of behavior intention (Ahmad et al., 2021). A lack of understanding about which products are recyclable and where to dispose it properly are the barriers society to recycle e-waste. (Arain et al., 2020). It is actually easier for Gen Z because they are more expose and catch up to understand the flow and the requirement. A study by Nguyen et al. (2023) highlight that Gen Z's recycling intentions increase when received exposure education on e-waste hazards and flow of recycling. Align with previous research (Ang et al., 2023) that found individual's confidence in their ability to perform behavior will significantly influences recycling intentions. The synergy between technical know-how and resource accessibility can enhance the ability of Gen Z to more intent to recycling e-waste (Prakash et al., 2024). In view of this, the following theory was formulated.

H3: Ability positively influences Gen Z's intention to recycle e-waste.

Theoretical Framework

Drawing from the Motivation-Opportunity-Ability (MOA) Theory and Regulatory Focus Theory, this study proposes a conceptual framework that integrates consumer motivation, opportunity and ability and advertisement strategies in shaping e-waste recycling behaviour. The framework will assess how different advertisement appeals (promotion vs. prevention) influence consumer decision-making. This research will adopt probability sampling method due to ensure the expected findings are both statistically reliable and generalizable to the broader Gen Z population in Malaysia. It will minimize selection bias and allows each member of the population an equal and known chance of being included in the sample (Creswell, 2014). More specific it will using simple random sampling due to more focus on understanding overall recycling behaviour of Gen Z in Malaysia.

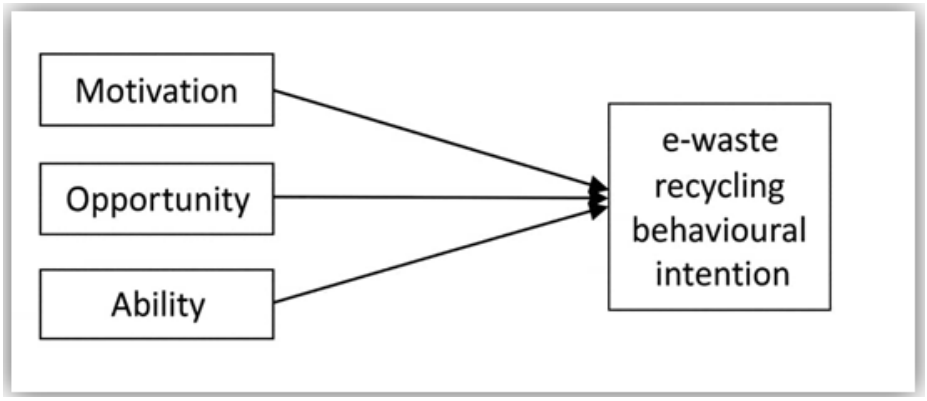

Figure 1: Motivation-Opportunity-Ability Framework

METHODLOGY

In this study we are using generation z (Gen Z) behavioural intention to recycle e-waste as dependent variable, also Gen Z as sample size. Generation Z refers to the persons that born between 1997 and 2012, the demographic group that replaced the Millennial Generation and preceded the Alpha Generation (Twenge, 2023). This generation also considered as a "green generation" who demonstrates higher environmental consciousness than older generations (Capgemini, 2020). The questionnaire (Google Form) will be distributed virtually by using social platforms likes WhatsApp and Telegram due to facilitate asynchronous discussions and maintain participant engagement over time (Julien, 2019).

EXPECTED FINDINGS

The expected findings of this study shows that Motivation, Opportunity and Ability (MOA) will positive influence towards Generation Z's behavioural intention towards recycling E-waste in Malaysia. Drawing upon the MOA framework by MacInnis et al. (1991), each of the three constructs exercises a central facilitative role towards E-waste recycling behaviour. Beside to analyse Gen Z's behaviour intention to recycle, these findings can prove instructive to environmental management stakeholders, educational policy makers and urban planners with an interest in municipal infrastructure.

CONCLUSION

This study illustrate that Motivation-Opportunity-Ability (MOA) framework provides a timely and relevant perspective through which to understand the behavioral intention of Generation Z, the primary contributors and potential mitigators of e-waste proliferation.

The expected findings propose that Generation Z's willingness to engage in e-waste recycling is not solely a matter of environmental awareness, but a result of the intricate interplay between motivational drivers, infrastructural opportunities and individual capability. This aligns with the broader academic consensus that sustainable behavior requires both internal intention and external facilitation (MacInnis et al., 1991; Ajzen, 1991).

From a policy and institutional perspective, the findings highlight important need for systematic enablers such as designated recycling drop points and awareness campaigns embedded within educational curricula. These structures act as the "opportunity" variable and without them, even the most motivated and capable individuals may fail to translate good intentions into action.

On the community level, the role of collective efficacy and social reinforcement cannot be overstated. Digital platforms widely used by Gen Z must be function to normalize and celebrate sustainable behaviors, creating a cultural shift in attitudes towards e-waste. Social media challenges, gamified recycling apps and influencer-led campaigns can effectively bolster the motivational climate. In addition, ability enhancing interventions such as hands on workshops, digital guides or curriculum-integrated modules can improve e-waste literacy and self-efficacy. These tools are essential in reducing the knowledge behavior gap that commonly hinders youth led environmental action (Nguyen et al., 2023; Tong et al., 2023).

To conclude, Malaysia's pathway toward reducing e-waste cannot be reliant solely on legislation or technology. It must be complemented by generational engagement inclusive infrastructure and education that improve capacity and agency. Only through this holistic integration can sustainable E-waste management evolve from isolated efforts to a normalized societal practice.

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