

## YOUNG CONSUMERS' PERCEPTIONS OF DISPOSAL, COLLECTION AND RECYCLING OF THEIR OLD PERSONAL ELECTRONIC DEVICES IN INDONESIA.

**Rayhan Ardhana, Frank Gruben**

Department of Accounting, Faculty of Economics and Business, Diponegoro University  
School of Finance and Accounting, Saxion University of Applied Sciences

### **ABSTRACT**

*The rising usage of personal electronic devices among young consumers in Indonesia raises a significant concern – the proper disposal of old devices. Rapid technological progress leads to shorter device lifecycles, contributing to environmental issues and an impending increase in e-waste. By 2028, it is projected that Indonesia will generate 487,416 tons of electronic waste, with Java Island contributing up to 56%. Currently, approximately 90% of e-waste generated ends up in the informal sector, worsening environmental impact and emphasizing the need for efficient waste management. Understanding the perceptions of young consumers about the disposal of end-of-life personal electronic devices is crucial for making targeted strategies that encourage responsible e-waste management. The study's analysis utilized both literature reviews and interviews. The findings explore young consumers' knowledge and awareness regarding this topic. Additionally, the study discusses strategies that can help the company engage young consumers in properly disposing of their old personal electronic devices.*

*Keywords: personal electronic devices, Electronic Waste (E-waste), young consumers, awareness*

### **BACKGROUND**

The surge in personal electronic device usage among young consumers in Indonesia has led to a concerning issue – the proper disposal of old personal electronic devices. With the accelerated pace of technology, shorter device lifecycles contribute to environmental challenges, particularly the impending surge in electronic waste (e-waste). The increasing use of electronic devices, reliance on electronic devices will inevitably lead to a higher rate of future e-waste generation. This impending crisis is underscored by a projection that, by the year 2028, Indonesia is expected to generate a staggering 487,416 tons of electronic waste (Santoso et al., 2019, p.6). Notably, Java Island is expected to contribute up to 56% of the total e-waste generated in the country (Mairizal et al., 2021, p.1).

Moreover, the current e-waste management scenario in Indonesia poses added challenges. Approximately 90% of the generated e-waste finds its way to the informal sector, undergoing treatment through improper channels (Santoso et al., 2019, p.7). This prevalence of informal and improper disposal practices worsens the environmental impact of electronic waste and emphasizes the urgent need for effective waste management strategies.

Understanding how young consumers aged 15-24 perceive the end-of-life phase of personal electronic devices is crucial. Insights into their attitudes and behaviours can provide valuable information for developing targeted strategies that promote responsible electronic waste management, fostering a more sustainable approach to personal electronic devices disposal in Indonesia. Management can tailor awareness campaigns and educational programs to resonate with this demographic, fostering a more sustainable approach to the disposal of personal electronic devices in Indonesia. This proactive approach aligns with global efforts to mitigate the environmental impact of e-waste and ensures a responsible and informed approach to the electronic devices' lifecycle.

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The main method of gathering data will be using interviews that ask individuals that match the criteria to answer questions related to the topic. The researcher will conduct interviews with individuals meet the criteria of young consumers aged 15–24 living in Indonesia to explore their responses and seek their opinions. In addition to that, the researcher will perform literature review that can help summarize and evaluate the discussed topic.

## **THEORITICAL FRAMEWORK**

### **Personal Electronic Devices**

Personal Electronic Devices (PED) are essential to modern life, offering a wide range of functionalities from communication and entertainment to data processing and computing. According to The National Institute of Standards and Technology (NIST), personal electronic devices can be defined as electronic devices having the capability to store, record, and/or transmit text, images/video, or audio. While the International Air Transport Association (IATA) defined personal electronic devices as any piece of lightweight, electrically powered equipment. These devices are typically consumer electronic devices, capable of communications, data processing and/or computing. Examples are laptop computers, tablets, e-readers, smartphones, MP3 players, drones, and electronic toys.

Fuelled by the rapidly changing technology, the rise of mass consumption, and shorter product life cycles has made it one of the fastest growing streams of waste globally. According to Statista (2024) more than 50 million metric tons of e-waste are generated each year globally. This numbers are expected to increase as PEDs becomes increasingly fundamental to everyday life. E-waste holds dangerous materials such as lead, mercury, and cadmium, which if improperly treated could potentially harm the environment and human health. This is worrying as reported by the World Health Organization (WHO) in 2019, it is estimated that 53.6 million tonnes of e-waste were produced globally, but only 17.4% was documented as formally collected and recycled. Improper disposal and recycling practices are more prevalent in in low and middle-income countries (WHO, 2023), further worsening these risks, exposing workers and communities to toxic substances from these e-wastes.

### **Young Consumers**

The World Health Organization defines youth' as individuals in the 15–24-year age group, while 'adolescents' are individuals in the 10-19 years age group, and 'young people' covers the age range of 10-24 years. In this research, individuals from the 'youth' category who become into consumers will be referred to as "young consumers"

This study focuses on young consumers for several reasons, namely because young consumers, who are consistent electronic device users over the long term, serve as representatives of society. Moreover, their substantial purchasing power for electronic products is a result of their exposure to technology (Ramzan et al., 2019). It is important for young consumers to understand the significance of managing e-waste properly. This fosters responsibility and can lead to positive social and behavioural changes in the future.

### **Awareness Level**

Awareness refers to being conscious or informed, suggesting that consumers have some level of understanding. According to Dourish & Bellotti (1992) awareness can be defined as awareness is an understanding of the activities of others, which provides a context for your own activity. Awareness is a crucial factor as it shapes their behaviours and attitudes. As such, Awareness is important consumers when it comes to handling their old electronic devices responsibly.

According to Kumari et al. (2021), awareness of the environmental impact of old electronic devices can lead to more sustainable disposal practices. The study found that consumers who were aware of the dangerous materials in these devices and the potential harm they can cause to the environment if not properly disposed were more likely to dispose of their devices responsibly.

Additionally, a study done by Nisha et al. (2022), found that awareness can also lead to more responsible purchasing practices. Consumers can become aware of the environmental and economic impact of their electronics purchases. This awareness can lead to more responsible purchasing practices, such as buying devices that are environmentally friendly and have a longer lifespan.

### Theory of Planned Behavior

The theory of planned behaviour (TPB) serves as a framework for understanding young consumers' perceptions on the disposal of their old personal electronic devices in Indonesia. Theory of planned behaviour has been useful in predicting customers intentions and behaviours. There are three components that shapes this theory; attitudes as an individual's favourable or unfavourable evaluation of the behaviour, subjective norms as an individual's perception of the social pressure to perform or not perform the behaviour, and perceived behavioural control as an individual's perception of the ease or difficulty of performing the behaviour (Ajzen, 1991). These three factors collectively shape an individual's behavioural intention, which is the most proximal determinant of their actual behaviour.

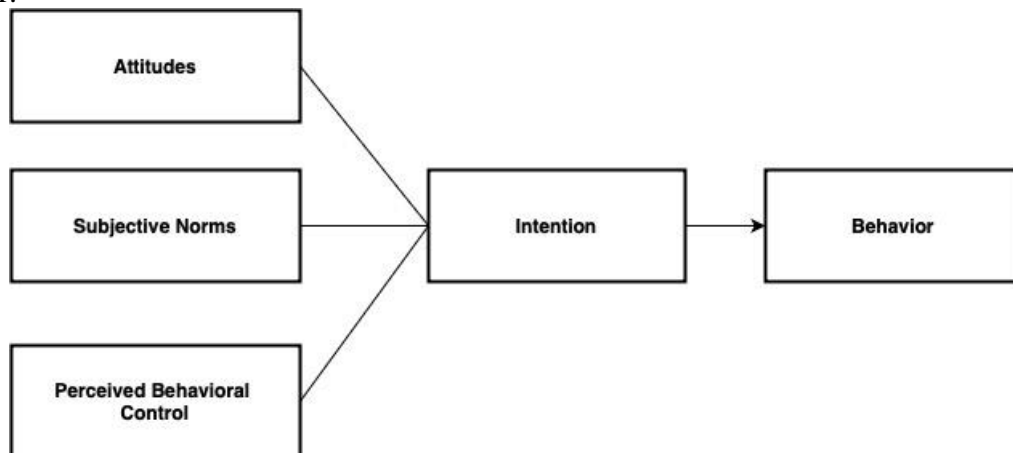


Figure 1. Theory of Planned Behavior (TPB) Model

According to TPB, individuals' intentions to properly dispose and recycle their electronic devices are influenced by their attitudes, subjective norms, and perceived behavioural control (Hair et al., 2022). Attitudes reflect how individuals perceive the outcomes of their disposal and recycling actions, while subjective norms encompass the perceived social pressures about these behaviours. Perceived behavioural control pertains to individuals' confidence in their ability to properly dispose of and recycle their electronic devices.

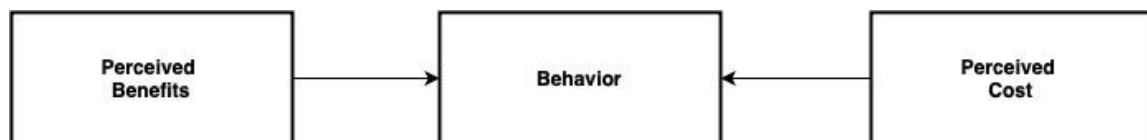
Several factors influence young consumers' perceptions of e-waste recycling, including their beliefs about environmental impact, societal expectations, ease of access to recycling facilities, convenience of recycling processes, and knowledge about proper disposal methods. Research by Thøgersen (2004) suggests that cognitive dissonance plays a role in shaping consistent environmentally responsible behaviour, implying that aligning people's perceptions with their willingness to recycle electronic waste can boost involvement in e-waste recycling efforts. While research by Vermeir and Verbeke (2006) found that the attitude-behavioural intention gap influences sustainable consumption

practices, suggesting that aligning attitudes with intentions is important for promoting environmentally friendly behaviours.

Additionally, research done by Afroz, et al. (2020) shows that there is a positive link between environmental awareness and attitudes toward recycling intention, showing that individuals who have higher levels of environmental awareness tend to show more favourable attitudes toward recycling.

### **Social Exchange Theory**

Social exchange theory is a framework for understanding processes of social association that feature exchanges between at least two persons (Tsai, 2014). It suggests that social behaviour is the result of an exchange process, where people weigh the potential benefits and risks of their social relationships (Cropanzano & Mitchell, 2005).



*Figure 2. Social Exchange Theory Model*

The theory proposes that individuals engage in behaviours based on the perceived costs and benefits of those actions, seeking to maximize their rewards and minimize their costs (Emerson, 1976). Social exchange theory suggests that individuals engage in behaviours based on the perceived costs and benefits of those actions. In the context of e-waste recycling, consumers may weigh the perceived benefits (e.g. environmental protection, financial incentives) against the perceived costs (e.g. time, effort) of properly disposing of their electronic devices. Additionally, emotions can play a role in these exchange processes, as individuals may experience positive or negative emotions based on their perceived outcomes, which can influence their future exchange decisions (Lawler & Thye, 1999).

While the TPB suggests that attitudes towards the behavior, subjective norms (perceived social pressure), and perceived behavioral control influence an individual's intention to perform a behavior like e-waste recycling, the social exchange theory suggests that individuals perform behaviours based on perceived costs and benefits or rewards (Bhutto et al., 2023). Both theories recognize the importance of perceived benefits in shaping behavior. For example, both TPB and social exchange theory would predict that if individuals believe recycling e-waste is beneficial (whether due to social approval or personal gain), they are more likely to engage in the behavior. As such, in this context, consumers may be motivated to recycle e-waste if they perceive greater benefits (e.g., financial incentives, convenience) compared to the costs involved, such as the effort required to find a recycling center or the time spent in sorting electronic waste.

### **RESEARCH METHODOLOGY**

This research will be done using qualitative strategy to give an insight on people's beliefs, attitude, behaviour, and interactions (Aspers & Corte, 2019). A qualitative approach produces non-numerical data, offering insights into people's beliefs, attitudes, behaviours, and interactions (Aspers & Corte, 2019). While a quantitative strategy aids researchers in measuring phenomena with numerical data, enabling description, prediction, pattern identification, and making forecasts (Bhandari, 2022).

The main method of gathering data will be using interviews that ask individuals that match the criteria to answer questions related to the topic. The researcher will conduct interviews with individuals meet the criteria of young consumers aged 15–24 living in Indonesia to explore their responses and seek their opinions. In addition to that, the

researcher will perform literature review that can help summarize and evaluate the discussed topic.

**RESULTS AND DISCUSSION**

The first sub-question of this research which is “What is the existing awareness level regarding the proper disposal of old personal electronic devices among young consumers in Indonesia?” To answer this question, we need to look at interview question number 2 which is “What sources of information, if any, have you come across regarding the proper disposal of electronic devices?”. Question 2 can answer the first sub-question because it helps measure how much people know about e-waste disposal by asking where they have learned about it. By checking where they have gotten information, it can be seen how much young consumers in Indonesia know about this topic.

Questions	Source	Answer
Q2	Social Media	social media, so many platforms that people use to shared informations such as videos or pics that related to the topic
		Infographics from social media like TikTok or Instagram
		online medias, mostly shared by people who works at the related field, the platforms are YouTube and Facebook shorts
		From the internet or social media, like waste should indeed be separated, especially electronic waste, so it can be recycled or processed again.
	Internet	Honestly, I don't know how to dispose of old electronics properly... but surely from the internet.
	No Information	none so far, unfortunately
		until now i dispose of my electronic devices improperly. i just left them on the bin outside (in front of my house) and wait for it to be picked up by a dump truck along with other domestic waste
		there isn't any
		I have no clue about proper disposal electronic devices
		I don't have any information regarding electronic disposal yet.

**Table 1.** Information sources about proper e-waste disposal

Table 1 shows the source of information about proper disposal of old electronic devices. This table consist of several answers to the interview questions that is related to the first sub-question. Firstly, social media appears as a prominent source, with I1, I3, I4, and I6 responses showing that platforms like TikTok, Instagram, and general social media channels are used for accessing information on electronic waste disposal. These platforms are influential in giving information through videos, pictures, and infographics, potentially reaching a wide audience. This highlights the role of subjective norms, where online content from professionals influences societal expectations and behaviors.

Secondly, Internet, are mentioned by I9. These are noted for hosting content shared by individuals working in related fields, suggesting that specialized content creators or professionals are contributing to the dissemination of information on electronic waste disposal.

Thirdly, there is a subset of respondents who have not met any information on electronic waste disposal. Answers from I2, I5, I7, I8, and I10 indicate a lack of exposure to information sources on this topic, whether through social media, online platforms, or other channels. This underscores a lack of perceived behavioral control mentioned in the theory of planned behavior, as these individuals may feel less capable of engaging in proper disposal practices due to a lack of information and guidance (Hagger et al., 2022).

Questions	Yes/No	Answer
Q8	Yes	I think yes.
		Yes and no. It's a double-edged sword really. On one point, monetary incentives are useful and would help with significantly improving and encouraging the masses to curate, recycle and manage their electronic waste properly yet on the other hand, it may also be seen as ableist and classist to give out penalties towards the ones unable to truly follow said "guidance/rules".
		yes
		Yes, definitely
		very much
		Yeah, it's like those empty containers from Sociolla (local retailer) or the bottle collectors who get money for them.
		The incentive sounds good, but penalties won't have any effect.
		Yes it'll be effective
		Effective.
		I think it'll motivate people to dispose old electronics properly.

**Table 2.** Incentives to do proper e-waste disposal

Discussing the second sub-question of this research which is “How to encourage young consumers to properly dispose their old personal electronic devices in Indonesia?” To answer this question, we need to look at interview question number 8 which is “Do you think financial incentives or penalties would be effective in encouraging consumers to recycle their old personal electronic devices?”. Question 8 can answer the second sub-question because it directly addresses a potential strategy for encouraging young consumers to properly dispose of their old personal electronic devices in Indonesia.

Table 2 shows whether monetary incentives will motivate consumers to do proper disposal of old electronic devices. This table consist of several answers to the interview questions that is related to the second sub-question.

The data presents a unanimous agreement among respondents on the effectiveness of financial incentives or penalties in promoting the recycling of old personal electronic devices. All respondents, as categorized under "Yes," express confidence in the potential of such measures to encourage individuals to properly recycle their electronic devices. These responses collectively suggest a widespread belief that offering monetary incentives or imposing penalties would serve as strong motivators for increasing participation in electronic waste recycling programs. The unanimity of responses in Favor of financial incentives or penalties shows a strong consensus among the interviewees about the potential effectiveness of such measures.

This alignment of perspectives suggests a widely accepted belief that financial incentives help promote electronic waste recycling, emphasizing the recognized importance of including economic incentives into strategies for managing waste. From the TPB’s perspective, economic incentives can enhance perceived behavioral control by making the desired behavior (e-waste recycling) more attractive and achievable. While if viewed from the social exchange theory, offering monetary incentives for e-waste recycling increases the perceived benefits of the behavior, making it more appealing (Denčić-Mihajlov & Krstić, 2021). As such, people are likely to engage in actions that provide clear financial benefits, reducing the perceived cost of effort and time involved in proper disposal. (Sabbir et al., 2022)

Questions	Obstacles	Answer
Q7	Lack of Disposal Location	I think due to lack of specifically place for disposing e waste, and sometimes it is hard to find it. And also lack of information regarding this matter the difficulty to find a trash can or any place which specifically for disposing electronic waste Lack of proper place to throw them I think the way to promote it is by accommodating more access for electronic disposal or electronic recycle.
	Lack of Knowledge	Resources and informations. I do not know where and how to dispose them properly. I would also love to know whether the third parties involved in handling such waste management are trustworthy or not. Like the recent Sociolla waste management issue. Yeah, exactly, there's no place to sell it. zero knowledge about it I even had no clue about electronic disposal until i had this interview

**Table 3.** Obstacles faced by young consumers to properly dispose e-waste

The third part discusses the last sub-question of this research which is “What are the barriers and challenges faced by young consumers in Indonesia in properly disposing of their old personal electronic devices?” To answer this question, we need to look at interview question number 7 which is “Are there any specific obstacles or difficulties that prevent you from properly disposing of any e-waste?”. Question 7 can answer the last sub-question because it offers targeted insights into the challenges they encounter

Table 3 shows the obstacles faced by consumers to do proper disposal of old electronic devices. This table consist of several answers to the interview questions that is related to the last sub-question.

Firstly, several respondents' express difficulties related to finding proper places to dispose of e-waste. They highlight challenges such as the absence of specific locations for e-waste disposal, making it hard to find suitable bins or facilities. Additionally, some

respondents emphasize the lack of knowledge about where and how to dispose of e-waste properly, showing a need for more accessible information and resources on the matter. One respondent suggests that promoting electronic disposal or recycling could be improved by accommodating more access points for disposal or recycling.

Secondly, several respondents acknowledge their lack of understanding of e-waste disposal practices. Some individuals admit to having zero knowledge about the topic, while others mention that they only became aware of electronic disposal through the interview process. This highlights a broader issue of insufficient awareness and education about proper e-waste disposal methods.

Questions	Factors	Answers
Q3	Environmental Issues	I think there are so many factors, one of them is because we can do the recycle from old devices into something more useful in the future
		Global warming issues and waste management issues would be the biggest main factors I think
		Seeing the impact of improper waste disposal (environmental damage), including disposing of electronics improperly, isn't good, right?
	Monetary Incentives	Monetary incentives, like in the EU when we dispose water bottles we get certain amount of money
		Perhaps if there's a point system or monetary incentive, people would be more motivated to separate their waste.
	Govt. Intervention	for government to set up a system for it. maybe grant incentive too like how germany does for bottles.
Social Movement	I think if people talk about it more to raise awareness and to make like a movement i think it'll help motivate me and other people more.	
Knowledge	If we have enough knowledge about how to properly dispose our electronic devices	
	personal awareness and the knowledge regarding the importance to commit such act	

**Table 4.** Factors that motivate young consumers to do proper disposal

The fourth part discusses the main question of this research, which is “What factors influences young consumers in Indonesia to properly dispose their old electronic devices?” To answer this question, we need to look at question number 3 which is “What factors do you think would motivate you and your peers to properly dispose of old electronic devices?”. Question 3 can answer the main question because it helps find key drivers influencing their behaviour

Table 4 shows the factors that motivate young consumers in doing proper disposal of old electronic devices. This table consist of several answers to the interview questions that is related to the main question. From the table it can be inferred that the main factors that motivate young consumers to do proper disposal is the environmental issues.

Other factors that can motivate young consumers are monetary incentives, government intervention, social movement, and knowledge. Both I4 and I6 stated that monetary incentives people might be more inclined to do proper disposal. As for government intervention I5 mentioned that if government set up a framework and legislation for proper disposal people might be more motivated to do proper disposal. Whereas I10 mentioned that they might be more inclined to do proper disposal if there is a social movement that might motivate them to do so. While I3 and I8 mentioned that if they have enough knowledge about these issues, it might motivate them to do so.

## CONCLUSION

The existing awareness level about the proper disposal of old personal electronic devices among young consumers in Indonesia varies. Social media appears as a prominent source of information, followed by the internet, while a subset of respondents lacks exposure to information on e-waste disposal. The findings emphasize the need for targeted educational campaigns using social media platforms and specialized online content to enhance awareness and knowledge about proper e-waste disposal practices. Examples of effective online content could include short educational videos, and infographics detailing proper disposal methods.

Financial incentives or penalties are widely perceived as effective measures to encourage proper disposal of old electronic devices among young consumers in Indonesia. The unanimous agreement among respondents highlights the potential of economic incentives to stimulate participation in e-waste recycling programs. Examples of financial incentives include offering discounts on new electronic purchases when old devices are returned or implementing deposit-refund schemes. This suggests that integrating financial

mechanisms into waste management strategies could significantly enhance recycling rates and promote sustainable consumption behaviours among young consumers. It fits with the social exchange theory who suggests that individuals engage in behaviours based on the perceived costs and benefits of those actions.

Several barriers and challenges obstruct young consumers in Indonesia from properly disposing of their old electronic devices. These include difficulties in finding proper disposal locations, lack of knowledge about proper disposal practices, and limited awareness regarding e-waste management practices. Addressing these barriers requires setting up accessible disposal infrastructure, providing comprehensive education on e-waste disposal, and enhancing awareness campaigns to promote responsible electronic waste management behaviours among young consumers. For example, successful initiatives in other countries, such as e-waste collection points in malls or partnerships with electronics retailers for in-store drop-off points, can serve as models.

The factors influencing young consumers in Indonesia to properly dispose of their old electronic devices are primarily driven by environmental concerns. Monetary incentives, government intervention, social movements, and knowledge also play significant roles in motivating proper disposal behaviours among young consumers. The findings point out the importance of addressing environmental awareness and providing incentives and education to encourage proper e-waste management practices among young consumers. This supports the TPB's claim that that perceived social pressures can effectively motivate individuals to engage in such behaviours. The presence of monetary incentives as one of the factors influencing young consumers' to properly dispose their old electronic devices also proves the social exchange theory which states that consumers may be motivated to properly dispose e-waste if they perceive greater benefits that they are getting if compared to the costs involved.

The results show that companies should prioritize spreading information through commonly used social media platforms like TikTok, YouTube, and Instagram, due to their extensive reach.

Additionally, offering monetary incentives (cash rewards, discounts, loyalty points) appears to be a key approach to incentivize young consumers to responsibly dispose of their old electronic devices. Companies could use this strategy to entice young consumers to properly dispose their old personal electronic devices.

Another solution to motivate young consumers to properly dispose of their old electronic devices is for companies to increase the number of collection points and disposal locations, especially in optimal locations and the locations that are often visited by young consumers, such as malls, schools, residential areas, and parks.

Furthermore, it might be necessary for the government to implement more rigorous regulations regarding e-waste disposal and management such as extended producer responsibility and labeling and certification requirements to encourage greater number of people to comply with proper e-waste disposal practices.

This study is subject to several limitations that needs to be kept in consideration. Firstly, the sample size represents a potential limitation, as a larger sample would yield better and more reliable findings. Secondly, the background of the interviewees presents another limitation. Diversifying the backgrounds and age groups of interviewees could enhance the data, offering insights from a wider perspectives and experiences. Lastly, the language used during the interviews also raises a limitation. Conducted in a semi-formal to non-formal manner, the responses may lack the formality necessary for detailed academic interviews, needing a conversion to a more formal language style for interpretation and synthesis of findings.



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