CHAPTER 1
INTRODUCTION

1.1. Research Background

The destruction of our natural environment, which is mostly caused by human activities, is the core of today's global issues. It is not a single problem, but it is a complex set of environmental crises that affect the land, oceans and atmosphere, each of which impact each other's. Resolving global environmental issues needs a deep understanding of their interconnectedness. As these interconnected issues continue to undermine the foundations upon which we all depend, the stability of human society and the planet's ecosystems is threatened. This interconnectedness highlights how plastic pollution, as a key example, intensifies broader environmental crises.

Waste management represents a significant contemporary challenge. Global waste generation is projected to increase rapidly due to resource-intensive practices that disregard the finite nature of raw materials. If current trends persist, Municipal Solid Waste (MSW) volumes will continue to rise beyond 2025 (UNEP, 2024). Managing millions of tonnes of waste each year, much of it is single-use plastic that contaminates land and marine ecosystems, puts Indonesia in a critical environmental crisis. Disposing of materials is only one aspect of effective plastic waste management. Another is changing the linear "take, make, dispose" model to create a more circular system (Eastman, 2023). In just 20 years, global plastic production more than doubled, reaching millions of tonnes (OECD, 2022).

A study conducted by Nadi & Wasesa (2024) found that an alarming 96% of e-commerce parcels in Indonesia are wrapped in multiple layers of plastic, including bubble wrap, plastic shipping bags, and plastic tape. This heavy reliance on plastic packaging directly contributes to the growing waste epidemic in Indonesia's major islands. A lower carbon footprint and a healthier environment can be achieved by implementing the 3R principles, which are crucial for preserving natural resources, cutting down on energy use, and minimizing the amount of waste dumped in landfills (US EPA, 2025).

Due to Indonesia’s large population and rapid urban growth lead to an estimated 6.8 to 7.8 million tonnes of plastic waste each year, and this amount continues to grow (World Bank, 2021) . However, the country’s waste management system have not kept up. Data shows that 4.8 to 4.9 million tonnes of plastic waste are mishandled every year, either left uncollected, dumped in open spaces, or burned in the open (NPAP, 2020).

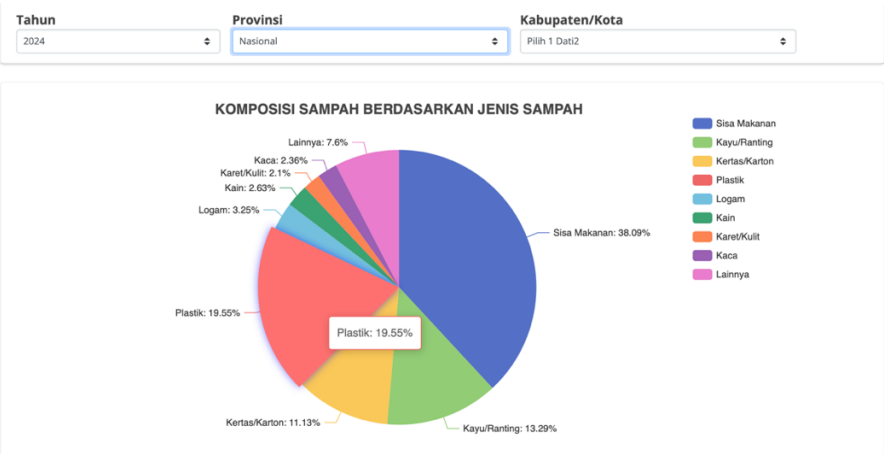

Figure 1. 1 **Waste Diagram Data in Indonesia 2024**

The demand to address these systemic failures is highlighted by the scale of the plastic problem within the national waste composition; the composition of Indonesia's national waste in 2024 shows that 19.55% consists of plastic waste, making it the second-largest waste category after food waste. This significant quantity illustrates how plastic pollution remains a pressing environmental challenge within Indonesia's overall waste management system. Addressing plastic waste is crucial, as its persistent presence causes ecological degradation and threatens marine and land ecosystems.

Therefore, understanding the behavioural drivers behind plastic consumption and disposal can provide key insights for improving waste reduction strategies in the country (Ministry of Environment and Forestry, 2024). This mismanagement draws attention to the systemic failures in waste handling that stimulate environmental degradation. These systemic issues directly impact the younger generation's ability to engage in effective pro-environmental actions despite their growing awareness.

The development of e-commerce in Indonesia has moved through several stages, starting in the 1990’s and evolving to a complex digital ecosystem (Yuli & Aisah, 2025). This progress started with an initial phase between 1990 and 2000, followed by a growth period from 2001 to 2006, and eventually reached a stage of deep market penetration between 2007 and 2020 (Yuli & Aisah, 2025). This rapid expansion is largely driven by the massive number of internet users in Indonesia, which reached over 221 million people by 2024 (Nida et al., 2024). This huge

digital audience has turned the country into a modern trade hub that provides consumers with great convenience and easy payment systems (Nida et al., 2024). Consequently, these historical phases and user statistics demonstrate how deeply e-commerce has integrated into Indonesian society.

Yet, this rapid economic expansion brings with it a significant environmental challenge, as the rise in online transactions directly correlates with an increase in non-biodegradable materials. When it comes to e-commerce, packaging is a major culprit in contributing to plastic waste. Sellers often over-package items with multiple layers of materials to ensure products reach customers safely, especially when shipping over long or difficult routes. So, an average online order might come wrapped in a cardboard box, plastic polymailers, bubble wrap, and plastic air cushions to keep things in place. While this packaging might protect the products, its mostly made from non-recyclable, mixed materials, which just adds to the growing waste problem. As a result, the waste generated from one online order is often much higher than what people see from buying products in-store (Keenan Recycling, 2024).

The significance of reducing online shopping is strongly tied to the environmental implications caused by these patterns of consumption. Online shopping may be convenient, but consumers largely ignore the environmental costs. Each online transaction also set off a series of unintended consequences that collectively undermine the environment such as over reliance on single-use plastic for packaging, more garbage to dispose and more carbon - causing transportation and last mile delivery (Nadi & Wasesa, 2024; Keenan Recycling, 2024). In contrast

with physical shopping where the customer has more direct control over packaging choice, and where multiple purchases can be grouped together, the online purchase process is served by regular logistic packaging in multi-layered plastic films not designed to conserve environmental resources (Herabadi et al., 2023).

These impacts help turn online shopping into a large source of plastic pollution, because the packaging materials used are mostly single-use and hard to recycle (OECD, 2022; NPAP, 2020). Thus, not only does online shopping speed up the accumulation of plastic waste; additionally, it worsens the overall environmental impact of consuming. Thus, diminishing one's online shopping would count as a poignant pro-environmental action among the younger generation whose consumption is heavily influenced by the digital media (Sujata et al., 2019). Understanding why people may form intentions to decrease online shopping in the face of such consequences is important when it comes to explaining how environmental concern can result in substantive behavioural change (Ajzen, 1991; Ajzen 2005).

In the Indonesian context, the potential for such behavior change is most significant among Generation Z, who have emerged as the most influential force in the nation's digital marketplace. It is very clear that Generation Z has become the most important group for online shopping in Indonesia today. They make up a huge part of the country, specifically about 27.94% of the total population, this means there are around 74.93 million young people (Widodo et al., 2024). Because they grew up with smartphones, they are the main reason why online shopping is growing so fast in the country (Helmi et al., 2023). In fact, the e-commerce market

in Indonesia is expected to be worth a huge USD 332 billion by the year 2025 because of them (Widodo et al., 2024). This massive population size explains why online stores are changing their strategies to fit what teenagers and young adults wants.

The data shows that Gen Z is much more active in online shopping than older people (Helmi et al., 2025). Research indicates that about 85% of all transactions on e-commerce sites come from users aged between 18 and 35 years old (Suprapto et al., 2025). This generation spends an average of IDR 414,309 every month on shopping apps, which is 14% more than they spent last year (Jakpat, 2024). This high level of activity shows that shopping online has become a daily habit for them. Therefore, the data proves that Gen Z is not just a small part of the market, but the actual engine that keeps e-commerce running.

Gen Z prefer to use their phones for almost everything, especially for buying things (Widodo et al., 2024). Data shows that 67% of all e-commerce sales in Indonesia happen through mobile devices, while online 33% happen on computers (PCMI, 2025). These young shoppers are also moving away from using cash and instead use digital wallets (e-wallets) 75% of the time (Jakpat, 2024). They are very smart at finding deals, with many of them using their phones to compare prices across different apps in just few seconds (Widodo et al., 2024).

Finally we can conclude that the combination of their large population and their love for technology makes Gen Z the ultimate winners in the e-commerce world. Even though they might spend less money per individual trip, they shop much more frequently than older generations (GLI, 2025). They also love

interactive features, with 62% of them buying items directly through live shopping videos (Jakpat, 2024). As they continue to grow and get more jobs, their influence on how they buy things will only get bigger and stronger.

However, this dominant role in digital consumption sits in complex tension with the generation's core values, as many young consumers struggle to adjust their high shopping activity with their environmental concerns. Study shows that Gen Z has a strong positive attitude and a high intention to engage in pro-environmental behaviours because they perceive single-use plastic pollution as a serious societal and ecological threat (Herabadi et al., 2023). The participation of young people in recycling activities shows a significant attitude-behaviour gap, despite the high awareness and good intentions (Keenan Recycling, 2024). Strong moral and subjective standards around sustainable conduct are created by increased environmental education in academic contexts and widespread information access through digital channels, which significantly contribute to this positive attitude (Situmorang et al., 2020).

The willingness of Generation Z to minimize plastic waste is largely determined by their personal values and the extent of their environmental education. Individuals within this demographic who demonstrate a strong environmental orientation − meaning they prioritize the sustainability of natural resources − are significantly more likely to reduce plastic consumption (Rosdiana et al., 2025). Furthermore, specific environmental knowledge, such as understanding recycling symbols and knowing how to select product that generate less trash, directly encourages individuals to adopt better waste habits (Rosdiana et al., 2025). Formal

environmental education also plays a critical role, as it increases ecological awareness and leads to a measurable decrease in plastic waste within urban settings (Wijayanto et al., 2024).

Recognizing the harmful effects of plastic packaging on the environment, large numbers of younger generation consumers are significantly invested in addressing this problem. They are usually pretty vocal about supporting efforts to recycle and cut back on waste, driven by concerns over plastic's harm to the planet and human health (Herabadi et al., 2023). They often learn about these problems from education and digital resource (Situmorang et al., 2020). This knowledge drives their role as advocates, yet it also exposes the paradoxes in their daily actions.

Social influences and digital media exposure also serve as essential factors in shaping the pro-environmental habits of the younger generation. Family norms, which include the behaviors and expectations set by parents, are powerful predictors of whether a young person will intend to engage in eco-friendly actions (Suminar et al., 2024). This internal intention to protect the environment acts as a bridge, turning social pressure from family members into actual habit changes (Suminar et al., 2024). Moreover, constant exposure to environmental news and information on social media platforms helps maintain a high level of awareness among Gen Z, keeping sustainability at the forefront of their digital lives (Suminar et al., 2024). The success of these individual efforts is further supported when communities provide clear waste management systems and public education on proper disposal (Wijayanto et al., 2024). Ultimately, the combination of a

supportive social circle and consistent digital engagement reinforces Gen Z's commitment to solving the plastic waste crisis.

Despite this awareness, younger generations face an agitation in translating attitudes into actions due to external constraints. Their dependence on online platforms places them in a position of limited agency, despite their great desire to reduce their trash and high environmental understanding regarding plastic pollution (Situmorang et al., 2020). Due to exposure to digital information and worldwide environmental movements, the younger, more educated segments of society show a measurable sense of urgency (Sujata et al., 2019). The seller and logistics partner gain complete control over packaging choices as soon as an order is placed, making it impossible for the customer to balance their positive mentality with the necessary plastic waste that will be delivered to their door (Herabadi et al., 2023). This lack of action clarifies the conflict between their environmental intentions and real-world consumption habits. Previous researches have explored Generation Z's eco-conscious behaviours in online shopping, they utilized different perspectives and theories. Nguyen et al. (2022) focused on sustainable brand preferences and app choices to reduce plastic waste.

While the previous studies highlight enabling choices and awareness, this research focusing on the underlying determinants of behavioural intention. This study will address the attitude and behaviour gap using Theory of Planned Behaviour, which emphasize perceived behavioural control in e-commerce packaging decisions. Specifically, this research investigate what stimulates young costumers to develop an intention to prevent plastic packaging waste, and what

would discourage or inhibit them from avoiding single-use plastics in the online shopping environment. Hence, the relevance of the TPB is evident since it combines three major determinants (attitude, subjective norms, and perceived behavioural control) into a comprehensive explanatory model. By adopting TPB, the present study systematically investigates how personal attitudes, social pressures and perceptions of difficulty jointly drive young consumers' intention to reduce plastic packaging waste, providing a deeper understanding of reasons why intention may not lead to actual behaviour change.

1.2. Research Problem

The important environmental impact of plastic waste is becoming more widely recognised, but this awareness frequently does not result in tangible action when it comes to online purchases. Online shopping's ease of use has resulted in a sharp rise in single-use plastic packaging, which is at odds with consumer behaviour and values. The main question is what are the key factors that drive individuals' intention to reduce single-use plastic usage. By using the Theory of Planned Behaviour (TPB) to investigate the attitudes, subjective norms, and perceived behavioural control which impact individuals' intentions for reducing online purchasing activities that lead to plastic waste accumulation.

1.3. Research Objective

Based on the research problem, the objective of this study:

- To explain the influence of attitude of younger generations towards intention to reduce plastic waste through online shopping
- To explain the influence of subjective norms of younger generations towards intention to reduce plastic waste through online shopping
- To explain the influence of perceived behavioural control of younger generations towards intention to reduce plastic waste through online shopping

1.4. Research Significance

1.4.1. Theoretical Significance

Through an empirical test of the framework's suitability in the unique, rapidly expanding context of Indonesian e-commerce consumption and plastic waste reduction, this study adds to the Theory of Planned Behaviour (TPB). A deeper theoretical understanding of the intention-behaviour gap in digital consumerism can be gained by refining the TPB model by examining Attitude, Subjective Norms and Perceived Behavioural Control as background of intention. This will show how these constructs interact in a conflict-of-interest scenario.

1.4.2. Practical Significance

By concentrating on Semarang, an Indonesian city dealing with serious plastic waste problems, the study offers context-specific empirical evidence. Researchers who looks into environmental psychology, marketing and sustainable consumer behaviour in developing countries will find the findings useful as a

baseline for creating and validating tools to measure indicators that affects pro-environmental behaviour regarding plastic waste.

1.4.3. Social Significance

The study offers useful, doable insights for environmental NGOs and e-commerce sites. The results can direct the development of targeted interventions, such as more transparent sustainable packaging options, incentive programs, and educational campaigns, to encourage consumers to actively reduce plastic waste, ultimately supporting local waste management efforts and environmental quality. These interventions can be developed by identifying the specific factors that hinder sustainable online shopping.

1.5. Theoretical Framework

1.5.1. State of The Art

The research entitled “News consumption and green habits on the use of circular packaging in online shopping in Taiwan: An extension of the theory of planned behaviour," which was conducted by Yi-Chih Lee, aimed to explore the factors influencing the adoption of circular packaging in online shopping in Taiwan, particularly amid the COVID-19 pandemic, by employing an extension of the Theory of Planned Behaviour (TPB). The tested variables included the core TPB constructs (Attitude, Subjective Norms, and Perceived Behavioural Control) along with external factors of News Consumption and the mediating variable of Green Habits, all leading to Circular Packaging Behavioural Intentions. Using a non-probability sampling method (convenience sampling), the study collected a sample

of 373 online questionnaires from Taiwanese consumers between January and February 2022. The results demonstrated that news consumption positively affected all TPB constructs and behavioural intentions, and furthermore, that green habits and environmental attitudes significantly mediated the relationship between news consumption and the intention to use circular packaging. This research has found that news consumption and green habits significantly influence consumers intention to adopt sustainable packaging practices.

The second study, entitled "Responsible Consumer Behaviour: Driving Factors of Pro-Environmental Behaviour toward Post-Consumption Plastic Packaging," was conveyed by Widayat Widayat, Ardik Praharjo, Viajeng Purnama Putri, Sri Nastiti Andharini, and Ilyas Masudin with the purpose of analyzing the factors that drive pro-environmental behaviour (PEB) related to post-consumption plastic packaging. This research utilized the Theory of Planned Behaviour (TPB) and incorporated an extension from the Theory of Normative Social Behaviour (TNSB), specifically testing variables like environmental awareness, attitude, subjective norms, perceived behavioural control, outcome expectancy, and recycling intention as drivers of the pro-environmental behaviour (post-consumption plastic packaging behaviour). The core hypotheses proposed positive relationships between environmental awareness, attitude, subjective norms, perceived behavioural control, outcome expectancy, and recycling intention on pro-environmental behaviour. The researchers collected 200 valid responses from consumers in Malang, Indonesia, using a non-probability convenience sampling method via an online questionnaire. The key finding was that recycling

intention, environmental awareness, and perceived behavioural control were significant predictors of PEB, with Subjective Norms (injunctive and descriptive) also playing a critical role.

The third research is conducted by Muhamad Al Fatih Sudin, Aini Azeqa Ma'rof, Haslinda Abdullah and Zeinab Zarimohzzabeih which is titled Inconvenience and Perceived Behavioural Control as The Main Predictive Factors of Recycling Behaviour: Malaysian University Students Context. This research aimed to investigate the primary determinants of recycling behaviour among university students in Malaysia. This research applied a modified version of the Theory of Planned Behaviour (TPB) by testing variables including Inconvenience, Attitude, Subjective Norms, Perceived Behavioural Control (PBC), and Recycling Behaviour. The study hypothesized that Inconvenience negatively affects attitude, while attitude, subjective norms, and PBC positively affect recycling behaviour, with PBC and inconvenience being the main predictors. The researchers used a convenience sampling method to collect a sample of 135 responses from students at Universiti Putra Malaysia. The results confirmed that Inconvenience and Perceived Behavioural Control (PBC) were the most significant positive predictors of Recycling Behaviour, although the negative relationship between inconvenience and attitude was not supported. The main limitation is that the findings are specific to the university student population in Malaysia, limiting generalizability to the wider public or different demographic groups.

The fourth research entitled The Role of Environmental Concern in Shaping The Purchase Intention of Eco-Friendly Packaging, conducted by Ni Ade Lianita, Harmini, Ratna Winadi Asmarantaka. This research aimed to analyse the influence Generation Z consumers' intention to purchase products with eco-friendly packaging and identify strategies that can be employed to enhance this intention, A path analysis was performed using Partial Least Square with Structural Equation Modelling (PLS-SEM). This research findings indicate that environmental concerns, support for the policy, perceived behavioural control, attitude, and subjective norm positively and significantly influence the increased intention to purchase Generation Z products with eco-friendly packaging. This study uses an extended variant of the TPB with a research focus different from previous studies that have been done. This study integrates environmental concern and policy to support the TPB model, examine the factors influencing Generation Z's purchase intention towards products with eco-friendly packaging, and identify strategies to increase Generation Z's intention to purchase. This concern influences various aspects of TPB, guiding consumers towards more sustainable choices. The study found that environmental concern, policy support, attitude, subjective norms, and perceived behavioural control significantly influence Generation Z's intention to purchase products with eco-friendly packaging using an extended TPB model. Therefore, stakeholders must enhance environmental awareness among Generation Z, as they will play a pivotal role in the future of environmental sustainability development. Integrating eco-friendly practices into campus environments and

business strategies will help meet this demand and support the shift toward more sustainable consumer behaviour.

The fifth study, entitled "Using an extended model of the reasoned action approach to explore individual behavioural intentions regarding litter and plastic pollution prevention in a developing country," was conveyed by Kwaku Oduro-Appiah, Abraham Afful, and Henrietta Osei-Tutu with the purpose of exploring the critical socio-cognitive determinants influencing individuals' intentions to prevent litter and plastic pollution in a developing country (Ghana). The research employed an extended Reasoned Action Approach (RAA) model, testing the core RAA constructs (Attitude, Subjective Norms, and Perceived Behavioural Control) alongside the added construct of Moral Norms as predictors of Behavioural Intention to stop littering. The main hypotheses proposed that all four constructs positively influence Behavioural Intention. The researchers used a structured questionnaire to collect 447 valid responses from participants in Ghana. The results indicated that Attitudes and Moral Norms were the most influential determinants of individuals' intentions to prevent littering. The analysis suggests that interventions targeting self-responsibility and moral obligation are key to promoting pro-environmental behaviour. The limitation is that the research findings are primarily context-specific to the Ghanaian population, which may restrict generalizability to other developing countries with different socio-cultural dynamics.

While the five previous studies collectively establish that environmental knowledge, attitudes and green perceived value are significant drivers of sustainable behavior, they primarily focus on general waste management or green

product consumption without addressing the specific digital consumption habits of the younger generation. For instance, Oduro-Appiah et al. (2024) successfully identified moral norms and attitudes as key predictors for litter prevention in Ghana, yet their research is restricted to physical disposal behaviours and public littering. In contrast, my research fills a critical gap by shifting the focus to the growing e-commerce sector, specifically examining how the digital lifestyle of Generation Z in Indonesia influences their intention to reduce plastic packaging waste at its source. By evaluating the intention to decrease online shopping frequency as a proactive environmental intervention, this research addresses a modern behavioural driver that previous research on traditional waste disposal has overlooked.

1.5.2. Research Paradigm

The research will bring up various theories, analyses, and perspectives that have various points of view. To harmonize these coherently into a unity that makes sense, a guideline is needed that can be the guide in finding and compiling his findings. This is referred to as a paradigm (Baxter & Babbie, 2003).

The paradigm used in this research is positivism. Positivism itself was born by a French scientist Auguste Comte. He considered social problems to be similar to science. For this reason, he examined the relationship between the two variables. Positivism is a paradigm that examines the causal relationship of the problems that arise. Positivism believes that there is an objective truth that can be researched to increase knowledge in the world. knowledge in the world. They believe in things that can be measured through visible symptoms, universal laws can be sought through all cases, there is only one reality/truth that can be studied through certain

characteristics or theories, every cause there is an effect whose relationship is linear. and observed as an object in science (Baxter & Babbie, 2003). The positivism paradigm is also utilized to identify or validate causal links that are frequently employed to forecast broad trends or social symptoms in human behaviour (Neuman, 2014).

1.5.3. Variable Description

1.5.3.1. Attitude Towards Reducing Plastic Packaging

The concept of attitude towards reducing plastic packaging through online shopping is a critical application of general attitude theory. In early 1935, Gordon Allport provided a foundational definition of attitude, " a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon an individual's response to all objects and situations with which it is related" (Allport, 1935). More recently, Icek Ajzen, defined attitude as a disposition to respond favourably or unfavourably to the act or outcome of minimizing plastic consumption associated with e-commerce (Ajzen, 2005; Fishbein & Ajzen, 2010).

According to Herabadi, Reksodiwiryo, and Adi (2023), conceptualizes the attitude variable as a multidimensional construct that indicates the evaluation of environmental issues by young Indonesian consumers. The indicators for this variable are usually divided into three separate area

1. Cognitive indicators (Belief and knowledge)

   The cognitive indicators look at what people think and know about how plastic waste affects the environment and how it could be reduced. One important part is being aware of how things affect the environment. Another

important sign is how effective people think waste reduction is. Recognizing the problem is also important because it shows that people know that plastic waste from online shopping is a serious environmental issue, especially in light of Indonesia's growing plastic waste crisis.

2. Affective indicators (Feelings and emotions)

   The affective indicators look at how people feel about the problem of plastic waste. Environmental concern is the feeling of worry or anxiety about the growing amount of plastic waste cause by online shopping and how it harms the environment. Another important part is the sense of responsibility that comes with feeling like they have a personal duty to cut down on plastic waste, even if it means changing the behavior on how to shop or supporting eco-friendly online stores. Having a strong emotional connection to nature is also very important. People who feel this way about the environment may feel like the damage caused by plastic waste is a personal loss, which pushes them to do something about it.

3. Evaluative indicators (Intent and tendency)

   Evaluative indicator look at how people tend to act or what they want to do to cut down on plastic waste. People who like eco-friendly packaging also like online stores that offer minimal or sustainable packaging, like materials that can be broken down or reused. Preferences for sustainable products means that people are more likely to buy things that come in less packaging or are made from materials that are good for the environment, rather than

things that come in too much plastic. The willingness to act is a key sign that someone is ready to adopt behaviours that reduce waste, like looking for eco-friendly packaging options or shopping less online to cut down on plastic use overall

In conclusion, the attitude towards reducing plastic waste through online shopping is an individual's readiness, organized through experience, to evaluate the specific behaviour of minimizing plastic usage during e-commerce transactions favourably or unfavourably (Allport, 1935; Ajzen, 2005).

1.5.3.2. Subjective Norms of Reducing Plastic Packaging Waste

Subjective norms refer to the perceived social pressure to engage or not engage in a specific behaviour. Specifically, in this context, the subjective norm is the individual's perception of whether important referent groups approve or disapprove of their effort to minimize plastic waste from e-commerce purchases (Ajzen, 2005). Subjective norms are considered as a latent variable.

The underlying components are important to the comprehensive definition of subjective norms. According to Ajzen approach, subjective norms or reducing plastic packaging through online shopping are a latent variable that must be implied from specific, measurable responses (Ajzen, 2005).

According to the research conduct by Situmorang and Lee (2020), indicators for this variable are divided into two:

1. Normative belief

   This indicator shows which reference groups affect the costumer's choice to cut down on plastic packaging when shopping online. The study

examines the impact of family and relatives emphasizing that immediate family members significantly influence an individual's decision to buy products with less plastic packaging or support eco-friendly online retailers. Additionally, a person's online shopping habits are influenced by their close friends and peers, especially when it comes to choosing sustainable decisions that minimize plastic packaging. Peer perceptions and actions also influence the intention to engage in more eco-conscious shopping activity.

2. Motivation to comply

   When it comes to cutting down on plastic packaging when purchasing online, these indicators determine how much consumers are compelled to comply to reference group standards. Expected acceptance represents the degree to which customers anticipate that their family, friends, or social circles would approve of their decision to purchase products with reduced or eco-friendly packaging, serving as a crucial motivator for making sustainable choices. Social pressure or expectations and social modelling describes the tendency to replicate and expects individual to engage environmentally by others in their social networks.

In conclusion, the subjective norms of reducing plastic packaging through online shopping quantify the perceived social pressure an individual feels to engage in the specific pro-environmental behaviour (Ajzen, 1991; Fishbein & Ajzen, 2010).

1.5.3.3. Perceived Behavioural Control of Online Shopping

Perceived behavioural control (PBC) refer to the perceived ease or difficulty of performing the behaviour, and it is a key determinant in models like Theory of Planned Behaviour (TPB) (Ajzen, 1991). In the context of online shopping, PBC reflects the individual's confidence on their ability to successfully execute the entire process, from finding a product to completing the secure transaction. PBC is also considered as latent variable.

According to Wang, Chang and Lee (2021), PBC can be indicated with two factors which are:

1. Self-efficacy

   Self-efficacy determine a person's confidence in their capacity to cut down on plastic packaging, especially when it comes to online shopping. These include knowledge and skill, where people believe they possess the knowledge and abilities needed to recognize the consequences of their online shopping behaviour. Even in situations where less sustainable are available, people who are confident in their ability to select online shopping options that minimize plastic packaging are said to be confident. Lastly, decision-making shows the conviction that people are capable of choosing goods or merchants with little to no plastic packaging, feeling prepared to make these eco-friendly decisions when they shop online.

2. Controllability

Controllability measures external factors or resources that influence how easy an individual to cut packaging when shopping online. Accessibility is the perception associated with the ability of consumers to find online retailers or products that propose environmentally friendly packaging. Opportunity reflects the idea that it is easy to find alternatives with less plastic packaging for purchasing online. Finally, platform support refers to the presence of particular tools in online shopping platforms that help customers make more sustainable choices and avoiding plastic packaging.

In conclusion, perceived behavioural control of online shopping quantifies an individual's subjective sense of control and self-efficacy over the act of purchasing goods via the internet (Ajzen, 1991; Fishbein & Ajzen, 2010).

1.5.3.4. Intention to Reduce Online Shopping Behaviour

The constructs of intention to reduce online shopping behaviour is an individual's deliberate motivation, personal readiness and intended action to restrain or diminish the involvement in online shopping activities resulting from their perceived negative environment implications especially in relation to generation of plastic waste through packaging and logistics. In the context of TPB, intention in the direct predictor to act as a person's readiness to make an effort for doing or obtaining from a particular action (Ajzen, 1991; Ajzen, 2005).

According to the research conducted by Li and Huang (2021), the indicators that are specifically framed around intention variable are:

1. Frequency reduction

As a tactic to cut down on plastic packaging waste, frequency reduction measures the intention to reduce the frequency of online shopping. This indicators illustrates the consumer's motivation to engage in fewer transactions of online shopping, recognizing that reducing their shopping habits will immediately contribute to minimizing the environmental impact of plastic packaging. By decreasing the overall amount of online purchases, individuals might reduce their consumption of single-use plastics typically linked with product packaging in e-commerce. This indicator emphasize an individual's conscious attempt to align their purchasing behaviours with environmentally friendly options, particularly in the context of protecting the environment and plastic waste reduction.

2. Quantity reduction

   This measure the intention to buy less when shopping online as a mechanism to reduce plastic packaging waste. This measure signals the consumers desire to try and shop more consciously by making fewer purchases online as a way of reducing their plastic guilt when considering ways to purchase products with less packaging. People can use less plastic for packaging by buying less, which helps to cut down on environmental pollution. And not only does the decrease in purchasing frequency help reduce waste, but it is another step toward a more sustainable way of consuming.

3. Implementation likelihood

This is a measure of how confident consumers feel to put their plans to cut single-use plastic into action by making more sustainable choices when shopping. It attends to whether or not the personal is ready and willing to actually decrease online shopping quantity and frequency, as well as chances of consistently selecting items characterized by little or few plastic when consuming. This indicator demonstrates the consumer's attitude to transfer their good intentions into actual behaviour that they can do, which contributes in turn to minimize the plastic waste and encourage a more sustainable consumption.

Together, they are positively associated with a person's intention to escalate perceived consequences of reducing online shopping behaviour. This intention, in turn, leads to actual behaviour, where individual actively refrain from shopping online more often, instead move towards offline shopping and select specific online shopping practices that lead to less plastic waste.

1.5.4. Theory

The Theory of Planned Behaviour (TPB), developed by Icek Ajzen (1991), is a widely influential social psychological framework used to predict and explain human behaviour in specific contexts. The core tenet of the TPB is that behaviour is determined by an individual's behavioural intention, which is the motivational factor that precedes the action. The stronger the intention to engage in a behaviour, the more likely the behaviour will actually be performed, provided the individual possesses sufficient control over the action. The TPB is an extension of the earlier Theory of Reasoned Action (TRA), with the critical addition of Perceived

Behavioural Control (PBC) to account for behaviours over which people do not have complete volitional control, thereby broadening the theory's applicability to real-world actions like managing health or environmental waste (Ajzen, 1991; Ajzen, 2005).

Behavioural intention itself is determined by the weighted contribution of three independent psychological determinants: Attitude toward the Behaviour, Subjective Norm, and Perceived Behavioural Control (Ajzen, 1991). Attitude represents the individual's overall positive or negative evaluation of performing the behaviour, derived from their underlying beliefs about the outcomes of the action (behavioural beliefs). Subjective Norm refers to the perceived social pressure to engage or not engage in the behaviour, reflecting the expectations of important referent groups (normative beliefs and motivation to comply). Finally, Perceived Behavioural Control (PBC) is the belief that one has the necessary resources, skills, and opportunities to successfully execute the behaviour, stemming from control beliefs (Ajzen, 2005).

A fundamental principle governing the TPB's predictive accuracy is the Principle of Compatibility (Ajzen & Fishbein, 2005). This principle mandates that the measures of intention, attitude, subjective norm, and perceived behavioural control must all correspond in terms of the specific Target, Action, Context, and Time (T-A-C-T) of the behaviour in question. When the components are measured with this required specificity, the TPB provides a robust explanation for the factors driving human action and serves as a crucial tool for designing effective behavioural interventions (Ajzen, 2005).

1.6. Hypothesis

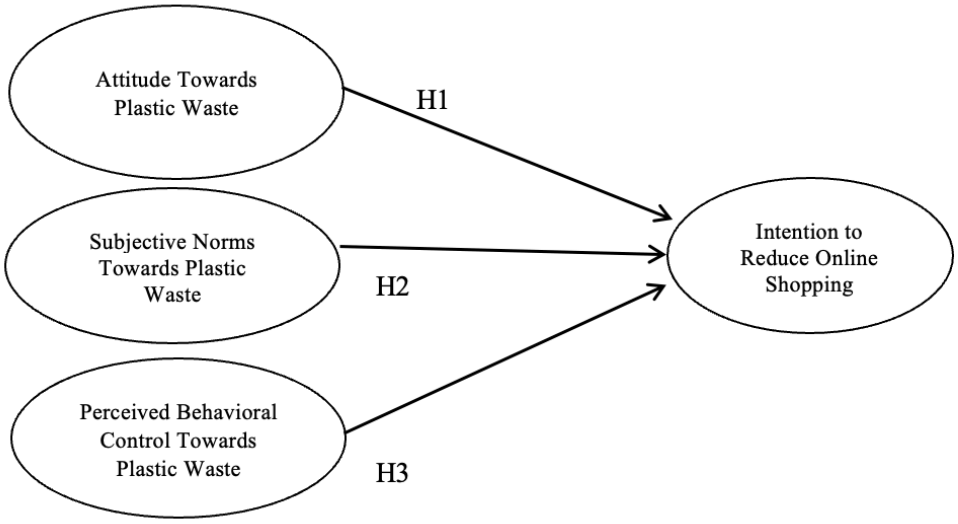

Figure 1. 2 Research Model

1.7. Conceptual Definition

1.7.1. Attitude Towards Plastic Waste

Attitude towards plastic waste refers to an individual's overall positive or negative evaluation of plastic waste and efforts to reduce its generation, particularly within the context of consumption behaviour such as online shopping. According to Theory of Planned Behaviour (TPB), attitude is defined as a latent psychological construct that reflects a person's tendencies to respond favourably or not toward a specific behaviour based on their beliefs about the consequences of the behaviour (Ajzen,1991; Ajzen 2005).

1.7.2. Subjective Norms Towards Plastic Waste

Subjective norms towards plastic waste refer to an individual's perception of social pressure to reduce plastic waste and to engage in environmentally responsible consumption behaviours. Within the TPB framework, subjective norms are defined

as the perceived expectations of significant others; such as family members, peers and social groups and the individual's motivation to comply with those expectation (Ajzen. 2005; Ajzen 1991).

1.7.3. Perceived Behavioural Control Towards Plastic Waste

Perceived behavioural control towards plastic waste refers to an individual's subjective assessment of their ability to reduce plastic waste through their consumption-related decisions, including the capacity to limit behaviours that contribute to plastic waste generation such as online shopping. Within the Theory of Planned Behaviour (TPB), perceived behavioural control is defined as the perceived ease or difficulty of performing a behaviour, which is shaped by control beliefs regarding the availability of resources and perceived barriers, as well as the perceived power of these factors to facilitate or hinder the behaviour (Ajzen, 1991; Ajzen 2005).

1.7.4. Intention to Reduce Online Shopping Behaviour

Intention to reduce online shopping behaviour means the conscious motivation, readiness and planned effort of an individual to restrain their participation in online shopping behaviour as a consequences of its environmental damages. Intention in Theory of Planned Behaviour (TPB), is the immediate determinant of behaviour, and represents an individual's motivation and willingness to make a behavioural effort to perform or not perform the behaviour in question (Ajzen 1991; Ajzen 2005).

1.8. Operational Definition

Table 1. 1 Operational Definition

Variable	Indicator	Items	Scale	Reference
Attitude Toward Plastic Waste (X_1)	Cognitive (Belief and Knowledge)	1. I believe plastic waste is a serious environmental problem 2. I believe plastic waste significantly contributes to environmental pollution 3. I believe reducing plastic use can help protect the environment	5 – point Likert Scale	Shin, J.Y. et al., 2024
	Affective (Feelings and Emotions)	1. I feel concerned about increasing amount of plastic waste 2. I feel worried about the long-term impact of plastic waste 3. I feel uncomfortable when I see plastic waste polluting the environment	5 – point Likert Scale	
	Evaluative (Intent and Tendency)	1. Reducing plastic use in daily is a good action	5 – point Likert Scale	

		2. Reducing plastic consumption is a responsible behavior 3. I support efforts aimed at reducing plastic waste		
Subjective Norms Towards Plastic Waste (X_2)	Normative belief	1. Most people who are important to me think that I should reduce single-use plastics. 2. People whose opinions I value expect me to minimize my use of single use plastic 3. Most people who are important to me reduce their own use of single-use plastic	5 – point Likert Scale	Shin, J.Y. et al., 2024
	Motivation to Comply	1. I feel a social pressure from people around me to reduce single-use plastic 2. I am motivated to follow the expectation of people who encourage reducing plastic use	5 – point Likert Scale	

		3. I try to meet the expectations of people who think I should reduce single-use plastic		
Perceived Behavioural Control Towards Plastic Waste (X_3)	Self-efficacy	1. I am confident that I can reduce single-use plastic in my daily activities. 2. If I want to, I can easily choose products with less plastic packaging.	5 – point Likert Scale	Shin, J.Y. et al., 2024
	Controllability	1. Whether or not I reduce my plastic waste is entirely up to me. 2. I have the time and opportunity to reduce single-use plastic consumption.	5 – point Likert Scale	
Intention to Reduce Online Shopping Behavior (X_4)	Frequency Reduction	1. I intend to reduce the frequency of my online shopping in the future 2. I plan to shop online less often that I currently do	5 – point Likert Scale	Shin, J.Y. et al., 2024

	Quantity Reduction	1. I intend to reduce the number of product I purchase online. 2. I plan to buy fewer items when shopping online	5 – point Likert Scale	
	Implementation Likelihood	1. I am confident that I can reduce my online shopping behavior 2. I am willing to make a serious effort to reduce my online shopping activities	5 – point Likert Scale	

1.9. Research Methods

1.9.1. Research Type

This research used an explanatory research design. Quantitative research is a systematic process dedicated to collect and analyse numerical data, a method which used to find patterns, testing relationship between variables, and generalizing

findings to a wider populations (Bhandari, 2022; Mohajan, 2021). The explanatory design is mandatory for statistically testing the causal hypotheses.

1.9.2. Population

The study population contains Generation Z consumers residing in Semarang, Central Java, Indonesia, who actively participate in online shopping. This fellow is selected due to their status as a digitally native generation whose consumption patterns are significantly influenced by online platforms and e-commerce services. Additionally, Generation Z is increasingly exposed to environmental information and public discourse concerning plastic waste and sustainability.

1.9.3. Sampling

1.9.3.1. Sampling Technique

Due to the barrier of the population and lack of sampling frame, a non-probability sampling technique is implemented, specifically purposive sampling. This method involves a conscious selection of participants based on predefined, non-random criteria to ensure that the sample units hold the essential characteristics that are relevant to the study (Palinkas et al., 2015)

1.9.3.2. Sample Size

Based on Structural Equation Modelling (SEM) for advanced statistical analysis, the absolute minimum of 200 is recommended for stable SEM analysis in social sciences, a more tight ratio is preferred (Memon et al., 2020). To balance practical probability with methodological accuracy, this study will set a minimum sample of 200 respondents, while aiming a target at 300 respondents.

1.9.4. Types and Sources of Data

This research will utilize primary data as the foundational evidence to empirically test the formulated hypotheses. Primary data is defined as information collected firsthand from the original source specifically for the current research project, and it has not been previously published or gathered by another party. For this study, the sample population will be the main source of primary data, which will be systematically collected through a structured questionnaire designed to capture the necessary variable measurements (Saunders, Lewis, & Thornhill, 2019).

1.9.5. Research Instrument and Data Collection Techniques

The sample population will serve as the main source of this data, which will be systematically collected using an online questionnaire method; this questionnaire is a standardized research instrument contains a set of written questions (Fowler, 2014), and data collection will be performed through a researcher-administered approach, where the researcher personally reads the questions to the respondent and records the answers based on the respondent's verbal replies to ensure clarity, consistency, and a high response rate.

The sample population will serve as the main source of this data, which will be systematically collected using an online questionnaire method; this questionnaire is a standardized research instrument comprising a set of written questions (Fowler, 2014). The questionnaires aim to gather standardized information on the influence of consumer environmental awareness and concern regarding plastic waste on their online shopping behaviour.

1.9.6. Data Processing

1.9.6.1. Editing

Editing is the crucial process of checking the collected raw data for completeness, consistency, and legibility. This stage involves screening of the questionnaires to ensure all questions have been answered, responses are recorded clearly, and the data is consistent across related questions. The focus of editing is to detect and correct errors and errors, making the data suitable and standardized for subsequent analysis (Malhotra, 2019).

1.9.6.2. Coding

Coding involves assigning a numerical or symbolic code to each response category for all variables within the questionnaire. This systematic classification transforms qualitative and categorical responses into a quantitative format suitable for computer processing and statistical analysis. The coding scheme must be thorough and mutually exclusive, ensuring that every answer can be placed into one defined category, thus facilitating accurate data entry (Malhotra, 2019).

1.9.6.3. Tabulating

Tabulating, or data summarization, is the process of counting the number of observations that fall into various categories, thereby organizing the coded raw data into a compact and manageable form. This is typically done by creating frequency distribution tables or cross-tabulation tables. The main objective of tabulation is to present the data in a clear, systematic manner, which is the foundational step before performing advanced statistical analysis (Malhotra, 2019).

1.9.7. Data Analysis Techniques

Partial Least Structural Equation Modelling (PLS-SEM), will be used to analyse the data that have been collected, a variance-based approach that has the ability to simultaneously test the complex causal relationship in the Theory of Planned Behaviour (TPB) (Hair, Hult, Ringle & Sarstedt, 2021). This fits the research because PLS-SEM outplay in predicting models by determining the strength between all three TPB factors at the same time (Ringle & Sarstedt, 2024).

1.9.7.1. Measurement Model Evaluation (Outer Model)

The measurement model evaluation needs to be conducted to assess the relationships between variables and their measurement indicators. This study employs a reflective measurement model evaluation, as the items within each construct are assumed to reflect a specific concept and share similar meanings. There are several steps involved in evaluating a reflective measurement model, including indicator reliability (individual item), internal consistency reliability, convergent validity, and discriminant validity (J. Hair & Alamer, 2022).

1.9.7.2. Structural Evaluation Model (Inner Model)

The structural model evaluation in PLS-SEM focuses on assessing the explanatory and predictive power of the model and is necessary to determine the model's ability to explain and predict one or more constructs. Several tests are conducted within the inner model, including the collinearity test, path coefficient test, R-square test, and f-square test (explanatory power) (J. Hair et al., 2022).