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RESEARCH PAPER

The role of media, life experience, knowledge and government support in creating Generation Z's pro-environmental behavior in Indonesia

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Abstract. As the world's fourth most populated country, Indonesia will need to use its resources sustainably. Generation Z as the future consumer has a key role to actively engage in pro-environmental behavior to prevent further environmental degradation. This study assessed the role of the media, life experiences, knowledge and government support in the adoption of pro-environmental behavior among generation Z using the Norm Activation Model. Data were collected using an online questionnaire to 590 university students in the greater area of Indonesia capital city, Jakarta. Data were analyzed using descriptive method and PLS-SEM. This study demonstrated the ability of the Norm Activation Model to predict the relationship between the media, life experiences, knowledge and government support to pro-environmental behavior and concluded that knowledge is the key influential factor of personal norms to engage in pro-environmental behavior, followed by the media and significant life experiences, while government has a negative influence. The implications are discussed.

Keywords: pro-environmental behavior; generation Z; norm activation model; partial least square – structural equation modeling.

1. Introduction

The ecology in Indonesia is deteriorating. News about declining environmental quality or environmental problems is becoming more common among Indonesians and has become the main topic of coverage in the Indonesian media. Some examples of key environmental degradation news include haze caused by forest and land fires in Sumatra (Muhardiansyah, 2019) and Kalimantan, causing disasters in Indonesia and its neighboring countries (Merdeka, 2019). Jakarta's deteriorating air quality in 2019 ranked the Indonesian capital city as the 3rd worst in the world (Yulika, 2019). Plastic waste is also a major issue; in 2010 Indonesia was the 2nd biggest plastic waste producer after China (Jambeck et al., 2015) and in 2017, 14.2% plastic waste in the world was coming from Indonesia (Lebreton et al., 2017). The impact of environmental degradation in Indonesia will contribute to global disasters, therefore it is very important to stop the process.

Based on the 2020 Environmental Performance Index (EPI), Indonesia was ranked 116 out of 180 countries with a score of 37.8 (EPI, 2020). Despite an increase in ranking from 133 in 2018 to 116 in 2020, the 116 rank shows that Indonesia still has a long way to go to improve environmental quality.

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As the fourth most populous country in the world with a projected population of 266.91 million in 2019 and a growth rate of 1.49%, there will be a population increase of 3.5 - 4 million per year in Indonesia (Databooks, 2019). To meet its consumption needs, various resources will be consumed which further suppress the Indonesia's environmental capacity . For this reason, maintaining the sustainability of existing resources, particularly the environment, will be critical. The Sustainable Development Goals (SDGs) number 12, responsible consumption and production, which aims to guarantee sustainable consumption and production (SCP), encourages the government to ensure a sustainable consumption and production pattern. The gorvernment has to increase the welfare of economic activities by reducing the use of resources, minimizing degradation and pollution throughout the life cycle, while improving the quality of life.

SDG 12 also requires a systemic approach and collaboration among actors operating in the supply chain, from producers to end consumers. Consumers are one of the main stakeholeders that will drive sustainable production and playing a pivotal role in sustainable development (OECD, 2008). Consumers' knowledge and understanding on sustainability consumption has to be increased since consumers can determine the type of product or service they want. Consumers who have environmental concerns are expected to create demand for environmentally friendly goods and services.

The first objective of this study is to investigate the influence and causal relationship of four influencing factors on generation Z's personal norms or moral obligation in adopting the pro-environmental behavior (PEB). The influencing factors are significant life experience/SLE (Tanner, 1980; Tanner, 1998), media influence/MI (Patchen, 2010), perceived environmental knowledge/PEK (Hines et al., 1987), and perception on authority or government support/PAGS (Tang & Zhou, 2012). These four factors are considered important to PEB based on the above research.

Personal norms are important to PEB since they stem from an individual's internal self, their feelings (Schwartz, 1977), the expectations that people hold for themselves (Turaga et al., 2010), the basis of individual's general predesposcition to PEB (Stren, 2000) and a moral motivation before being limited by the ability to perform PEB (Turaga et al., 2010). This study will use the Norm Activation Model (NAM), a theory or model developed by Shalom H Schwartz. Additionally, the second objective of this study is to analyze the predictive ability of the model and formulate the managerial implications to support PEB. Finally, PEB is believed to be able to support sustainable production and consumption.

In the research of PEB, the aforementioned factors mostly are linked directly to PEB (Finger, 1994; Howell & Allen, 2019; Li & Chen, 2015; Jharotia, 2018; Östman, 2014; Huang, 2016; Trivedi et al., 2018; Muralidharan et al., 2015; Patchen, 2010; Vicente-Molina et al., 2013; Goh & Balaji, 2016; Kaiser & Fuhrer, 2003; Levy et al., 2016; Peschel et al., 2016; Yin, 1999; Mafuzah & Majid, 2018; Kesari et al., 2018; Sohlberg, 2017 and Mufidah et al., 2018). The influence of those factors to PEB through personal norms using NAM is rarely researched. This study will add to the body of literature of the four factors, their influences and relationships to awareness of consequences as a critical factor in NAM which leads to personal norms and intention/actual PEB of generation Z in Indonesia.

Generation Z in Indonesia was chosen as the focus of this study for several reasons. First, generation Z is the next generation of Indonesia who will replace millennial generation as future consumers. Second, 65% of generation Z in Indonesia is concerned about climate change in the future (Broadbent et al., 2017). Third, 78% of Indonesia's generation Z wants to contribute to society (Broadbent et al., 2017), and last, this generation is still in school or college, therefore their opinions are considered impartial since they are not influenced by economic interests.

2. Literature Review

2.1. Theoretical Foundation: Norm Activation Model

The Norm Activation Model (NAM) is a theory or model developed by Shalom H Schwartz. It is often used to study environmentally friendly behavior (Octav-Ionut, 2015; Klöckner, 2013; Turaga et al., 2010; Steg & Nordlund, 2012; Van Der Werff & Steg, 2015). The basic idea of this model is that personal norms (PRN) will be activated when individuals become aware of environmental problems as a result of their behavior (Steg & Nordlund, 2012). The higher the awareness of the problem, the higher personal norms and intention/behavior (Steg & Nordlund, 2012). In their library review, Turaga et al., (2010) concluded that environmentally friendly behavior will emerge when individuals are aware of the repercussion of individual decisions on environmental quality and accept their responsibility to do their part to achieve mutual benefits.

Schwartz (1977) explained that NAM components consist of three variables including Personal Norms (PRN), Ascription of Responsibility (AR) and Awareness of Consequences (AC). Steg & Nordlund (2012) defined PRN as a feeling of a moral obligation to do or not to take a specific action. PRN is unique to each individual because it is influenced by their experiences and social position (Schwartz, 1977). AR is a sense of responsibility for the negative consequences of failing to perform an expected behavior (De Groot & Steg, 2009). AC is defined as an individual's tendency to become aware of the consequences of one's own behavior towards oneself (Schwartz, 1977) or a situation to which a person is aware of the negative consequences of not acting in an environmentally friendly manner (De Groot & Steg, 2009). AC is a critical factor that will influence an action. The more aware consumers are of the consequences of their actions on others, the greater their feeling of obligation, which will be expressed in their personal norms (Steg & Nordlund, 2012). De Groot & Steg (2009) summarized the theory in Figure 1.

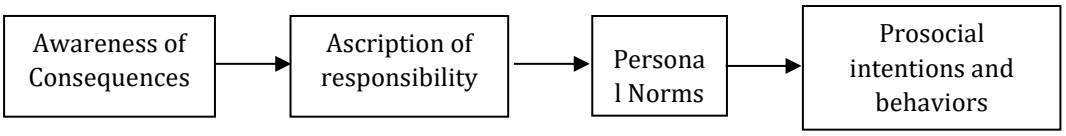

Figure 1. Norm Activation Model (De Groot & Steg, 2009)

2.2. Development of hypotheses

2.2.1. Significant life experiences

Significant life experiences (SLE) is one of the factors that influence the behavior and tendencies of an environmental actor or activist. This variable was first put forward by Tanner (1998) and Tanner (1980) in the field of environmental science teaching. SLE is a person's (environmental activist) direct experience of an event that helps foster an individual's environmental concern.

In Switzerland, Finger (1994) classified experiences which related to the environment and learning behavior into three types: (1) experience activism, (2) experiences about natural surroundings, (3) experiences of environmental disasters. Arnold et al. (2009) concluded that the most significant SLEs for young people in Canada are: (1) influential individuals (parents, role models, teachers and friends, (2) experiences (time to do activities in the wild, in youth groups, conferences and meetings and schools). Some respondents also stated that books and the media also had a significant influence while natural damage and pollution were the factors that affect negatively (Arnold et al., 2009). Howell & Allen (2016) showed that education, work, media, people, groups/organizations, negative experiences/events, outdoor/nature experiences and impacts of climate change are eight significant experiences which influenced respondents' concerns about climate change in the UK.

Previous research on the relationship between experiences and awareness consequences (AC) has concluded that personal experiences are positively related to AC in climate changes

beliefs (Rosenthal, 2022), support for environmental protection (Stern et al., 1985) and marine environment tourism (Christensen et al., 2008). Zuo et al. (2017) who studied experience as a moderator to AC, came to the same conclusion. Christensen et al. (2008) stated that people with more experience are more aware of the impacts of their actions to the animals and environment.

Another study from Li & Chen (2015) which investigated the direct relationship between SLE and environmental action stated that experiences which influence environmental action the most are: (1) principles of life, (2) environmental organization, (3) experiences in nature (during university), (4) experiences in nature (during pre-school and elementary school) and (5) formal education (at university). Hence, for this study, life experiences is hypothesized to have positive and significant influence to PEB mediated by awareness of consequences as critical factor of NAM.

H1: Significant life experiences have positive and significant association with the awareness of consequence

2.2.2. Media Influence

The media plays a crucial role in increasing individual understanding of an environmental problem (Patchen, 2010; Wen et al., 2020; Ando et al., 2020). There are two opinions regarding direct influences of the media to PEB. Jharotia (2018), Östman (2014), Huang (2016), Trivedi et al. (2018) and Wen et al. (2020) support the first opinion that media online/offline or both promote pro-environmental behavior. The second opinion, that the media does not influence the pro-environmental behavior is supported by Muralidharan et al. (2015).

Previous studies which learned about media influence to PEB intention or actions using NAM conclude that media has a positive influence on awareness of consequences (AC) in sustainable commuting (Wen et al., 2020), energy saving behaviors (Ando et al., 2020) and support for environmental protection (Stern et al., 1985). Rosenthal (2022) believed that social media has direct influence on AC, but according to Wen et al. (2020), both online and offline media had direct influence on PEB and indirectly through AC. Ando et al. (2020) summed up that personal communication has a stronger effect on AC than mainstream media.

Based on the above studies, this study hypothesized that media has a positive and significant influence on the pro-environmental behavior of generation Z mediated by awareness of consequences as a critical factor in NAM. The media variable will be referred to as media influence (MI).

H2: Media influence has a positive and significant association with the awareness of consequence

2.2.3. Perceived Environmental Knowledge

Environmental knowledge involves what people know about the environment, the key relationships that lead to environmental aspects or impacts: the "whole system", and the collective responsibilities necessary for sustainable development. Knowledge of several environmental aspects can differ significantly from one country to another due to cultural differences, different situations and limitations in obtaining environmental knowledge (Geiger et al., 2018). According to Hines et al. (1987), there are two types of knowledge: (1) knowledge of environmental issues, (2) knowledge of available and effective actions for the situation at hands. Knowledge of the issue is a prerequisite for action. Before an individual intends to take an action on an environmental problem, one must be aware of environmental problems (Hines et al., 1987).

There are two different opinions regarding the influence of environmental knowledge on the selection of environmentally friendly products. The study of Grankvist & Biel (2001) supported the opinion that a consumer will buy environmentally friendly products if they care about the environment, is aware of the environmental problems or understand that the product they will buy is environmentally friendly. This is in accordance with Patchen's (2010) hypothesis that knowledge and personal characteristics will influence individual behavior. Individuals who have knowledge (climate change in Patchen's study) have a tendency to take a positive action in

dealing with climate change. Similar result has been found by the studies from Vicente-Molina et al. (2013), Goh & Balaji (2016), Kaiser & Fuhrer (2003)and Levy et al. (2016). As opposed to the above finding, the study by Peschel et al. (2016) supported the opinion that knowledge of the environment does not affect consumer choices for environmentally friendly products.

In his study, Stren (2000) summed up that scientific and technical information influence AC positively. The study from Yamoah et al. (2021) showed that a farmer who understands the cocoa yield from a production system will have an awareness of consequences and make the farmer exhibits PEB. Similar result from Akitsu & Ishihara (2018) showed that basic energy knowledge predicts the AC and at the end predicts the energy literacy structural model. Based on the above studies, this study hypothesized that perceived environmental knowledge (PEK) has a positive and significant influence on awareness of consequences (AC) which will lead pro-environmental behavior of generation Z

H3: Perceived environmental knowledge has a positive and significant association with the awareness of consequence

2.2.4. Perceived Authority/Government Support

The government has an important role to play in all parts of the business ecosystem. Governments must develop public policies and provide incentives for companies and consumers to become more environmentally and socially responsible (Tang & Zhou, 2012). Governments can influence development activities by establishing and enforcing physical rules and procedures that broadly cover issues such as safety, health, norms and economy. The government is in the highest position to support, provide, or impede development activities with the aim of minimizing negative impacts that can affect the environment and society (Persada et al., 2015). Perceived authority/government support (PAGS) can be defined as an individual's perception that every resource, regulation, facility and support/action provided by the government is to help individuals perform certain behaviors (Lin et al., 2017).

Some research studies have investigated the direct relationship between the government/authority/policies and PEB. Yin (1999), Mafuzah & Majid (2018), Kesari et al. (2018), Sohlberg (2017) and Mufidah et al. (2018) support the opinion that the government or authority gives a direct positive influence to pro-environmental behavior. However only a few studies in literature have investigated the relationship between government/authority/policies and awareness of consequences using NAM theory. Liu et al. (2017a) reported that low carbon transport policy has a positive and significant influence to awareness of consequences for low carbon travel intention in Tianjin, China. A slightly different study from Wan et al. (2014) who studied the moderator effect of perceived policy effectiveness to the relationship between awareness of consequence and recycling intention in Hongkong concluded that it is negatively significant. Shen et al. (2022) who used the same model but for waste classification intention in Bengbu, China, also had a similar result.

This study can fill a knowledge gap of the government/authority/policy and their relationship with awareness of consequences since the study of this relationship is limited. In accordance with the Norm Activation Model which states that an intention or behavior is initiated by awareness of consequences, this study therefore hypothesizes:

H4: Perceived authority/government support has a positive and significant association with the awareness of consequence

2.2.5. Constructs of Norm Activation Model

In this study, the prosocial intention and behavior of the norm activation model based on the study from De Groot & Steg (2009) is replaced by intention and actual pro-environmental behavior (ACPEB). The relationship between awareness of consequences (AC), ascription of

responsibility (AR), personal norms (PRN) and pro/friendly-environmental intention or behavior (ACPEB) has been tested in many green behavior studies.

Wang et al. (2018) who studied about energy saving behavior in China using the norm activation model and theory for planned behavior (TPB) concluded that the awareness of the consequences (AC) can directly activate personal norms (PRN), and indirectly can activate personal norms (PRN) through the ascription of responsibility (AR). Similar result is also coming from the study of pro-environmental behavior in the Netherlands by Onwezen et al. (2013) using NAM and TPB. The study showed significant relation between AC, AR and PRN, in addition to the previous relationship. PRN also influences pro-environmental behavior through intention. A slightly different model of NAM and TPB has been used by Liu et al. (2017b) to study about the intention of sustainable transport behavior, and the result also showed that AR and AC has a positive and significant relation with PRN, while PRN also mediates the influence of AC to the intention to do sustainable transport behavior. Liu et al. (2017a) who also used the combination of NAM and TPB for low-carbon travel modes in China showed that the relationships between AC, AR, PRN and low-carbon travel intention are positive and significant. Another model, which link AC to AR, AR to PRN and PRN to attitude by Akitsu & Ishihara (2018), also showed a positive and significant relationship between AC, AR and PRN.

Other studies that employed the De Groot & Steg (2009) model have concluded that relationships between AC to AR, AR to PRN and PRN to PEB intention are positive, and significant (Wen et al., 2020; Rosenthal, 2022). Similar model with actual PEB as dependent variable from (Stern et al., 1985), Zhang et al. (2013) and Fang et al. (2019) also showed positive and significant relationship between AC, AR. PRN and PEB.

Based on the above studies, the relationships between AC, AR, PRN and the intention/actual pro-environmental behavior (ACPEB) are hypothesized as:

H5: Awareness of consequences is positively associated with the ascription of responsibility

H6: Ascription of responsibility is positively associated with the personal norms

H7: Personal norms is positively associated with the intention/actual pro-environmental Behavior

The study concept and hypotheses are depicted in Figure 2.

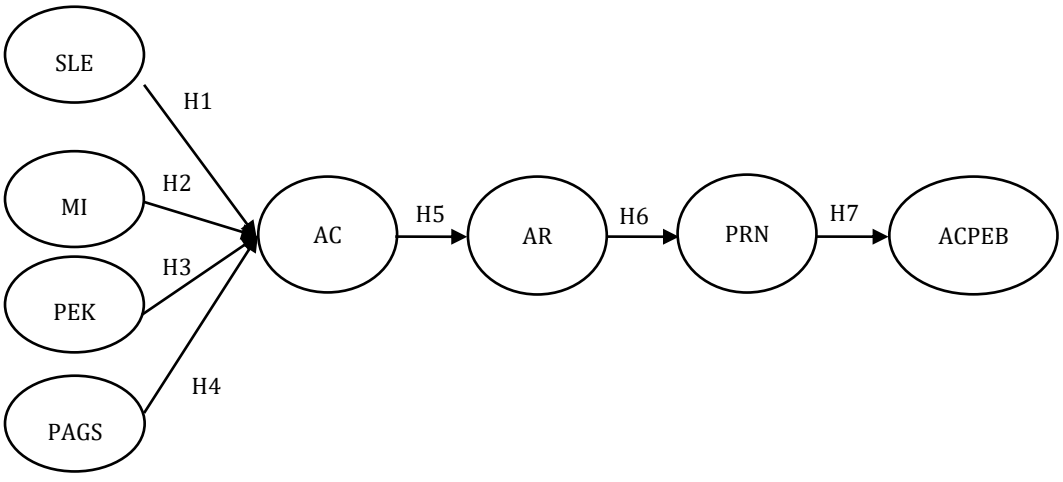

Figure 2. Study concept and related hypotheses

3. Methodology

3.1. Participant and Procedure

This study was part of a larger research project on the intention of generation Z to become an agent of change in preventing environmental degradation in Indonesia. It was conducted to Generation Z, which represented by respondents who were university and vocational school students in Jabodetabek (Jakarta greater area, the Republic of Indonesia's capital city), aged 18-22 years old during March-April 2020. It was a cross sectional study with convenient samples. The data was gathered by filling out a Google form questionnaire. The link of the questionnaire was distributed through the WhatsApp application. The total number of respondents who participated in the research were 908 and after data cleaning, the valid data was 590 respondents.

3.2. Instrumentation

The questionnaire was created using existing studies and pertinent additional questions based on the observation of the target respondent. The detail of the questionnaire, sources and references were detailed in Table 1. The original questions were translated to the Indonesian language and adjusted to make it easier for respondents to understand without losing the purpose of the questions. It had been validated by experts and pilot tested with a small group of respondents. The questionnaire consisted of demographic, psychographic and the variables dimension. The variables questionnaire used 1-7 Likert scale with different attributes based on the requirement.

The SLE items consisted of six items with the opening question of "*There is an opinion which says that … (experiences)…. shape your environmental concern. How much do you agree with that opinion?"* The responses were measured on a 7-point Likert scale from totally disagree (1) to totally agree (7).

The MI consisted of 12 items with the opening question of "*There is an opinion that the media affects a person's environmental concern. How do you agree with that opinion?*" The responses were measured on a 7-point Likert scale from totally disagree (1) to totally agree (7).

The PEK consisted of three items. The first item had the opening question "*How do you agree with the below opinion*" and the responses were measured on a 7-point Likert scale from totally disagree (1) to totally agree (7). The second and the third items were questions and the responses were measured on a 7-point Likert scale from very bad (1) to very good (7).

The PAGS (2 items), AR (2 items), AC (2 items) and PRN (3 items) had the opening question "*How do you agree with the below opinion*" and the responses were measured on a 7-point Likert scale from totally disagree (1) to totally agree (7). The ACPEB which consisted of 10 items had the opening question "*How often do you do the below pro-environmental behavior?"* and the responses were measured on a 7-point Likert scale from never (1) to always (7).

3.3. Data analysis

Partial Least Square – Structural Equation Modeling (PLS-SEM) was used to analyze the model since it was a composite model. The PLS-SEM application was Smart PLS 3.3.2. The significance level used for analysis was 5%. The constructs, definition, indicators and sources were explained in Appendix A.

4. Results

4.1. Respondents' profile

Table 1 presents the demographic characteristics of the respondents. Of the total sampled, 73% were female and 27% were male. The number of female respondents were more than males, similar with the number of students in the universities and vocational schools of the three provinces where the respondents lived, 62.4% female and 37.7% male (PDDikti, 2018). Female respondents were more than males, which was similar to Smith's (2008) study in the United States, which found that the response rate of women to surveys was significantly higher than men.

This might be related to gender disparities in how women and men behave online. The study by Jackson et al. (2001) on college students in the United States found that women and men use the internet in different ways. Men use the internet more to find information, while women use it more to communicate. According to Smith (2008) participation in surveys is more of a process of exchanging information than seeking information, so this may be the reason why in this study the response rate of women to a survey is higher than men.

Table 1. Demographic characteristic of the respondents (N= 590)

Characteristic	Demographic Characteristic	Frequency	Percentage
Gender	Female	431	73
	Male	159	27
Age	18 yo	55	9
	19 yo	169	29
	20 yo	183	31
	21 yo	114	19
	22 yo	69	12
Semester	2	146	25
	4	176	30
	6	165	28
	8	101	17
	10	2	0
Field of Study	Education	146	25
	Engineering	116	20
	Agriculture	99	17
	Health & Medicine	63	11
	Mathematics & Natural Sciences	55	9
	Social, Politics, Humanities	48	8
	Economy	45	8
	Art, Design, Media	12	2
	Religion	3	1
	Language	3	1

There were 79% respondents in the age range of 19-21 years and 83% were in semester 2-8. According to the month in which this survey was conducted, all students were in the even semester. According to the study fields of the respondents, the composition was nearly balanced, with 57% respondents being hard science students (engineering, agriculture, health and medicine; mathematics and natural sciences) and the rest were soft science students (education, social, politics and humanities; economics; art, design, media; religion and languages).

4.2. Measurement Model Evaluation

As reflective model, the assessment of the measurement model consists of two validity and one reliability tests (Hair et al., 2017). The two validity tests are convergent validity and discriminant validity, and the reliability test is internal consistency reliability. Convergent validity is evaluated from the outer loading (OL) and average variance extracted (AVE) values, whereas the discriminant validity is evaluated from cross loading and outer loading values, heterotrait-monotrait ratio (HTMT) and confidence interval bias corrected (Hair et al., 2014; Hair et al., 2017). Internal consistency reliability is measured by composite reliability/CR (Hair et al., 2014; Hair et al., 2017).

Convergent validity was measured by outer loadings of indicator. Hair et al. (2017) explained that indicator with outer loading ≥ 0.7 has to be retained and indicators with a value of ≤ 0.7 are sometimes maintained because it will affect content validity. The indicator with an outer loading value of < 0.4 has to be deleted and the indicator with outer loading values between ≥ 0.4 and <0.7 has to be evaluated and deleted if it only improves the CR and AVE above the threshold;

AVE > 0.5 and CR < 0.95. In terms of discriminant validity, cross loading values has to be smaller than outer loading values of the respected indicator, HTMT <]0.85 and confidence interval bias corrected between 2.5% - 97.5% should not include value 1 for all combination of construct (Hair et al., 2017). With the aforementioned requirements, some indicators were deleted. In this study, indicator SLE3 (OL = 0.567), ACPEB4 (OL = 0.659), ACPEB5 (OL = 0.566), ACPEB6 (OL = 0.494), ACPEB7 (OL = 0.650), ACPEB8 (OL = 0.468) and ACPEB9 (OL 0.587) were deleted due to OL <0.7 and the deletion improved CR and AVE values. After the first indicator deletion, cross loading values is smaller than the outer loading values and AVE between 0.509 – 0.794 which fulfilled the requirement of AVE > 0.5, hence the convergent validity requirement was fulfilled.

Based on the discriminant validity, which used HTMT and confidence interval bias corrected, from the initial two AR's indicators, indicator AR1 was deleted due to AR's HTMT value, which was 0.944 before deletion. After AR1 deletion, the final measurement model had HTMT values between 0.064 – 0.658 which fulfilled the requirement of HTMT values of <0.85. After all the deletion, the second parameter of discriminant validity, confidence interval bias corrected, the value was between 2.5% - 97.5% for the remaining indicators which were not including value 1, thus the model fulfilled all the validities required.

The final measurement model had the CR between 0.773 – 0.946 which fulfilled the requirement of CR of <0.95. The exception applied for AR, which after deletion left with only one indicator (AR2). It automatically gave AVE and CR of one. After the evaluation, from 40 indicators of the measurement models, eight were deleted and 31 retained. The measurement model with final indicators has fulfilled all the requirements as shown in Table 2 and 3. Table 2 is convergent validity (OL & AVE values) and internal consistency reliability (CR values). Table 3 is discriminant validity (HTMT and confidence interval bias corrected values).

4.3. Structural Model Evaluation

Structural model evaluation has three main analyzes. First, the size and significance of the path coefficient that will determine whether seven hypotheses tested in this model are accepted or rejected. Second, predictive power of the model consists of in-sample (R^2 value) and out-of-sample which will be seen from the results of the analysis with PLSpredict. The last one is the total effect that shows which construct have a significant influence on the key construct of ACPEB.

Before the structural model analysis is conducted, a collinearity test must be carried out to ensure that there is no bias in the path coefficient due to OLS regression, which is the basis of PLS-SEM. A model must have a VIF value of ≤ 5 (Hair et al., 2017). From the results of checking the VIF value, it can be seen that the VIF values were between 1.000 – 1.204 so that further analysis could be continued.

4.3.1. Path Analysis

The path analysis will explain about hypotheses testing result. The model tested consists of eight constructs and 31 indicators; it has seven hypotheses to be analyzed. A hypothesis will be accepted if the relationship between construct has a positive and significant effect. The positive effect is indicated by the positive value of the path coefficient, while the significance is expressed by the t value> 1.96 for α = 5% or p value <0.05. The accepted hypotheses were H1: SLE ->AC (path coefficient = 0.124, t-value = 2.865), H2 : MI->AC (path coefficient = 0.169, t-value = 4.066), H3 : PEK->AC (path coefficient = 0.192, t-value = 4.755), H5 : AC->AR (path coefficient = 0.443, t-value = 11.678), H6 : AR->PRN (path coefficient = 0.439, t-value = 13.463), and H7 : PRN->ACPEB (path coefficient = 0.313, t-value = 8.483). The result of path analysis is summarized in Table 4.

Table 2. Convergent validity and internal consistency reliability

Code	Indicator	OL	CR	AVE
	"There is an opinion that says that … (experiences)…. shape your environmental concern. How much do you agree with that opinion?"		0.837	0.509
SLE1	Experience in nature (activities, walks, etc.)	0.638		
SLE2	Experience in environmental organizations	0.757		
SLE4	Formal education / school	0.595		
SLE5	Experience in student organizations	0.771		
SLE 6	Experience in public organizations (non-students)	0.784		
	"There is an opinion that the below media affects a person's environmental concern. How do you agree with that opinion?"		0.946	0.595
MI1	Newspaper	0.589		
MI2	Magazine	0.587		
MI3	Television	0.799		
MI4	Radio	0.708		
MI5	Website	0.794		
MI6	Online media	0.844		
MI7	Facebook	0.807		
MI8	Twitter	0.835		
MI9	Instagram	0.844		
MI10	YouTube	0.827		
MI11	WhatsApp	0.807		
MI12	Blog	0.754		
PEK1	How do you agree with the opinion "I know the solution to environmental problems"?	0.759	0.830	0.620
PEK2	How do you assess your knowledge of environmental issues?	0.781		
PEK3	How do you assess your knowledge of pro-environmental behavior?	0.820		
	"How do you agree with the below opinion?"		0.885	0.794
PAGS1	Government regulations are sufficient to get people to protect the environment	0.821		
PAGS2	The government has sufficiently instructed related parties to facilitate environmentally friendly behavior (for example: the use of trash cans by type)	0.956		
	"How do you agree with the below opinion?"		0.773	0.632
AC1	The pollution generated in one country harms people all over the world	0.718		
AC2	If the Indonesian people do not practice pro-environmental behavior, environmental damage in Indonesia will accelerate	0.866		
	"How do you agree with the below opinion?"		1.000	1.000
AR2	Every citizen including myself must be responsible for environmental conditions in Indonesia	1.000		
	"How do you agree with the below opinion?"		0.887	0.723
PRN1	I feel a strong personal obligation to adopt pro-environmental behaviors in my daily life	0.884		
PRN2	I will feel guilty if I don't practice pro-environmental behaviors in my daily life	0.823		
PRN3	I am willing to make more efforts in carrying out pro-environmental behaviors in everyday life	0.843		
	How often do you do the below pro-environmental behavior?"		0.840	0.568
ACPEB1	I save water by using it as needed	0.886		
ACPEB2	I save electricity by turning off unnecessary lights	0.784		
ACPEB3	I save electricity by turning off unused electronic equipments	0.800		
ACPEB10	I always throw the trash in its place	0.699		

Notes :

- OL, outer loading; CR, composite reliability; AVE, average variance extracted; AC, awareness of consequences; ACPEB, actual pro-environmental behavior; AR, ascription of responsibility; MI, media influences; PAGS, perceived authority/government support; PEK, perceived environmental knowledge; PRN, personal norms; SLE, significant life experiences
- convergent validity: the outer loading (Outer loading>cross loading) & AVE values (AVE>0.5) internal consistency reliability: CR values (CR<0.95 except AR =1)

Table 3. The discriminant validity

Construct	AC	ACPEB	AR	MI	PAGS	PEK	PRN
ACPEB	0.243*						
	(0.124, 0.345)**						
AR	0.658	0.162					
	(0.535, 0.794)	(0.090, 0.252)					
MI	0.329	0.064	0.082				
	(0.202, 0.466)	(0.048, 0.068)	(0.028, 0.156)				
PAGS	0.148	0.143	0.081	0.075			
	(0.053, 0.246)	(0.067, 0.230)	(0.016, 0.168)	(0.044, 0.093)			
PEK	0.386	0.404	0.201	0.130	0.274		
	(0.246, 0.518)	(0.296, 0.509)	(0.100, 0.294)	(0.068, 0.205)	(0.179, 0.377)		
PRN	0.608	0.396	0.476	0.175	0.127	0.515	
	(0.480, 0.737)	(0.296, 0.492)	(0.401, 0.542)	(0.092, 0.270)	(0.047, 0.227)	(0.417, 0.602)	
SLE	0.313	0.235	0.177	0.254	0.306	0.471	0.512
	(0.175, 0.453)	(0.134, 0.338)	(0.096, 0.259)	(0.155, 0.359)	(0.201, 0.416)	(0.372, 0.566)	(0.419, 0.599)

Notes :
- *) HTMT <0.85
- **) Confidence Interval bias corrected (2.5% - 97.5%)

Table 4. The path analysis result

	Hypotheses	Path Coefficient	*t* values	*p* values	95% Confidence Interval BC	Association	Significance	Summary
H1	SLE->AC	0.124	2.865	0.004	(0.033, 0.203)	positive	yes	supported
H2	MI->AC	0.169	4.066	0.000	(0.088, 0.247)	positive	yes	supported
H3	PEK->AC	0.192	4.755	0.000	(0.109, 0.268)	positive	yes	supported
H4	PAGS->AC	-0.156	3.622	0.000	(-0.218, 0.023)	negative	yes	not supported
H5	AC->AR	0.443	11.678	0.000	(0.364, 0.513)	positive	yes	supported
H6	AR->PRN	0.439	13.463	0.000	(0.372, 0.498)	positive	yes	supported
H7	PRN->ACPEB	0.313	8.483	0.000	(0.234, 0.380)	positive	yes	supported

Notes: BC, Bias Corrected; numbers in the brackets represent the 95% bias-corrected and accelerated confidence interval derived from complete bootstrapping with 5,000 samples. AC, awareness of consequences; ACPEB, actual pro-environmental behavior; AR, ascription of responsibility; MI, media influences; PAGS, perceived authority/government support; PEK, perceived environmental knowledge; PRN, personal norms; SLE, significant life experiences

AC is the critical factor in the norm activation model; the more aware consumers about the consequences of their behavior, the higher their sense of responsibility, that is expressed in the personal norms (Steg & Nordlund, 2012). Therefore, understanding the influence of four factors tested to AC is very important in creating personal norms of an individual to engage in pro-environmental behavior. The result showed that the highest influence to AC was from PEK with path coefficient of 0.192 followed by MI with 0.169 and SLE with 0.124.

The acceptance of H1: SLE ->AC showed that SLE, which is defined as one's direct experience of an event that helps fosters environmental concern for an individual. This result supported the study from Stern et al. (1985), Christensen et al. (2008) and Rosenthal (2022). In terms of strength, SLE was the third factor in influencing AC. The SLE indicators strength in consecutive order based on outer loading (OL) values were *experience in public or non-students organizations*, *experience in student organizations*, e*xperience in environmental organizations, experience in nature for example nature activities, nature walks,* and *formal education/school.*

The acceptance of H2: MI->AC showed that MI which is defined as the influence of the media in increasing individual perceptions of environmental problems was the second strongest influencer for AC. Based on strength (OL values), media which is considered affects a person's environmental concern in consecutive order are *Instagram,* online *media*, *Twitter*, *YouTube WhatsApp*, *Facebook*, *television*, *Website*, *Blog*, *radio*, *newspaper* and *magazine.* The highest influence of traditional media is television, which rank no 7 among 12 media tested.

The acceptance of H3: PEK->AC showed that PEK which is individual opinion about the level of one's environmental knowledge had the highest influence and significannce to AC. The most influential PEK indicator was PEK3, *how individual score his own knowledge about pro-environmental behavior*, followed by PEK2, *how individual score his own knowledge about environmental* problem and PEK1, about *one's perception on his knowledge about solution of the environmental problem*.

H4: PAGS->AC was not supported due to negative influence of PAGS to AC even though the relationship is significant. Definition PAGS is individual perceptions of every resource, regulation, facility and support/action provided by the government to help individuals to do pro-environmental behavior. Based on respondents' opinion, the PAGS indicators, which influenced the result in consecutive order, were *the* PAGS 2: *government has sufficiently instructed related parties to facilitate environmentally friendly behavior, for example: the application of trash cans by type* and PAGS 1: *Government regulations are sufficient to get people to protect the environment*.

H5: AC->AR was supported. As explained by Hair et al. (2017), the closer path coefficient to one, the stronger the positive relationship. The indicator, which influences the highest, was respondents' opinion on statement *if the Indonesian people do not practice pro-environmental behavior; environmental damage in Indonesia will accelerate* followed by *the pollution generated in one country harms people all over the world*.

H6: AR -> PRN was supported. Like H5, H6 also shows that the causal relationship between AC and PRN in NAM fundamental theory is also proven. As a result of measurement model evaluation, AR only had one indicator, respondents' opinion on the statement that *every citizen including myself must be responsible for environmental conditions in Indonesia.*

H7; PRN->ACPEB was supported. It concludes that one's feeling of a moral obligation to engage in pro-environmental behavior or not will affect one's decision to do pro-environmental behavior which is carried out by individuals consciously in an effort to minimize the negative impact of their actions on nature and the earth that has been built. Out of 10 intention and actual pro-environmental behaviors tested, four indicators were used in the final model. Based on how the indicator influenced the construct consecutively, the indicators were : *I save water use by using water as needed*, *I save electricity by turning off unused electronic equipment and lamp* and *I always throw the trash in its place*.

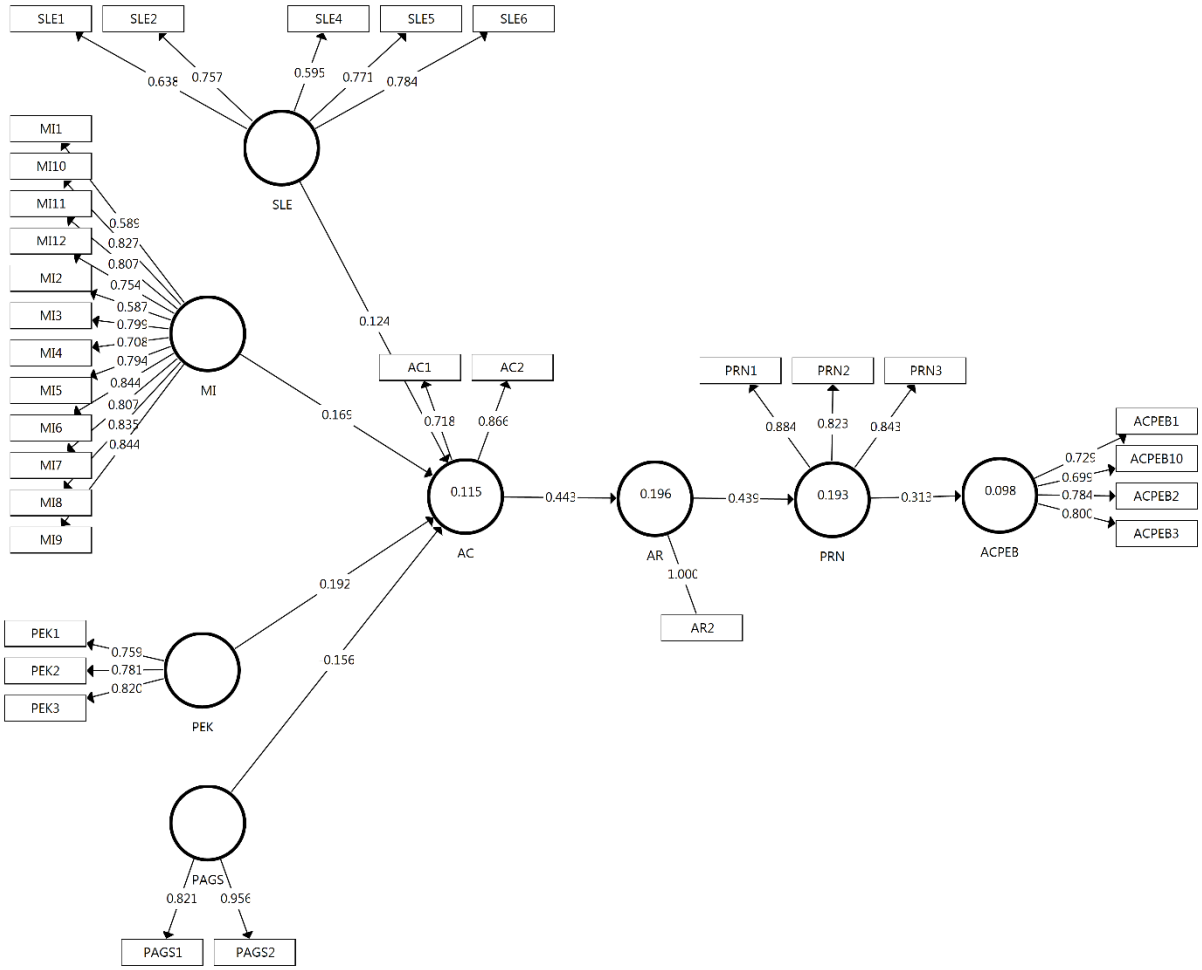

Figure 3. The SEM result with outer loading, path coefficient and R^2 values

Table 5. Total effect values of model constructs to ACPEB

Construct	Value to ACPEB	*t*-values	*p*-values	95% Confidence Interval BC	Association	Significance
AC	0.061	5.675	0.000	(0.041, 0.083)	positive	yes
AR	0.137	7.201	0.000	(0.100, 0.175)	positive	yes
MI	0.010	3.340	0.001	(0.005, 0.017)	positive	yes
PAGS	-0.010	2.985	0.003	(-0.015, -0.001)	negative	yes
PEK	0.012	3.383	0.001	(0.006, 0.019)	positive	yes
PRN	0.313	8.483	0.000	(0.234, 0.380)	positive	yes
SLE	0.008	2.409	0.016	(0.002, 0.14)	positive	yes

Notes: BC, Bias Corrected; numbers in the brackets represent the 95% bias-corrected and accelerated confidence interval derived from complete bootstrapping with 5,000 samples. AC, awareness of consequences; ACPEB, actual pro-environmental behavior; AR, ascription of responsibility; MI, media influences; PAGS, perceived authority/government support; PEK, perceived environmental knowledge; PRN, personal norms; SLE, significant life experiences

To find out the most influential construct in the model, total effects values (TEV) of each construct to key construct has been analyzed. The interpretation of the total effect value is useful in understanding which construct has the greatest and most significant influences on the key

construct. Based on the total effect value and t value in Table 5, the constructs that had a positive and significant influence on ACPEB as the key construct are PRN, AR, AC, PEK, MI and the last is SLE, while PAGS even though was significant but it had a negative influence. Among four factors tested, it concludes that knowledge has the biggest influence in creating personal norms, which will lead to respondents to engage in pro-environmental behaviors.

4.3.2. Predictive Power

The predictive power of a model is very important for theory building and evaluation (Shmueli et al., 2016). The predictive ability of the model consists of two analyses, the analysis of the predictive power of the samples under study (in-sample predictive power) and the analysis of the predictive ability of new samples or the ability of the model to be applied in new data measurements (out-of-sample predictive power). In-sample predictive power is obtained from the coefficient of determination R^2 (Hair et al., 2017; Hair et al., 2014) and out-of-sample predictive power is obtained from the analysis of the PLSpredict results (Shmueli et al., 2016).

The purpose of PLS-SEM is to maximize the R^2 value; it shows the effect of all exogenous constructs on endogenous constructs. The range of R^2 values is $0 < R2 < 1$, the higher the coefficient the higher the prediction accuracy. Consumer behavior research such as this study will consider R^2 of 0.2 as a high value (Hair et al., 2014).

The result showed that all R^2 values were positive (>0), which meant that the model had in-sample predictive power. However, from R^2 value of the model's key construct (ACPEB), it concluded that the model had moderate in-sample predictive power. The R^2 of ACPEB concluded that construct AC, AR and PRN influenced ACPEB by 9.8%, The R^2 values of the models is summarized in Table 6.

Table 6. R^2 values

Construct	R^2	R^2 quality
AC	0.115	moderate
AR	0.196	high
PRN	0.193	high
ACPEB	0.098	moderate

The next analysis is out-of-sample predictive power with the PLSpredict from Shmueli et al. (2016). The power of estimating the out-of-sample model must be exercised because PLS-SEM does not have the ability to answer whether the model under study can be used for populations outside the sample in general (SmartPLS, 2020) therefore PLSpredict can help to create conclusions that are useful for business and have managerial implications (Hair et al., 2019). The basic principle of PLSpredict is to compare the prediction error of PLS SEM and linear regression model (LM).

The key construct of this study is ACPEB, therefore the power of the out-of-sample prediction for this model will be carried out on ACPEB and its indicators. Table 7 demonstrates that the PLS Q^2 predict value of all indicators shows a value greater than zero which means the model has predictive power. Since the degree of prediction error of PLS-SEM and LM for ACPEB indicator was highly non-symmetric (see appendix A), the evaluation of PLSpredict used MAE values.

After comparing the MAE PLS-SEM and LM values of all ACPEB indicators, it can be seen that the MAE PLS-SEM values of ACPEB2 and ACPEB3 were smaller than the MAE LM values. MAE PLS-SEM ACPEB2 value was 0.880 < MAE LM ACPEB 2 value which was 0.890, and MAE PLS-SEM ACPEB3 value was 0.904 < MAE LM ACPEB3 which was 0.908. The rest of ACPEB indicators showed MAE PLS-SEM > MAE LM. In accordance with the instructions on how to interpret the

PLSpredict results from Shmueli et al. (2019), with 2 indicators that their MAE PLS-SEM < MAE LM among 4 indicators, then the model is considered has a medium predictive power.

Table 7. PLSpredict result analysis

Indicator	PLS	MAE		
	Q^2predict	PLS-SEM	LM	PLS-SEM - LM
AC1	0.053	0.794	0.808	-0.014
AC2	0.067	0.442	0.445	-0.003
AR2	0.043	0.499	0.486	0.013
PRN1	0.036	0.537	0.504	0.033
PRN2	0.033	0.578	0.574	0.003
PRN3	0.033	0.494	0.498	-0.005
ACPEB1	0.003	0.969	0.929	0.040
ACPEB2	0.004	0.880	0.890	-0.0103
ACPEB3	0.005	0.904	0.908	-0.0038
ACPEB10	0.004	0.700	0.672	0.0281

Notes : MAE, mean absolute error derived from PLS predict program with 10 repetitions and 10 folds and 95% confidence level; PLS-SEM, partial least squares structural equation modelling; LM, linear regression modelling; from complete bootstrapping with 5,000 samples. AC, awareness of consequences; AR, ascription of responsibility; PRN, personal norms; ACPEB, actual pro-environmental behavior

4.3.3. Discussion

Based on the path analysis, it showed that among four constructs tested, three hypotheses, H1, H2, and H3 were accepted, while H4 was not accepted. The highest influence to AC was from PEK (H3) with path coefficient of 0.192 followed by MI (H2) with 0.169 and SLE (H2) with 0.124.

The result confirmed that knowledge was very important in increasing AC. It was supported by the study from Stern et al. (1985), Yamoah et al. (2021) and Akitsu & Ishihara (2018). Gen Z must have the necessary information to take appropriate action to protect the environment. Based on the PEK indicator, gen Z needs to have knowledge about various environmental problems and their solutions. They must be aware about the relevant PEBs to take the necessary action.

The studies from Yusuf et al. (2020) and Sumarwan (2020) supported the fact that Indonesian students had limited environmental knowledge. UNEP (2015) and Masdar (2016) studies showed that education had a very important role to increase the knowledge and awareness, change the unsustainable behavior and encouraging pro-environmental behavior. Therefore, it is concluded that education plays a key role in increasing generation Z's knowledge. Education can be delivered in the form of formal education which is guided by the Ministry of Environment and Forestry as the main reference in schools and universities. Informal education that can be done through media, public facilities and other means are also necessary to instill environmental education in Gen Z's daily life.

The implementation of formal environmental education in Indonesian schools has not been optimized due to several factors. The first factor is a lack of understanding, awareness and commitment from stakeholders on the importance of environmental education. Second is a lack of facilities, infrastructure, materials, implementation methods and funding. The final factor is a lack of coordination and synergy across agencies and the absence of government-integrated policies to support environmental education in all levels (Sudjoko, 2014). To improve environmental education, all stakeholders must be able to solve the above problems.

Based on H2 acceptance, it showed that media had a positive and significant influence to AC. The biggest influence was from online media and television, while offline media such us

newspapers and magazines had the least. The findings confirm Rosenthal's (2022) study that social media has a positive influence on AC.

The role of media in influencing AC of gen Z will be more relevant for them by increasing their involvement in creating media content. Gen Z is naturally a content creator and wants to be credited when their creation is used in various form of communication (YPulse, 2022). Influencers (Arndt, 1967) and celebrities (Brereton & Gomez, 2020) through their online channels can also help spreading the environmental message. The right media for communicating and educating gen Z about environmental aspects (Rahsilaputeri, 2021) can help to increase AC.

This study confirmed that, in addition to knowledge and media, activities or experiences of generation Z significantly shaped the respondents' awareness on how one behavior can have consequences to the environment. The result, which showed that SLE had a positive and significant influence to AC, supported the result of Stern et al. (1985), Christensen et al. (2008) and Rosenthal (2022). It shows how activities can be a potential tool in shaping environmental awareness. Based on the SLE indicator strength, to instill environmental knowledge to activities both on and off campus will be the key action to increase their environmental concern. Furthermore, the Indonesian government also promotes environmentally friendly lifestyles through education by providing information, instruction and tools or facilities for behavior modification in public places. The provision of public amenities is in line with the Clean Indonesia Movement Program and the Orderly Indonesia Program (Wardojo, 2020).

The previous study from (Liu et al., 2017b) did not validate the conclusion that PAGS as a mediator had a negative but substantial impact on AC,, but it had a similar result with Wan et al. (2014) and Shen et al. (2022) which studied PAGS as moderator between AC and PEB intention. With prior research limitation of government influence to AC, this study can contribute as an additional reference of NAM theory implementation for actual or PEB intention in the future.

The analysis of why PAGS had a negative effect was predicted to result from the respondent's polarized answer to PAGS' questionnaire. According to the questionnaire data, 40.2% of respondents did not agree that government regulations are sufficient (PAGS1), 11.5% did not know was and 48.3% agreed. Furthermore, 26.3% of respondents did not agree that the government has sufficiently facilitated environmentally friendly behavior (PAGS2), 6.5% did not know and 67.4% agreed. The finding concluded that respondents did not believe that the government had facilitated citizens to engage in pro-environmental behavior. While the Indonesian government both at national or local level has created regulation, public facilities or some public service advertising on environmental issues, respondents may perceive them as insufficient to give a positive influence. Respondents may see it as inadequate reinforcement.

The negative yet significant influence can jeopardize the government's efforts to protect the environment while also utilizing them sustainably for economic purposes. The Indonesian government must be able to regain its position as the owner and strong supporter of sustainable production consumption by promoting sustainable lifestyle (Shove, 2010), maintaining communication about the importance of guarding the environment, and spending government money in sustainable products and services (Hessam & Yousefi, 2013). Moreover, the Indonesian government must create public policies and provide incentives for companies and consumers to become more socially and environmentally responsible (Tang & Zhou, 2012; Persada et al., 2015).

Among all hypotheses tested, the relationship between AC->AR was the strongest, showed by the highest path coefficient in the model. This relation explains how one's awareness of the bad consequences of not engaging in pro-environmental behavior will affect one's sense of responsibility which focuses on pro-environmental behavior. Therefore, it is very important to increase the awareness of the consequences as it will lead to a sense of responsibility, personal norms, and ultimately, the action of doing PEB.

The supporting H5, H6 and H7 showed that the NAM was proven that it can be used to study about intention or actual PEB. The findings confirmed the previous studies from Stern et al.

(1985), Onwezen et al. (2013), Zhang et al. (2013), Wen et al. (2020), Liu et al. (2017a), Liu et al., (2017b), Wang et al. (2018), Akitsu & Ishihara (2018), Fang et al. (2019) and Rosenthal (2022). The final model is depicted in Figure 3. The result has shown that generation Z in Indonesia has had an internal feeling or a moral obligation to undertake PEB. This is a promising result as the motivation of engaging in PEB has been internalized in the gen Z's mindset. With the appropriate supports from relevant stakeholders, gen Z can become the agent of change in environmental protection in Indonesia.

5. Conclusion

5.1. Conclusion and Implication

To participate in preventing further environmental degradation, generation Z as the future consumer has had to engage in pro-environmental behavior. This study has been able to answer the first objective. It has shown that media, life experiences and knowledge had a positive and significant influence to AC, which in the end influenced PRN and ultimately PEB. However, government has had a negative but significant influence. This study also has shown that knowledge was the key influencial factor followed by media and significant life experiences.

In response to the second objective, this study was also able to prove the ability of the Norm Action Model in predicting the intention and actual PEB both for in-sample and out-of-sample. The current model is considered to have a medium predictive power. This study has added the learning of the four factors influences and relationship to awareness of consequences as critical factor in NAM theory and the application of PLSpredict in estimating the model predictive power.

Generation Z, as represented by respondents, demosntrated a moral obligation to engage in pro-environmental behavior because they understood the consequences of not engaging in the action and hence felt responsible to do so. This conclusion is supported by the study from Broadbent et al. (2017) which found that 65% generation Z in Indonesia was concerned about climate change, that climate change was the second biggest threat after ISIS (Poushter & Huang, 2019) and 54% of Indonesians were willing to change their lifestyle to combat climate change (Stokes et al., 2015).

This study has some implications regarding the four influencing factors. To increase the knowledge of generation Z, the dissemination of relevant environmental subjects can be done through formal education in all levels and informal through media and daily activities. The Indonesian government has to be able to regain its influence on environmental issues. They have to be able to improve generation Z's perception of government involvement in guarding the environment and all factors which have high influence to environment. Several suggested actions: include improving environmental or sustainability education in school, improving or adding more facilities which support consumer to engage in pro-environmental behavior, working with businesses or NGOs to reach and instill sustainability or environmental knowledge of generation Z through their out of school activities and working with online social media platform to disseminate news, innovation and actions on environmental subject.

5.2. Limitations and future research directions

As a cross sectional research, this study has limitation that it is only a snapshot of respondents' behavior at a given point in time,;the response may change if a significant event related to environmental occurs after the study. The potential future research can include the longitudinal or cross-sequential research.

The usage of online method for data gathering is also adding limitations to the study. It can create a systematic bias in which some individuals responded to the research request while others did not (Wright, 2017). It may also have not benn able to reach respondents who did not have internet access, or guarantee that respondents answer the question correctly (some respondents might have been reluctant in filling out the questionnaire or wanted to finish the questionnaire quickly or without thinking about the answer properly). Furthermore, there were also

possibilities that respondents had different interpretation and understanding of the questions. Lastly, respondents might have been fatigued since the study was done at the beginning of the COVID-19 pandemic in 2020 when the respondents had just begun the online learning and the mid-semester exam.

This study can serve as the foundation for future research into more detail solution about knowledge in formal education (i.e. environmental or sustainability education), the appropriate media and effective way to disseminate environmental subjects, the relevant activities of gen Z and gen Z's expectations from the Indonesian government. This study can also be replicated to understand the entire generation Z by expanding it to other age groups (10-17 years old), employed and unemployed respondents and expanding to other locations (small cities vs. big cities, urban vs. rural).

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Appendix A: Constructs, definitions and construct indicators

Variables and definition	Code	Indicator	Source
Significant life experience (SLE)	SLE1	Experience in nature (activities, walks, etc.)	all are from Li & Chen (2015)
	SLE2	Experience in environmental organizations	
One's direct experience of an event that helps foster environmental concern for an individual.	SLE3	Firsthand experience of pollution or environmental disasters	
	SLE4	Formal education / school	
	SLE5	Experience in student organizations	
	SLE 6	Experience in public organizations (non-students)	
Media influences (MI)	MI1	Newspaper	all are from Muralidharan et al. (2015), Velnampy & Achchuthan (2016)
The influence of the media in increasing individual perceptions of environmental problems	MI2	Magazine	
	MI3	Television	
	MI4	Radio	
	MI5	Website	
	MI6	Online media	
	MI7	Facebook	
	MI8	Twitter	
	MI9	Instagram	
	MI10	YouTube	
	MI11	WhatsApp	
	MI12	Blog	
Perceived environmental knowledge (PEK)	PEK1	I know the solution to environmental problems	Carmi et al. (2015)

Variables and definition	Code	Indicator	Source
Individual perceptions about the level of environmental knowledge	PEK2	How do you assess your knowledge of environmental issues?	Ellen et al. (1991)
	PEK3	How do you assess your knowledge of pro-environmental behavior?	Redman & Redman (2013)
Perceived authority/government support (PAGS)	PAGS1	Government regulations are sufficient to get people to protect the environment	Ellen et al. (1991)
Individual perceptions of every resource, regulation, facility and support/action provided by the government to help individuals to engage in pro-environmental behavior	PAGS2	The government has sufficiently instructed related parties to facilitate environmentally friendly behavior (for example: the use of trash cans by type)	Mufidah et al. (2018)
Awareness of consequences (AC)	AC1	The pollution generated in one country harms people all over the world	Hansla et al. (2008)
A condition to which individual is aware of the bad consequences of not engaging in pro-environmental behavior	AC2	If the Indonesian people do not engage in pro-environmental behavior, environmental damage in Indonesia will accelerate	new
Ascription of responsibility (AR)	AR1	I have to take responsibility for environmental damage if I don't practice pro-environmental behavior	Wang et al. (2018)
Specific responsibilities focused on pro environmental behavior	AR2	Every citizen including myself must be responsible for environmental conditions in Indonesia	Wang et al. (2018)
Personal norm (PRN)	PRN1	I feel a strong personal obligation to adopt pro-environmental behaviors in my daily life	Harland et al. (2007)
A feeling of a moral obligation whether to engage in a pro-environmental action	PRN2	I will feel guilty if I don't practice pro-environmental behaviors in my daily life	Harland et al. (2007)
	PRN3	I am willing to make more efforts in carrying out pro-environmental behaviors in everyday life	Harland et al. (2007)
Actual pro environmental behavior (ACPEB)	ACPEB1	I save water use by using water as needed	Lee & Jan (2015), Östman (2014)
Actual pro-environmental behavior performed by individuals consciously in an effort to minimize the negative impact of their actions on nature and the earth	ACPEB2	I save electricity by turning off unnecessary lights	Lee & Jan (2015)
	ACPEB3	I save electricity by turning off unused electronic equipment	Enzler et al. (2019), Östman (2014), Levy et al. (2016)
	ACPEB4	When I have to buy a product, I will choose the product that causes the least amount of waste/pollution	Muralidharan et al. (2015), Straughan & Roberts (1999)
	ACPEB5	To reduce plastic bag waste, I bring my own shopping bag when I shop	Huang (2016)
	ACPEB6	I brought my own drinking bottle	new
	ACPEB7	I avoid using disposable cutlery (example: spoons/forks/straws/plastic cups or styrofoam boxes)	Levy et al. (2016)
	ACPEB8	I use both sides of the paper	Lee (2011)
	ACPEB9	If I have trusted information, I will not buy products from companies that are not ecologically responsible	Lee (2011)
	ACPEB10	I always throw the trash in its place	new

Apendix B

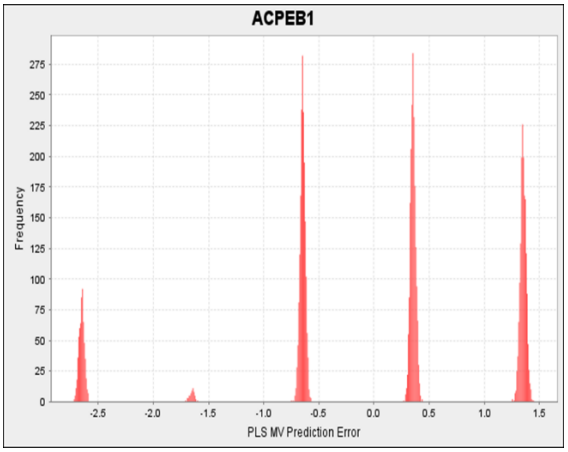

Figure A.1. PLS MV prediction error ACPEB1

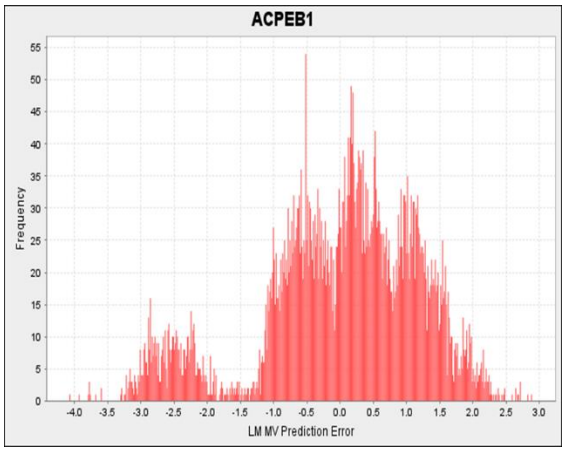

Figure A.2. LM MV prediction error ACPEB1

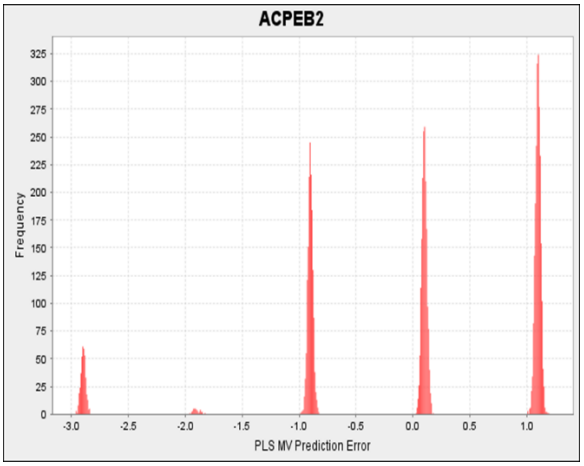

Figure A.3. PLS MV prediction error ACPEB2

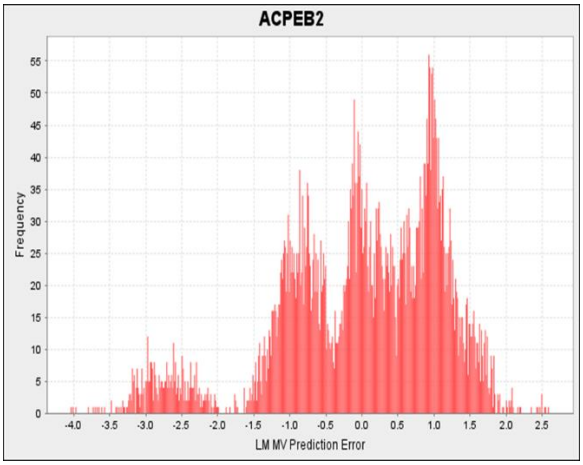

Figure A.4. LM MV prediction error ACPEB2

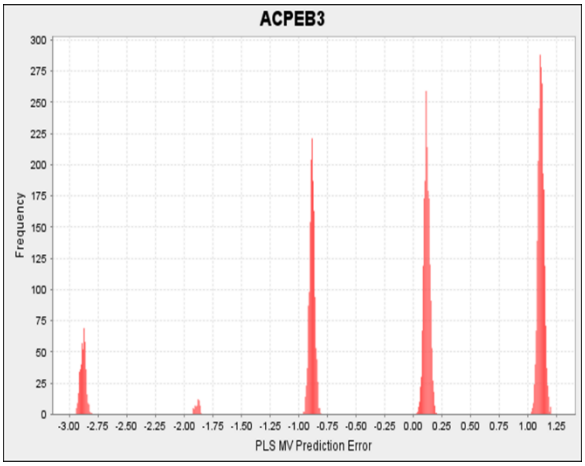

Figure A.5. PLS MV prediction error ACPEB3

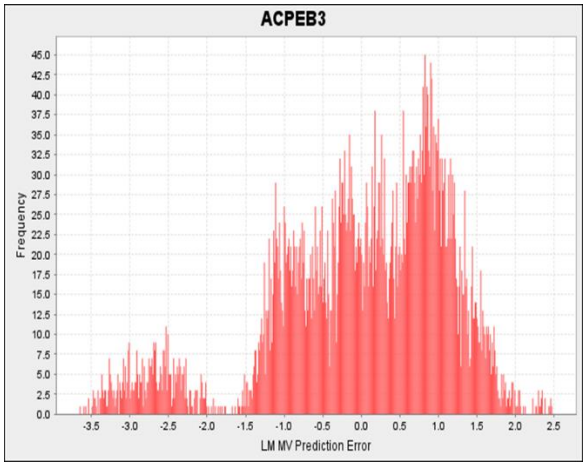

Figure A.6. LM MV prediction error ACPEB3

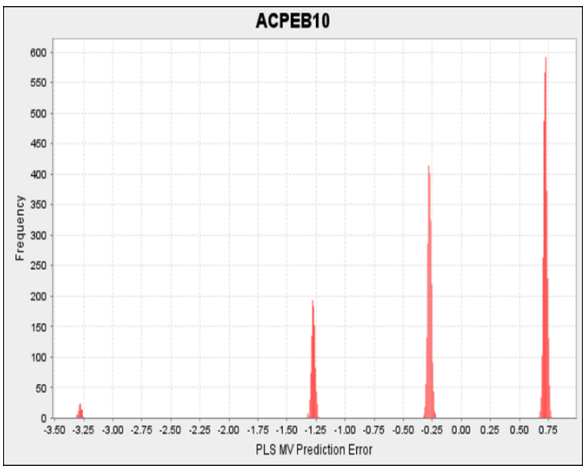

Figure A.7. PLS MV prediction error ACPEB10

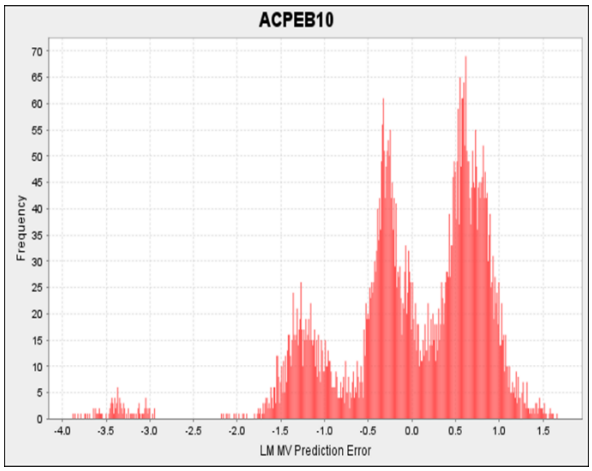

Figure A.8. LM MV prediction error ACPEB10