

From Values to Climate Action: The Impact of Green Self-Efficacy on Pro-Environmental Behaviour in Greater Jakarta's Higher Education Zillennials (SDG 13 View)

Maria Grace Herlina^{1*}, *Karto Iskandar*², *Dewi Dewi*³

¹Management Department, BINUS Business School Undergraduate Program, Bina Nusantara University, Jakarta, Indonesia 11480

²Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480

³Business Creation Program, BINUS Business School Undergraduate Program, Bina Nusantara University, Jakarta, Indonesia 11480

Abstract. This study examines the relationship between Generation Z's environmental values in Greater Jakarta and their pro-environmental behavior, focusing on the mediating role of green self-efficacy. Using a cross-sectional survey of 200 university students, we employed Partial Least Squares Structural Equation Modeling to analyze the data. The findings reveal significant paths from environmental values to both green self-efficacy and pro-environmental behavior, highlighting green self-efficacy as a crucial mediator in translating environmental values into actual pro-environmental actions. The study underscores the importance of fostering environmental values and green self-efficacy to promote sustainable practices among young people. Practical implications include the development of educational curricula and community workshops aimed at enhancing green self-efficacy, as well as the formulation of public policies and corporate strategies that reflect environmental values and encourage community-led environmental initiatives. However, the study has limitations, primarily due to its focus on a specific demographic in Greater Jakarta, suggesting the need for further research across diverse regions and populations. Overall, these findings aim to inform strategies that advance sustainability and contribute to the goals outlined in SDG 13: Climate Action for policymakers, educators, and businesses.

*Corresponding author: herlina01@binus.edu

1 Introduction

The world faces significant environmental degradation due to extreme industrialisation, construction, and overexploitation of natural resources [1], [2]. This has led to issues like deforestation, pollution, and soil erosion [3], posing risks to the planet, its inhabitants, and societal aspects, including the economy and ecosystems [4]. Reports from the Intergovernmental Panel on Climate Change (IPCC) and the World Meteorological Organization (WMO) highlight the urgent need to mitigate greenhouse gas emissions and adapt to climate impacts [5].

Indonesia is notably vulnerable, experiencing severe weather events and long-term changes such as sea level rise and altered rainfall patterns [6]. It is also a major greenhouse gas emitter due to deforestation and peatland clearance for agriculture, including palm oil plantations [6], [7]. Indonesia ranks as the 17th highest in global pollution, with temperatures reaching 37.2 degrees Celsius [6].

Addressing these challenges requires the engagement of various stakeholders—communities, governments, and industries. Sustainable policies, particularly those related to Environmental, Social, and Governance (ESG) practices, are crucial for promoting sustainability [8]. International agreements like the Paris Climate Agreement and the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs), drive these efforts [7]. Businesses are increasingly integrating sustainability into their models [9], influenced by growing environmental awareness among both youth and adults [7], [10], [11].

Business success now encompasses profit, people, and planet, aligned with sustainable values [12]. Awareness of environmental issues has surged, with a 70% increase post-pandemic. Furthermore, 87% of industry stakeholders believe companies should incorporate more environmental considerations into their products and operations [11].

The UN reports that climate change has a severe impact on human, economic, and environmental systems, with the fastest-warming continent being in focus [13]. Sociologists identify harmful environmental behaviours as a key issue, underscoring the need to promote pro-environmental behaviour (PEB) [14].

Generation Z, with its heightened sustainability awareness, plays a crucial role. A 2022 Nielsen survey shows that 73% of Generation Z in Indonesia are concerned about the environmental impact of their purchases, and 67% are willing to pay more for sustainable products [15]. This awareness has driven companies to adopt sustainability practices such as reducing emissions and minimizing waste [16], [17].

Examining how individuals respond to environmental concerns and their readiness to embrace sustainable practices is essential. This study focuses on Generation Z and the impact of environmental values on pro-environmental behavior (PEB). Research indicates that Generation Z is highly aware of sustainability issues, with many expressing concern about the environmental impact of their purchases [18]. Additionally, the level of environmental awareness in a country can influence its citizens' pro-environmental behaviors [19]. This increased awareness has led companies to prioritize sustainability strategies, such as reducing greenhouse gas emissions and using sustainable materials. Our study aims to explore the relationship between environmental values and PEB, with a particular focus on Generation Z in Greater Jakarta, Indonesia.

To achieve these objectives, the study has four main focuses: first, to empirically assess the correlation between environmental values and PEB; second, to examine how environmental values affect green efficacy as a mediator; third, to investigate the impact of green efficacy on environmental values; and fourth, to explore the complex relationship between environmental values and PEB, specifically considering the mediating role of green efficacy. The study will pay special attention to Generation Z in Indonesia, known for their strong emotional commitment to pro-environmental initiatives, and university students, who are expected to show a more intrinsic and cognitive connection with

environmental values and behavior. This approach aims to provide deeper insights into the cognitive processes that translate intent into actionable practices.

The study poses several crucial questions to delve into these dynamics:

1. Does environmental value significantly influence green efficacy?
2. Does environmental value significantly influence pro-environmental behaviour?
3. Does green efficacy influence pro-environmental behavior?
4. Does environmental value impact pro-environmental behavior when mediated by green efficacy?

This study aims to offer valuable insights into addressing pressing environmental challenges by understanding the cognitive mechanisms that drive the translation of environmental values into actionable behavior. It will provide context-specific information for targeted interventions, particularly in Greater Jakarta, Indonesia.

2 Literature Review

2.1 Environmental Value

The Environmental value (EV) refers to the importance and significance attributed to the natural environment and its preservation [20]. It denotes an optimal approach to managing human-environment interactions, reflecting how much individuals prioritise ecological and biospheric concerns [21]. There are various environmental values. Ecocentric values emphasise nature's intrinsic worth, prioritising ecosystems over human interests and rejecting the exploitation of nature for personal gain [22]. In contrast, anthropocentrism holds that only humans possess intrinsic value, despite its literal human-centred interpretation [22]. These values influence interactions with the natural world [22].

Environmental theories identify three primary factors affecting individual environmental engagement: internal, external, and demographic [20]. Internal factors include an individual's values, motivation, environmental knowledge, awareness, responsibilities, attitudes, and self-efficacy. External factors involve the availability of facilities, economic influences, institutional support, community engagement, cultural norms, and environmental campaigns [23]. Sociodemographic factors, such as age, gender, education, social class, and household income, also play a role [24].

Values guide individuals' environmentally conscious behaviors and can be categorized as altruistic, biospheric, hedonic, or egoistic [25]. Hedonic values, focused on pleasure and comfort, are crucial for understanding environmentally relevant attitudes and choices, while egoistic values also impact behaviors [26]. Altruistic and biospheric values drive pro-environmental actions beyond personal gain [27].

2.2 Green Efficacy

Green efficacy, or green self-efficacy, stems from Albert Bandura's 1977 concept of self-efficacy, which relates to individuals' confidence in their ability to tackle future challenges [28]. Self-efficacy generally involves belief in one's capability to achieve specific performance levels [27]. Green self-efficacy specifically pertains to individuals' confidence in their ability to engage in and promote environmental conservation [28]. It reflects the belief in one's capacity to plan and execute actions for environmental goals, especially in green entrepreneurship and sustainable practices [13]. This confidence aids in addressing environmental challenges and fostering innovation in green processes, products, and practices [29], [30].

Generation Z significantly influences environmental awareness, driven by their demand for eco-friendly products and willingness to pay a premium. Studies show Generation Z's strong concern for sustainability, their evaluation of green product quality, and the benefits

they associate with such products [31]. Research also highlights Generation Z's environmentally conscious actions, satisfaction with sustainable practices, and engagement in environmental protection [32]. Individuals with high green self-efficacy are vital in sustainability efforts, as they believe in their ability to perform environmentally friendly tasks [33]. This research aims to explore how Generation Z's green efficacy influences pro-environmental behavior, with a focus on the impact of environmental values.

2.3 Pro-Environmental Behaviour

Scholars generally agree on the definition of pro-environmental behavior (PEB), with minimal debate on the topic [34]. PEB involves individuals consciously engaging in actions that protect and enhance environmental sustainability, taking proactive measures to safeguard and contribute to the long-term well-being of the environment [34]. Any action aimed at mitigating the harmful effects of human activities on environmental quality and performance is considered PEB. This includes actions that minimize harm and potentially benefit the environment [34]. Examples of PEB include recycling, saving water, using public transportation, and purchasing sustainable products [35]. These behaviours can serve as adaptive responses to climate change, positively contributing to environmental sustainability [36]. PEB is linked to individuals' environmental concerns, biospheric values, and environmental self-identity [36]. General measures of PEB help understand differences in environmentally friendly actions across various groups and explore the factors influencing such behaviour. When examining general PEB, it's important to use scales that consider multiple dimensions [37].

Generation Z, accounting for 40% of the global population and born between the mid-1990s and early 2010s, has shown a growing interest in PEB [19]. This is evident in their efforts to reduce carbon footprints, support pro-environmental social campaigns through loyalty programs [19], make environmentally conscious travel choices [38], and influence the energy transition through their environmental awareness and concern [39], [40]. However, some studies indicate that Generation Z participates in PEB less than older age groups [41]. This study will explore how green self-efficacy and environmental values affect PEB among Generation Z.

2.4 The Influence of Environmental Value on Green Efficacy

Recent [42], [43] highlight the importance of environmental values and green self-efficacy in understanding human behaviour towards the environment and promoting sustainable practices. Environmental value refers to the significance of the natural environment and the importance of its protection and preservation. Green self-efficacy, on the other hand, is an individual's belief in their capability to organise and execute actions required to achieve environmental goals [44].

[42] found a positive relationship between environmental values and sustainable entrepreneurship, although previous research did not directly address green self-efficacy. Their analysis of environmental values within green entrepreneurship contexts underscores their vital role in achieving sustainability. These values shape positive attitudes towards sustainable business practices and influence the intention to pursue green opportunities [42].

While the effectiveness of environmentally friendly practices is acknowledged, additional studies indicate that collective efficacy moderates the relationship between environmental values and pro-environmental behaviour. Diminished levels of nature preservation and appreciation correlate with a decline in ecological actions, emphasising the importance of environmental values in promoting green self-efficacy [45]. Given the limitations of previous research, which has rarely directly explored the relationship between

environmental values and green self-efficacy, this study aims to fill that gap by examining their direct influence:

H1 *Environmental Values significantly influence green efficacy.*

:

2.5 The Influence of Environmental Values on Pro-Environmental Behaviour

The Factors influencing pro-environmental behaviour are multifaceted, including knowledge, values, intentions, and socio-demographic characteristics [20]. Research identifies three distinct value sources driving environmental awareness: self-preservation concerns, empathy for fellow humans, and respect for the living world and its diverse inhabitants [46]. Prior studies have shown that environmental values positively influence pro-environmental behaviour in young adults [47], [48] and across various individual and group settings [49].

Environmental preservation is strongly associated with altruistic, egoistic, and biospheric values [25]. Indicators of environmental values, such as biospheric values and environmental self-identity, correlate positively with pro-environmental behaviour (PEB) [50]. However, challenges exist, such as respondents' difficulties in connecting with biospheric values when they do not directly impact their family or daily life, indicating low awareness and education in using these values. Additionally, respondents were often unwilling to sacrifice comfort, such as giving up self-driving for public transportation or reducing electricity usage [20].

Research has shown that biospheric values positively influence pro-environmental behaviours, while environmental knowledge negatively impacts the association between prosocial values and environmental attitudes. Elevated egoistic values can diminish the impact of environmental attitudes on pro-environmental behaviours [50]. Furthermore, individuals' overall environmental concerns correlate positively with both recycling and environmental activism [36].

While previous studies have identified several factors influencing pro-environmental behaviour, few have directly examined the impact of both environmental values and pro-environmental behaviour. No evidence suggests that environmental values negatively impact pro-environmental behaviour. Therefore, this study aims to provide strong evidence supporting the notion that environmental values significantly affect pro-environmental behaviour:

H2 *Environmental value significantly influences pro-environmental behaviour.*

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2.6 The Influence of Green Efficacy on Pro-Environmental Behaviour

The relationship between green self-efficacy and pro-environmental behaviour has been studied extensively. Research indicates that environmental attitudes are a strong predictor of pro-environmental behaviours (PEBs), while environmental efficacy has a small direct effect and a non-significant moderation effect on PEB [51]. Green self-efficacy (GSE) is identified as a key psychological motivator that drives employees to adopt environmental protection behaviours in the workplace [52].

A report from the Sustainability Office at Diponegoro University in 2020 recognised green self-efficacy as a contributing factor to pro-environmental behaviour [53]. Individuals with high green self-efficacy tend to have a stronger inclination towards green entrepreneurship and are more likely to engage in pro-environmental behaviours [42].

Additionally, green self-efficacy positively impacts green innovation and green purchase behaviour [29].

Despite these findings, our research highlights a gap in understanding the direct relationship between green efficacy and pro-environmental behaviour. While several studies have identified green efficacy as playing a mediating role, only a limited number have directly explored this relationship. The specific mechanisms and interactions among these factors may vary, necessitating further research to comprehensively understand their influence on promoting pro-environmental behaviours—literature examination of the interaction that exists between green efficacy and pro-environmental behaviour. According to research by [51], while environmental attitudes strongly predict PEBs, one finds a small direct effect from environmental efficacy and a non-significant moderation effect on PEB. Green self-efficacy has been posited as an important psychological motivator instigating employees' actions toward environmental protection behaviours at the workplace. A 2020 report by the Sustainability Office, Diponegoro University identified GSE as one of the main contributors to PEB. A person with a high GSE level will be strongly inclined towards green entrepreneurship and will be likelier to engage in PEB. Researchers also reported that GSE positively influences green innovation and green purchase behaviour.

While this has been the finding in most studies, understanding its direct relationship to PEB remains vague. Few studies identified it as a mediating factor, while little research has directly explored it with the relationships in PEB. In this case, specific mechanisms and interactions among these factors may differ and, therefore, require further research to develop a comprehensive understanding of their influence in promoting pro-environmental behaviours. Hence, the research hypothesis proposed is:

H3 *Green efficacy significantly influences pro-environmental behaviour.*

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2.7 The Influence of Environmental Value on Pro-Environmental Behaviour through Green Efficacy as the Mediator

Three variables—environmental values, pro-environmental behaviour (PEB), and green self-efficacy (GSE)—are interconnected concepts crucial for sustainability efforts [51], [53].

Environmental values signify individuals' importance on environmental issues and their commitment to preserving the natural world. PEB involves conscious actions to reduce an individual's negative environmental impact. GSE represents an individual's belief in their ability to achieve environmental goals, serving as a significant psychological motivator for adopting eco-friendly behaviours in the workplace [52], [53]. Despite some limitations in existing research, particularly the lack of direct impact assessment on each variable, current studies aim to address this gap and foster further discussion. In this research, we introduce a novel hypothesis to explore these relationships comprehensively:

H4 *Environmental value significantly influences pro-environmental behaviour through green efficacy as the mediator.*

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3 Research Methodology

3.1 Research Design and Approaches

This research involved a cross-sectional survey with a quantitative approach using partial least square structural equation modeling (PLS-SEM) to justify the conceptual

framework and proposed hypothesis.

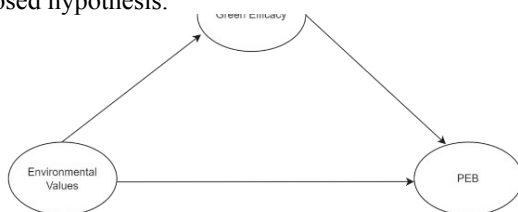


Fig. 1. Research Framework

The study was conducted in Greater Jakarta, which was selected because Jakarta is the capital of Indonesia, surrounded by satellite cities. Additionally, Figure 1 depicts the research model presented in this paper. The model is derived from preliminary papers and relevant underpinning theories.

3.2 Data Collection

The researchers conducted a study involving 200 employees in Greater Jakarta using convenience sampling due to the absence of a sampling frame. This method facilitated quick data collection, with efforts to minimise associated biases. Data were collected using online questionnaires distributed via Google Forms through email and WhatsApp, and participation was voluntary. Initially, 250 questionnaires were sent out, and 235 responses were received. Of these, 35 incomplete ones were excluded. Rasch Model Analysis was employed to detect and remove outliers, specifically using Person Measure Analysis to evaluate response bias. Based on established criteria, 35 outliers were eliminated because their MNSQ value fell between 0.5 and 1.5 [54], [55].

3.3 Research Instrument

The research instrument was developed based on scholarly literature, and the questionnaire items, as presented in Table 1, were adapted from that work.

Table 1. Research Instrument

Item	Environmental Value (EV) [18], [56]–[58]
EV1	Prevent environmental pollution
EV2	Preserve the natural environment
EV3	Respect nature
EV4	Unity with nature
EV5	Equal opportunity
EV6	Care for the less fortunate
EV7	Everyone is treated fairly
EV8	There is no war or conflict
EV9	Help others
EV10	Time to have fun
EV11	Enjoy life
EV12	Doing things, you like
EV13	Having control of others
EV14	Having power over others
EV15	An influential person
EV16	Having money and possessions
EV17	Hardworking and ambitious

Item	Green Efficacy [30]
EF1	My ideas can be successful in efforts to protect the environment
EF2	I can achieve most of the goals of environmental awareness efforts
EF3	I am competent to handle environmental awareness efforts
EF4	I am able to overcome environmental problems
EF5	I am able to find creative solutions to environmental problems
Item	Pro-Environmental Behaviour (PEB) [20], [59], [60]
PEB1	I check the ideal room temperature (24°C or more)
PEB2	I make sure the AC is turned off in empty rooms
PEB3	I make sure the temperature is raised if the room is not in use
PEB4	I make sure the AC is turned off when I leave the room
PEB5	I use a glass/tumbler to drink
PEB6	I take a new plastic/cardboard glass every time I drink
PEB7	I use a non-plastic straw when drinking
PEB8	I reduce my use of plastic straws when drinking
PEB9	I choose healthy food
PEB10	I bring my own shopping bag when shopping
PEB11	I consider sustainability factors when buying goods/services
PEB12	I turn off my computer/laptop when it is not used for a long enough time
PEB13	I turn off my computer/laptop when I go home
PEB14	I turn off the lights when I leave the room
PEB15	I turn off the lights when the room is empty
PEB16	I recycle glass
PEB17	I recycle plastic bottles
PEB18	I recycle batteries
PEB19	I recycle chemical waste
PEB20	I recycle paper

Source: Authors, 2023

3.4 Data Analysis

The chosen data analysis method is structural equation modeling (SEM). This approach enables researchers to test models that capture the hierarchical structure of constructs, offering a nuanced understanding of the relationships among observed and latent variables [61], [62]. The analysis will be performed using SMARTPLS 3.2.9 software. The aim is to deepen our comprehension of relationships between observed and latent variables, thereby contributing to a comprehensive understanding of the research model.

4 Results and Discussion

This national-scale study did not focus on any particular region in Indonesia. However, most respondents were sourced from Java Island, reflecting the high concentration of higher education institutions there. This trend is attributed to Jakarta, the capital city of Indonesia, being located on Java Island. The research spanned from March 2023 to December 2023.

4.1 Demographics of Respondents

This research, conducted over approximately four months at the end of 2023 by university students in Greater Jakarta, Indonesia, involved 102 respondents. The sample size exceeded the minimum requirement of 96. According to Table 3.1, with 102 respondents providing demographic data, 56.9% of participants were female, and 43.1% were male. All respondents were between 16 and 20 years old, focusing on younger

students. Their academic progress was fairly evenly distributed, with the largest groups in semesters 3-4 (42.2%) and 5-6 (36.3%). Regarding academic performance, 70.6% of participants had a GPA above 3.50, with smaller groups in lower GPA ranges. The data also showed a diverse range of parental occupations, with the largest representation among businessmen (44.6%) and a notable group employed by national private companies (25.7%). This demographic summary provides valuable insights into the characteristics of the surveyed student population.

4.2 Measurement Model Analysis

Validity and reliability (Table 2) in this study were evaluated using SmartPLS 3.2.9 software. Convergent validity was assessed by ensuring that indicators had outer loadings exceeding 0.7, aligning with guidelines from [61], [62]. Variables were deemed valid if their Average Variance Extracted (AVE) exceeded 0.5.

Table 2. Measurement Model Analysis

Items	Loading Factor (>0.7)	Cronbach's Alpha (>0.6)	Composite Reliability (>0.6)	AVE (>0.5)	Remarks
EV1	0.621	0.762	0.790	0.595	Valid and Reliable
EV2	0.868				
EV3	0.901				
EV4	0.655				
EF1	0.845	0.934	0.937	0.793	Valid and Reliable
EF2	0.934				
EF3	0.879				
EF4	0.901				
EF5	0.890				
PEB1	0.763	0.938	0.944	0.602	Valid and Reliable
PEB2	0.736				
PEB3	0.753				
PEB4	0.760				
PEB5	0.629				
PEB6	0.904				
PEB7	0.769				
PEB8	0.933				
PEB9	0.915				
PEB10	0.764				
PEB11	0.651				
PEB12	0.664				

Source: Authors, 2023

Notes: GT: AR Green Training; EK: Environmental Training; PEB: Pro-Environmental Behaviour

Reliability in this study was evaluated using guidelines from [61], [62], with composite reliability values exceeding 0.6 considered reliable. Similarly, Cronbach's alpha values above 0.6 indicate reliability. Table 2 confirms the validity of indicators with loading factor values exceeding 0.7, and AVE values for each variable surpassing 0.5 further support their validity. Additionally, all variables demonstrate composite reliability values exceeding 0.6, indicating overall reliability and validity across the board.

4.3 Structural Model Analysis

According to [61], [62] R-Square values above 0.75 indicate high influence, values around 0.5 signify moderate influence, and values around 0.25 suggest low influence. Table 3 shows Green Efficacy is 0.389 R-square. It is interpreted to mean that an R-Square value

of 0.389 indicates that Green Efficacy contributes 38.9% in the variation of the dependent variable under study. This means that Green Efficacy has moderate explanatory power toward the dependent variable. It infers that other than Green Efficacy, factors also come into action that influence the dependent variable.

Table 3. R-Square Analysis

Variable	R-Square
Green Efficacy	0.389
Pro-Environmental Behaviour	0.649

Source: Authors, 2023

Pro-Environmental Behavior’s R-Square = 0.649. A measure, such as an R-Square value of 0.649, would mean that Pro-Environmental Behaviour explains 64.9% of the variance in the dependent variable. This implies that with this high R-Square value, pro-environmental behaviour strongly predicts the dependent variable. Changes in Pro-Environmental Behaviour can account for most variations in the dependent variable. The higher the value of R-Square, the better the fit of the model to the data. A model with Pro-Environmental Behaviour as a predictor had a better fit compared to Green Efficacy. Pro-environmental behaviour is a stronger predictor of the dependent variable than Green Efficacy. Further Investigation: The model should have more variables with Green Efficacy to increase its explanatory power.

4.4 Hypothesis Testing

According to [61], [62], a path coefficient with a positive value indicates a positive relationship, while a negative value indicates a negative relationship. Additionally, according to [61], [62] A t-statistic value above 1.96 is considered valid, and a p-value below 0.05 is considered valid. Table 4 and Figure 2 present the results of the hypothesis testing.

The research findings demonstrate that The statistical analysis reveals a strong positive relationship between Environmental Value (EV) and Green Efficacy (GE), as indicated by a path coefficient of 0.623 and a T-statistic of 9.186, which is significantly greater than the critical value of 1.96 at a 95% confidence level. This confirms that the relationship is highly significant (P-value < 0.05), thereby supporting H1. The finding aligns with the research of [63]–[68] that examined the path from green training to environmental knowledge.

Table 4. Hypothesis Testing Results

Hypotheses	Path Coefficient	T-statistic	P-values α 0.05	Results
EV → GE	0.623	9.186	0.000	H1 Supported
EV → PEB	0.420	5.764	0.000	H2 Supported
EV → GE → PEB	0.474	7.767	0.000	H3 Supported

Source: Authors, 2023

Notes: EV: Environmental Value; GE: Green Efficacy; PEB: Pro-Environmental Behaviour

Similarly, the relationship between Environmental Value (EV) and Pro-Environmental Behaviour (PEB) is also supported, with a path coefficient of 0.420 and a T-statistic of 5.764, well above the critical value. This demonstrates a moderate positive relationship that is statistically significant (P-value < 0.05), thereby supporting H2. The result supports the work [23], [50], [69]–[74] who explored how environmental education should impart both human-environment system knowledge and environmental action knowledge to foster pro-environmental behaviour. Furthermore, the relationship between Green Efficacy (GE) and Pro-Environmental Behaviour (PEB) is strong, as shown by a path coefficient of 0.474 and

a T-statistic of 7.767. This high T-statistic confirms the statistical significance of this relationship (P-value < 0.05), supporting H3. The result supports the work [23], [50], [69]–[74] who explored

This indirect path shows that the mediation analysis indicates a moderate indirect effect of GE on the relationship between EV and PEB, with a path coefficient of 0.295 and a T-statistic of 5.353, which is significantly above the critical value. This confirms that the mediation effect is statistically significant (P-value < 0.05), supporting H4. This finding represents a significant contribution to research, as it reveals for the first time that green self-efficacy positively mediates the relationship between environmental values and pro-environmental behaviour.

All path coefficients are positive, indicating that as one variable increases, the other variable also increases. Specifically, EV positively influences both GE (0.623) and PEB (0.420), GE positively influences PEB (0.474), and the mediation effect of GE on the relationship between EV and PEB is also positive (0.295). The T-statistics for all relationships are significantly higher than the critical value of 1.96, confirming that these relationships are statistically significant. The P-values, all being 0.000, are much lower than the significance level of 0.05, indicating that the probability of these results occurring by chance is extremely low. In conclusion, the statistical results robustly support the hypotheses, indicating that Environmental Value significantly influences Green Efficacy and Pro-Environmental Behaviour, both directly and indirectly through Green Efficacy. This reinforces the theoretical framework, suggesting that fostering strong environmental values and self-efficacy beliefs is crucial for promoting pro-environmental behaviours. These findings are statistically significant and provide a solid foundation for practical applications in climate action and sustainability initiatives.

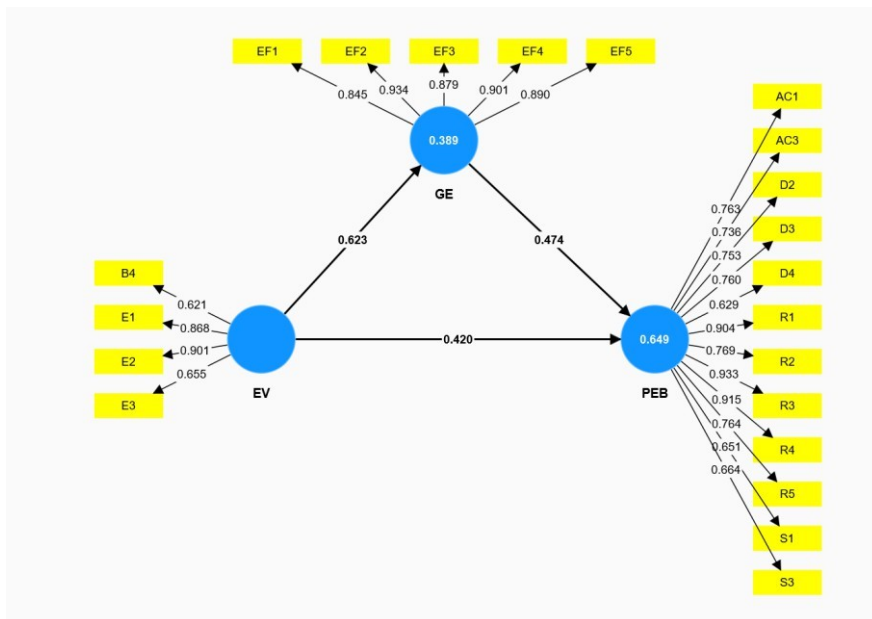


Fig. 2. Path Analysis Structural Model

These findings show that all direct and indirect paths of environmental value and green efficacy impacting pro-environmental behaviour are significant. Furthermore, what may also be viewed as very strong evidence for the positive relationships among these constructs is represented in high T-statistics with extremely low p-values across these paths.

4.5 Discussion

The findings underscore several important theoretical implications regarding the relationships between Environmental Value (EV), Green Efficacy (GE), and Pro-Environmental Behavior (PEB). Firstly, the results reinforce the Value-Belief-Norm (VBN) Theory, which suggests that values shape beliefs, and these beliefs, in turn, guide behaviours. More specifically, the high influence of EVs on both GE and PEB supports the notion that strong environmental values are a precondition for green self-efficacy and pro-environmental acts. This forms the basis for the intrinsic values in driving pro-environmental attitudes and behaviour.

The study also found a mediating role of GE to be substantially significant in the relationship between EV and PEB, explaining the importance of self-efficacy as suggested by Bandura's social cognitive theory. This mediation effect suggests that people's beliefs in their capabilities for performing pro-environmental acts are central to translating EVs into manifest behaviours. Indeed, this finding underlines the theoretical importance of self-efficacy in behaviour change processes.

The findings identify direct routes from EV to PEB and indirect pathways. One implication is, therefore, that theoretical models of pro-environmental behaviour should include the value block as having a direct influence on behaviour while also including mediated effects through efficacy beliefs. This inclusive approach provides a better-nuanced explanation of the factors influencing pro-environmental behaviour.

It also confirms multi-stage behaviour change models that propose progression through stages of behaviour change, from forming values to building self-efficacy and actual behaviour change. This is mirrored in this model by the largely mediated pathway from EV to PEB through GE, underscoring behaviour change as sequential and involving multiple influencing factors.

The high path coefficients and significant T-statistics with EV, GE, and PEB inform it. This means that the predictive models designed to predict pro-environmental behaviour must include measures that ensure better prediction of desired results based on environmental values and self-efficacy.

The significant relationship between EV, GE, and PEB underlines the theoretical relevance of promoting environmental values to improve green efficacy for sustainable behaviours. These insights thereby support both VBN and Social Cognitive Theories but also promise to inform the development of effective interventions and policies toward achieving sustainability goals, such as those outlined in SDG 13. By integrating these mechanisms into theoretical models, one is in a better position to understand how these mechanisms drive pro-environmental actions and thus could develop strategies to encourage greater environmental sustainability.

The findings provide several action strategies in line with SDG 13, which focuses on climate action. For efficient and effective mitigation and adaptation of climate change, education that values the environment should be provided. This will allow people to deeply appreciate the environment and subsequently encourage practices that promote climate action. These suggested activities can be best performed in schools, universities, and community centres.

The other way would be to have training programs that boost people's belief in their ability to undertake pro-environmental behaviours. Through workshops and hands-on activities, community gardening, waste reduction projects, and energy conservation practices can build such green efficacy. By equipping people with the relevant competencies and confidence in undertaking climate action, these programs greatly contribute towards SDG 13.

It is also about incorporating environmental values into the design and execution of

climate policies, such as giving incentives for sustainable practices, supporting green technologies, and launching campaigns that promote environmental stewardship. Policies reflecting societal values toward the environment are more likely to succeed.

Other key steps include promoting community involvement in climate action initiatives. Community-led projects, such as tree planting and clean-up drives, could strengthen the capacity to act together; local sustainability workshops facilitate reinforcing values related to the environment. Such activities will help build social networks, which can sustain pro-environmental behavior over time.

Corporate Social Responsibility (CSR) can also be instrumental in its wake. Businesses should be encouraged to embrace and promote environmental values through CSR programs. Within companies, actions could include energy efficiency, sourcing policies, waste reduction strategies, and employee engagement in green activities to create a culture of sustainability.

Governments can create public policies and incentives to encourage the inculcation of environmental values and green efficacy. Examples include fiscal benefits from sustainable practices, renewable energy installation subsidies, and community-based environmental project grants. Ends.

In support of such monitoring and evaluation systems, robust frameworks become critical to credible climate action under programs and policies. On its part, tracking progress toward and measuring outcomes accruing from the climate actions would allow the stakeholders to identify good practices while showing areas for improvement, hence committing effort towards the realisation of SDG 13 in a data-driven and responsive manner to evolving conditions.

Hence, achieving SDG 13 requires a holistic approach, one that includes education, building self-efficacy, policy integration, community engagement, CSR initiative actions, public incentives for pro-environmental action, and monitoring and evaluation. These strategies draw on the important role of environmental value and green efficacy in influencing pro-environmental Behaviour, creating necessary instruments in the global struggle against climate change and its consequences.

5 Conclusion and Limitations

This research investigates how environmental values, green self-efficacy, and pro-environmental behaviour are interrelated within Generation Z in Greater Jakarta. The results show that environmental values and green self-efficacy play important roles when motivating pro-environmental behaviour.

Results show that environmental value significantly influences green self-efficacy and pro-environmental behaviour. A person holding these values has stronger beliefs in his/her ability to positively affect the environment, hence motivating him/her towards environmentally friendly behaviour. Green self-efficacy, therefore, acts as an important mediator between environmental values and pro-environmental acts. The stronger one's self-efficacy regarding performing acts that benefit the environment, the more frequent such behaviours are likely to be. Thus, building self-efficacy becomes a requirement if there is a need to translate these values into actual actions effectively.

This study confirms that stronger environmental values, in combination with heightened green self-efficacy, predict higher levels of pro-environmental behaviour. With increased environmental awareness, Generation Z has a great potential to impact sustainability through their actions.

For example, this means focusing on environmental values within curricula and the development of green self-efficacy. This may include programs such as schools,

universities, community centres, and other entities that can offer hands-on activities to instil confidence in the ability to perform pro-environmental behaviours. Similarly, workshops and training conducted at the community level and those focused on sustainability could foster increases in this belief in abilities to act in a manner that improves conditions for the environment, increasing green self-efficacy.

Environmental values should be encoded in public policy and corporation strategies that provide incentives for developing green technologies, creating a sense of larger environmental stewardship. Community-based tree-planting and waste reduction initiatives can enhance collective efficacy, transferring commitment toward pro-environment behaviours over the longer term. In addition, businesses must be encouraged to create and propagate green values in the workplace through Corporate Social Responsibility activities, energy efficiency practices, and sustainable sourcing to foster a culture of sustainability within organisations.

Thus, the research is confined only to Generation Z of Greater Jakarta; hence, generalisation can be done. Further studies are still needed to include other broad geographical locations and demographic groups to continue this current result. Qualitative studies could help elaborate more on the deeper psychological mechanisms underpinning green self-efficacy and how it influences pro-environmental behaviour. Developing strong environmental values goes hand in hand with raising green self-efficacy in performing pro-environmental behaviour. Uncovering these relationships may also be very useful for policymakers, educators, and businesses in developing strategies most appropriate toward attaining sustainability and SDG 13: Climate Action.

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Authors' Contributions and Data Availability

MGH lead the research, overseeing conceptualization, methodology, software, writing (including the original draft preparation), and final review. **KI** prepare the literature review and discussion and is responsible for writing, proofreading, and editing. **MGH, DW, and KI** handle data collection and prepare the literature review. They are responsible for writing, proofreading, and editing.

Data availability https://docs.google.com/spreadsheets/d/1846xZ8oGv8ajL48VCwVzZp_vWUilyat1/edit?usp=sharing&ouid=103333082160155599462&rtfpof=true&sd=true

References

- [1] N. A. Faraz, F. Ahmed, M. Ying, and S. A. Mehmood, "The interplay of green servant leadership, self-efficacy, and intrinsic motivation in predicting employees' pro-environmental behavior," *Corp. Soc. Responsib. Environ. Manag.*, vol. 28, no. 4, pp. 1171–1184, 2021, doi: 10.1002/csr.2115.
- [2] S. Kousar, M. Afzal, F. Ahmed, and Š. Bojnec, "Environmental Awareness and Air Quality: The Mediating Role of Environmental Protective Behaviors," *Sustain.*, vol. 14, no. 6, pp. 1–20, 2022, doi: 10.3390/su14063138.
- [3] X. Wang and X. Chen, "An empirical study on financing constraints of digital inclusive finance development on small and medium-sized technology-based enterprise," *Kybernetes*, vol. 52, no. 2, pp. 585–600, 2023, doi: 10.1108/K-01-2022-0095.

- [4] W. Riaz, S. Gul, and Y. Lee, "The Influence of Individual Cultural Value Differences on Pro-Environmental Behavior among International Students at Korean Universities," *Sustain.*, vol. 15, no. 5, 2023, doi: 10.3390/su15054490.
- [5] WMO, *State of the Climate in Asia 2022*. 2024. doi: 10.18356/9789263113214.
- [6] M. De Sario, K. Katsouyanni, and P. Michelozzi, "Climate change, extreme weather events, air pollution and respiratory health in Europe," *Eur. Respir. J.*, vol. 42, no. 3, pp. 826–843, 2013, doi: 10.1183/09031936.00074712.
- [7] B. Shirvell, "Climate Change in the Indonesian Mind," *Yale Sch. Environment*, p. 6, 2023, [Online]. Available: <https://climatecommunication.yale.edu/wp-content/uploads/2023/09/climate-change-in-the-indonesian-mind-e.pdf>
- [8] P. Fu, Y. S. Ren, Y. Tian, S. W. Narayan, and O. Weber, "Reexamining the relationship between ESG and firm performance: Evidence from the role of Buddhism," *Borsa Istanbul Rev.*, vol. 24, no. 1, pp. 47–60, 2024, doi: 10.1016/j.bir.2023.10.011.
- [9] I. M. Ilyas and O. Osiyevskyy, "Exploring the impact of sustainable value proposition on firm performance," *Eur. Manag. J.*, vol. 40, no. 5, pp. 729–740, 2022, doi: 10.1016/j.emj.2021.09.009.
- [10] C. Calculli, A. M. D'Uggento, A. Labarile, and N. Ribecco, "Evaluating people's awareness about climate changes and environmental issues: A case study," *J. Clean. Prod.*, vol. 324, no. November, 2021, doi: 10.1016/j.jclepro.2021.129244.
- [11] N. Kachaner, J. Nielsen, and P. Adrien, "The Pandemic Is Heightening Environmental Awareness | BCG," 2020, [Online]. Available: <https://www.bcg.com/publications/2020/pandemic-is-heightening-environmental-awareness>
- [12] C. Hu, Z. Xu, and S. Chen, "How do businesses achieve sustainable success and improve the quality of products in the green competitive era?," *Total Qual. Manag. Bus. Excell.*, vol. 34, no. 3–4, pp. 496–514, 2023, doi: 10.1080/14783363.2022.2071693.
- [13] A. Lampert, "Over-exploitation of natural resources is followed by inevitable declines in economic growth and discount rate," *Nat. Commun.*, vol. 10, no. 1, 2019, doi: 10.1038/s41467-019-09246-2.
- [14] H. S. Karimi and A. A. Piña, "Building Resiliency and Creating Innovation in the Digital Age Through Leadership and Human-Connection," *J. Strateg. Innov. Sustain.*, vol. 17, no. 3, pp. 10–20, 2022, doi: 10.33423/jsis.v17i3.5638.
- [15] S. Smit *et al.*, "Toward a sustainable, inclusive, growing future: The role of business," *McKinsey Co.*, no. November 2022, pp. 1–32, 2022, [Online]. Available: https://www.mckinsey.com/~media/mckinsey/featured_insights/sustainable_inclusive_growth/toward_a_sustainable_inclusive_growing_future_the_role_of_business/toward-a-sustainable-inclusive-growing-future-the-role-of-business.pdf?shouldIndex=false
- [16] D. C. Dabija, B. M. Bejan, and C. Pușcaș, "A Qualitative Approach to the Sustainable Orientation of Generation Z in Retail: The Case of Romania," *J. Risk Financ. Manag.*, vol. 13, no. 7, 2020, doi: 10.3390/jrfm13070152.
- [17] J. Sheasby, "Examining Factors that Contribute to Pro-Environmental Behaviour and Conscious between Rural and Urban Populations," 2022.
- [18] S. Pradeep and M. Pradeep, "Awareness of sustainability, climate emergency, and generation Z's consumer behaviour in UAE," *Clean. Responsible Consum.*, vol. 11, no. September, p. 100137, 2023, doi: 10.1016/j.clrc.2023.100137.
- [19] K. Andruszkiewicz, M. Grzybowska-Brzezińska, M. Grzywińska-Rapca, and P. D. Wiśniewski, "Attitudes and Pro-Environmental Behavior of Representatives of Generation Z from the Example of Poland and Germany," *Sustainability*, vol. 15, no. 20, p. 15068, 2023, doi: 10.3390/su152015068.
- [20] N. Ahmat Zainuri, N. Abd-Rahman, L. Halim, M. Y. Chan, and N. N. Mohd Bazari, "Measuring Pro-Environmental Behavior Triggered by Environmental Values," *Int. J. Environ. Res. Public Health*, vol. 19, no. 23, 2022, doi: 10.3390/ijerph192316013.
- [21] X. Li, Z. Liu, and T. Wuyun, "Environmental Value and Pro-environmental Behavior Among Young Adults: The Mediating Role of Risk Perception and Moral Anger," *Front. Psychol.*, vol. 13, no. February, pp. 1–11, 2022, doi: 10.3389/fpsyg.2022.771421.
- [22] S. Pyo, S. G. Chung, H. R. Ma, and D. H. Oh, "Firms for Sustainable Manufacturing: Understanding the Key Determinants of Pro-environmental Behaviour," *Sci. Technol. Soc.*, vol.

- 29, no. (2), pp. 262-281., 2024, [Online]. Available: <https://doi.org/10.1177/09717218241238265>
- [23] A. Kollmus and J. Agyeman, "Mind the Gap: Why Do People Act Environmentally and What Are the Barriers Mind the Gap: why do people act environmentally and what are the barriers to," *Environ. Educ. Res.*, no. August 2002, pp. 37–41, 2015, doi: 10.1080/1350462022014540.
- [24] S. Moser, S., Kleinhüchelkotten, "Good Intentions, but Low Impacts: Diverging Importance of Motivational and Socioeconomic Determinants Explaining Pro-Environmental Behavior, Energy Use, and Carbon Footprint," *Environ. Behav.*, vol. 50, no. (6), pp. 626-656., 2018, doi: 10.4324/9780429039614.
- [25] G. Torkar and F. X. Bogner, "Environmental values and environmental concern," *Environ. Educ. Res.*, vol. 25, no. 10, pp. 1570–1581, 2019.
- [26] E. van der Werff, L. Steg, and K. Keizer, "Follow the signal: When past pro-environmental actions signal who you are," *J. Environ. Psychol.*, vol. 40, pp. 273–282, 2014, doi: 10.1016/j.jenvp.2014.07.004.
- [27] X. Wang, E. Van der Werff, T. Bouman, M. K. Harder, and L. Steg, "I Am vs. We Are: How Biospheric Values and Environmental Identity of Individuals and Groups Can Influence Pro-environmental Behaviour," *Front. Psychol.*, vol. 12, no. February, pp. 1–11, 2021, doi: 10.3389/fpsyg.2021.618956.
- [28] W. T. Chen and M. H. Hsieh, "Environmental self-identity, self-efficacy, and the emergence of green opinion leaders: An exploratory study," *Heliyon*, vol. 9, no. 6, p. e17351, 2023, doi: 10.1016/j.heliyon.2023.e17351.
- [29] J. Guo, "The significance of green entrepreneurial self-efficacy: Mediating and moderating role of green innovation and green knowledge sharing culture," *Front. Psychol.*, vol. 13, no. September, pp. 1–18, 2022, doi: 10.3389/fpsyg.2022.1001867.
- [30] L. Guo, Y. Xu, G. Liu, T. Wang, and C. Du, "Understanding firm performance on green sustainable practices through managers' ascribed responsibility and waste management: Green self-efficacy as moderator," *Sustain.*, vol. 11, no. 18, pp. 1–16, 2019, doi: 10.3390/su11184976.
- [31] S. Gomes, J. M. Lopes, and S. Nogueira, "Willingness to pay more for green products: A critical challenge for Gen Z," *J. Clean. Prod.*, vol. 390, no. January, 2023, doi: 10.1016/j.jclepro.2023.136092.
- [32] L. L. Dragolea *et al.*, "Determining factors in shaping the sustainable behavior of the generation Z consumer," *Front. Environ. Sci.*, vol. 11, no. January, pp. 1–21, 2023, doi: 10.3389/fenvs.2023.1096183.
- [33] T. Chen and Z. Wu, "How to facilitate employees' green behavior? The joint role of green human resource management practice and green transformational leadership," *Front. Psychol.*, vol. 13, no. August, pp. 1–11, 2022, doi: 10.3389/fpsyg.2022.906869.
- [34] H. Tian and X. Liu, "Pro-Environmental Behavior Research: Theoretical Progress and Future Directions," *Int. J. Environ. Res. Public Health*, vol. 19, no. 11, 2022, doi: 10.3390/ijerph19116721.
- [35] Z. Ren and K. Zhong, "Driving mechanism of subjective cognition on farmers' adoption behavior of straw returning technology: Evidence from rice and wheat producing provinces in China," *Front. Psychol.*, vol. 13, no. August, pp. 1–14, 2022, doi: 10.3389/fpsyg.2022.922889.
- [36] A. Balundė, G. Perlaviciute, and L. Steg, "The relationship between people's environmental considerations and pro-environmental behavior in Lithuania," *Front. Psychol.*, vol. 10, no. OCT, pp. 1–10, 2019, doi: 10.3389/fpsyg.2019.02319.
- [37] F. Mõnus, "Environmental perceptions and pro-environmental behavior—comparing different measuring approaches," *Environ. Educ. Res.*, vol. 27, no. 1, pp. 132–156, 2021, doi: 10.1080/13504622.2020.1842332.
- [38] M. A. Ribeiro, S. Seyfi, S. Elhoushy, K. M. Woosnam, and V. Patwardhan, "Determinants of generation Z pro-environmental travel behaviour: the moderating role of green consumption values," *J. Sustain. Tour.*, vol. 0, no. 0, pp. 1–21, 2023, doi: 10.1080/09669582.2023.2230389.
- [39] M. Berliandaldo, A. Wijaya Holman Fasa, S. Kholiyah, A. Chodiq, and T. Hendrix, "Transformasi Digital Dan Strategi Pengembangan Bisnis Umkm Yang Adaptif Dan Berkelanjutan Pasca Pandemi Covid-19," *J. Anal. Kebijak.*, vol. 4, no. 2, pp. 54–73, 2021, doi: 10.37145/jak.v4i2.468.
- [40] D. I. Wijaya and P. Kokchang, "Factors Influencing Generation Z 's Pro-Environmental Behavior towards Indonesia 's Energy Transition," pp. 1–19, 2023.

- [41] A. J. Parzonko, A. Balińska, and A. Siczko, “Pro-environmental behaviors of generation z in the context of the concept of homo socio-oeconomicus,” *Energies*, vol. 14, no. 6, 2021, doi: 10.3390/en14061597.
- [42] N. Yasir, M. Babar, H. S. Mehmood, R. Xie, and G. Guo, “The Environmental Values Play a Role in the Development of Green Entrepreneurship to Achieve Sustainable Entrepreneurial Intention,” *Sustain.*, vol. 15, no. 8, 2023, doi: 10.3390/su15086451.
- [43] X. Xie and Q. Zhu, “Exploring an innovative pivot: How green training can spur corporate sustainability performance,” *Bus. Strateg. Environ.*, vol. 29, no. 6, pp. 2432–2449, 2020, doi: 10.1002/bse.2512.
- [44] S. O. Atiku, “Institutionalizing Social Responsibility Through Workplace Green Behavior,” no. October, pp. 183–199, 2018, doi: 10.4018/978-1-5225-6286-3.ch010.
- [45] E. Cuadrado, L. H. Macias-Zambrano, A. J. Carpio, and C. Taberner, “The moderating effect of collective efficacy on the relationship between environmental values and ecological behaviors,” *Environ. Dev. Sustain.*, vol. 24, no. 3, pp. 4175–4202, 2022, doi: 10.1007/s10668-021-01611-w.
- [46] M. Allen, “Understanding Pro-Environmental Behavior: Models and Messages. In: Strategic Communication for Sustainable Organizations.,” in *CSR, Sustainability, Ethics & Governance*, Springer International Publishing Switzerland, 2016. doi: https://doi.org/10.1007/978-3-319-18005-2_4.
- [47] A. Roy, A. Basu, Y. Su, Y. Li, and X. Dong, “Understanding Recent Trends in Global Sustainable Development Goal 6 Research: Scientometric, Text Mining and an Improved Framework for Future Research,” *Sustain.*, vol. 14, no. 4, 2022, doi: 10.3390/su14042208.
- [48] X. Y. Wang, G. Li, S. Malik, and A. Anwar, “Impact of COVID-19 on achieving the goal of sustainable development: E-learning and educational productivity,” *Econ. Res. Istraz.*, vol. 35, no. 1, pp. 1950–1966, 2022, doi: 10.1080/1331677X.2021.1927789.
- [49] M. Chen, E. Jeronen, and A. Wang, “Toward environmental sustainability, health, and equity: How the psychological characteristics of college students are reflected in understanding sustainable development goals,” *Int. J. Environ. Res. Public Health*, vol. 18, no. 15, 2021, doi: 10.3390/ijerph18158217.
- [50] M. Tamar, H. Wirawan, T. Arfah, and R. P. S. Putri, “Predicting pro-environmental behaviours: the role of environmental values, attitudes and knowledge,” *Manag. Environ. Qual. An Int. J.*, vol. 32, no. 2, pp. 328–343, 2021, doi: 10.1108/MEQ-12-2019-0264.
- [51] L. B. Miller, R. E. Rice, A. Gustafson, and M. H. Goldberg, “Relationships Among Environmental Attitudes, Environmental Efficacy, and Pro-Environmental Behaviors Across and Within 11 Countries,” *Environ. Behav.*, vol. 54, no. 7–8, pp. 1063–1096, 2022, doi: 10.1177/00139165221131002.
- [52] B. Yuan and J. Li, “Understanding the Impact of Environmentally Specific Servant Leadership on Employees’ Pro-Environmental Behaviors in the Workplace: Based on the Proactive Motivation Model,” *Int. J. Environ. Res. Public Health*, vol. 20, no. 1, 2023, doi: 10.3390/ijerph20010567.
- [53] M. Y. Yusliza *et al.*, “An investigation of pro-environmental behaviour and sustainable development in Malaysia,” *Sustain.*, vol. 12, no. 17, 2020, doi: 10.3390/su12177083.
- [54] W. J. Boone, M. S. Yale, and J. R. Staver, *Rasch analysis in the human sciences*. New York: Springer US, 2014. doi: 10.1007/978-94-007-6857-4.
- [55] B. Sumintono, *Model Rasch untuk Penelitian Ilmu-Ilmu Sosial*, November 2. Trim Komunikata, 2014.
- [56] P. C. Stern, T. Dietz, and G. A. Guagnano, “A Brief Inventory of Values.,” *Educ. Psychol. Meas.*, vol. 58, no. (6), pp. 984-1001., 1998.
- [57] T. Bouman, L. Steg, and H. A. L. Kiers, “Measuring values in environmental research: A test of an environmental Portrait Value Questionnaire,” *Front. Psychol.*, vol. 9, no. APR, pp. 1–15, 2018, doi: 10.3389/fpsyg.2018.00564.
- [58] L. Steg, G. Perlaviciute, E. van der Werff, and J. Lurvink, “The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions,” *Environ. Behav.*, vol. 46, no. 2, pp. 163–192, 2014, doi: 10.1177/0013916512454730.
- [59] D. G. J. Dei and F. Y. Asante, “Role of academic libraries in the achievement of quality education as a sustainable development goal,” *Libr. Manag.*, vol. 43, no. 6–7, pp. 439–459, 2022, doi: 10.1108/LM-02-2022-0013.

- [60] W. Fu, Y. Zhou, L. Li, and R. Yang, "Understanding household electricity-saving behavior: Exploring the effects of perception and cognition factors," *Sustain. Prod. Consum.*, vol. 28, no. August, pp. 116–128, 2021, doi: 10.1016/j.spc.2021.03.035.
- [61] I. Ghozali, *Partial Least Squares Menggunakan Program SmartPLS 3.2.9*. Jakarta: Badan Penerbit Universitas Diponegoro, 2021.
- [62] M. Sarstedt, G. T. M. Hult, C. M. Ringle, and J. F. Hair, *A primer on partial least squares structural equation modeling (PLS-SEM)*. California USA: SAGE Publications, Inc., 2014. doi: 10.1007/978-3-319-05542-8_15-2.
- [63] E. Yafi, S. Tehseen, and S. A. Haider, "Impact of green training on environmental performance through mediating role of competencies and motivation," *Sustain.*, vol. 13, no. 10, pp. 1–15, 2021, doi: 10.3390/su13105624.
- [64] J. Wang, Y. Xue, X. Sun, and J. Yang, "Green learning orientation, green knowledge acquisition and ambidextrous green innovation," *J. Clean. Prod.*, vol. 250, 2020, doi: 10.1016/j.jclepro.2019.119475.
- [65] M. Barba-Aragón and D. Jiménez-Jiménez, "Is training a green innovation driver? The mediating role of knowledge acquisition," *J. Knowl. Manag.*, 2023.
- [66] F. T. Moradeke, G. K. Ishola, and O. L. Okikiola, "Green Training and Development Practices on Environmental Sustainability: Evidence from WAMCO PLC," *J. Educ. Manag. Soc. Sci.*, vol. 1, no. 2, pp. 1–19, 2021, doi: 10.48112/jemss.v1i2.212.
- [67] J. Liu, Y. Liu, and L. Yang, "Uncovering the influence mechanism between top management support and green procurement: The effect of green training," *J. Clean. Prod.*, vol. 251, p. 119674, 2020, doi: 10.1016/j.jclepro.2019.119674.
- [68] P. Paillé, P. Valéau, and D. W. Renwick, "Leveraging green human resource practices to achieve environmental sustainability," *J. Clean. Prod.*, vol. 260, 2020, doi: 10.1016/j.jclepro.2020.121137.
- [69] M. A. V. Molina, A. F. Sáinz, and J. I. Olaizola, "Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university students from emerging and advanced countries," *Journal of Cleaner Production*, vol. 61, pp. 130–138, 2013.
- [70] G. Liobikiene and M. S. Poškus, "The importance of environmental knowledge for private and public sphere pro-environmental behavior: Modifying the Value-Belief-Norm theory," *Sustain.*, vol. 11, no. 12, 2019, doi: 10.3390/su10023324.
- [71] P. Díaz-Siefer, A. Neaman, E. Salgado, J. L. Celis-Diez, and S. Otto, "Human-environment system knowledge: A correlate of pro-environmental behavior," *Sustain.*, vol. 7, no. 11, pp. 15510–15526, 2015, doi: 10.3390/su71115510.
- [72] M. Ienna *et al.*, "The Relative Role of Knowledge and Empathy in Predicting Pro-Environmental Attitudes and Behavior," *Sustain.*, vol. 14, no. 8, 2022, doi: 10.3390/su14084622.
- [73] R. Gifford and A. Nilsson, "Personal and social factors that influence pro-environmental concern and behaviour: A review," *Int. J. Psychol.*, vol. 49, no. 3, pp. 141–157, 2014, doi: 10.1002/ijop.12034.
- [74] I. Hossain, M. Nekomahmud, and M. Fekete-Farkas, "How Do Environmental Knowledge, Eco-Label Knowledge, and Green Trust Impact Consumers' Pro-Environmental Behaviour for Energy-Efficient Household Appliances?," *Sustain.*, vol. 14, no. 11, pp. 1–16, 2022, doi: 10.3390/su14116513.