Jurnal Ilmu Dakwah
https://journal.walisongo.ac.id/index.php/dakwah/index

Enhancing students on climate issues through social media marketing and green knowledge sharing: A contemporary da'wah approach in Indonesia and Turkey

Sutopo Sutopo[1], Nur Hendrasto[2], Afif Zaerof[3], Abdullah Haidar[4]

[1,2,3] Tazkia University, Indonesia
[4] Süleyman Demirel University, Turkey
Email: sutopo@tazkia.ac.id

Article Information:
Received:
8 May 2025
Revised:
22 June 2025
Accepted:
30 June 2025

Keywords:
Social media marketing, green knowledge sharing, climate change awareness, digital da'wah, cross-cultural study.

Abstract

Purpose - This study examines the influence of social media marketing and green knowledge sharing on climate change awareness among university students in Indonesia and Turkey. These digital initiatives are framed as a contemporary form of *da'wah bil hal*, where Islamic values of environmental stewardship are promoted through action-based communication and active engagement on social media platforms.

Method - A quantitative approach was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze data collected from 327 students through purposive sampling.

Result - The findings reveal that social media marketing significantly impacts green knowledge sharing (β = 0.279, p = 0.016) and climate awareness (β = 0.305, p = 0.012), with green knowledge sharing mediating the relationship (β = 0.112, p = 0.038). However, climate awareness alone does not significantly lead to pro-environmental behavior.

Implication – The study highlights that empowering students through social media campaigns can be an effective strategy for environmental da'wah, integrating Islamic values into climate action.

Originality/Value - This study is one of the first cross-cultural investigations linking social media-driven environmental communication with Islamic *da'wah* practices between Indonesia and Turkey. It highlights cultural variations in environmental awareness and communication style, where Indonesian students show higher collectivist-driven engagement in green campaigns. In contrast, Turkish students tend to approach environmental messaging more individually. These contrasts enrich understanding of how Islamic *da'wah bil hal* can be contextualized across different cultural and educational settings.

Jurnal Ilmu Dakwah
Vol. 45 No. 1 (2025)
1693-8054 (p)
2581-236X (e)
25-44
https://doi.org/10.2158/jid.45.1.26371

For citation: Sutopo., Hendrasto, N., Zaerof, A., & Haidar, A. (2025). Enhancing students on climate issues through social media marketing and green knowledge sharing: A contemporary da'wah approach in Indonesia and Turkey. *Jurnal Ilmu Dakwah*. *45*(1). 25-44. https://doi.org/10.2158/jid.45.1.26371.

***Corresponding author**: Sutopo, sutopo@tazkia.ac.id, Ir. H. Djuanda Street No. 78 Sentul, Citaringgul, Bogor City, West Jawa, Indonesia, 16810.

Kata kunci:
Pemasaran media sosial, berbagi pengetahuan ramah lingkungan, kesadaran perubahan iklim, dakwah digital, studi lintas budaya.

Abstrak

Tujuan - Studi ini bertujuan untuk menganalisis pengaruh pemasaran media sosial dan berbagi pengetahuan hijau terhadap kesadaran perubahan iklim di kalangan mahasiswa universitas di Indonesia dan Turki. Inisiatif digital ini dikonsepkan sebagai bentuk kontemporer dari da'wah bil hal, di mana nilai-nilai Islam tentang pengelolaan lingkungan dipromosikan melalui komunikasi berbasis aksi dan keterlibatan aktif di platform media sosial.

Metode - Pendekatan kuantitatif digunakan dengan menggunakan Partial Least Squares Structural Equation Modeling (PLS-SEM) untuk menganalisis data yang dikumpulkan dari 327 mahasiswa melalui sampling purposif.

Hasil - Temuan menunjukkan bahwa pemasaran media sosial secara signifikan mempengaruhi berbagi pengetahuan hijau ($\beta = 0.279$, $p = 0.016$) dan kesadaran iklim ($\beta = 0.305$, $p = 0.012$), dengan berbagi pengetahuan hijau sebagai mediator dalam hubungan tersebut ($\beta = 0.112$, $p = 0.038$). Namun, kesadaran iklim sendiri tidak secara signifikan mengarah pada perilaku pro-lingkungan.

Implikasi – Studi ini menyoroti bahwa memberdayakan mahasiswa melalui kampanye media sosial dapat menjadi strategi efektif untuk da'wah lingkungan, dengan mengintegrasikan nilai-nilai Islam ke dalam aksi iklim.

Orisinalitas/Nilai - Studi ini merupakan salah satu penelitian lintas budaya pertama yang menghubungkan komunikasi lingkungan berbasis media sosial dengan praktik da'wah Islam antara Indonesia dan Turki. Studi ini menyoroti variasi budaya dalam kesadaran lingkungan dan gaya komunikasi, di mana mahasiswa Indonesia menunjukkan keterlibatan yang lebih tinggi didorong oleh kolektivisme dalam kampanye hijau. Sebaliknya, mahasiswa Turki cenderung mendekati pesan lingkungan secara lebih individual. Perbedaan ini memperkaya pemahaman tentang bagaimana da'wah bil hal Islam dapat dikontekstualisasikan dalam berbagai setting budaya dan pendidikan.

Introduction

Climate change has become an urgent and tangible global threat, with countries like Indonesia and Turkey already experiencing its severe impacts, including rising temperatures, melting polar ice, and more frequent natural disasters such as floods and droughts (Mangunjaya, 2022). These effects disrupt ecosystems and human life, particularly in developing countries that are more vulnerable to climate-related risks. Raising awareness, especially among youth as future leaders, is therefore essential in climate change mitigation efforts (Sahendra, Y., Azhari, S. R., Rahmat, R., Fadillah, S. A., Fauzi, Y., & Hikmat, 2023).

The advancement of information and communication technologies has transformed Islamic *da'wah*, enabling broader, faster, and more interactive dissemination of religious messages through the internet (Andriani, 2023; Karim & Riyadi, 2024). In the digital era, social media platforms serve not only for religious instruction but also as tools to address contemporary issues like climate change. Islam promotes a holistic worldview where environmental sustainability is humankind's moral and spiritual duty as *khalifah* (Al-Jayyousi, 2016). As stated in the Qur'an (Al-Baqarah: 30), humans are entrusted to preserve the Earth and prohibited from causing *fasad* (Bsoul, L., Omer, A., Kucukalic, L., & Archbold, 2022). Raising climate awareness among youth through digital means can thus be framed as *da'wah bil hal* (Riyadi & Karim, 2023), preaching through action. In this context, social media marketing and green knowledge sharing are part of a broader da'wah strategy to promote responsible environmental behavior. This study defines student empowerment through three mechanisms: exposure to environmental campaigns, participation in green content sharing, and internalization of Islamic values (*khalifah* and *amanah*), which together encourage proactive climate advocacy.

Protecting the environment is not only a moral obligation but a religious duty grounded in Shari'ah law (Munib, M., Patrajaya, R., Ihsan, R. N., & Amin, 2022). Thus, initiatives to raise environmental awareness and promote sustainability align with Islamic principles as part of a divine mandate. Empowering students to advocate for climate responsibility via digital platforms reflects *dakwah bil hal*, where Islamic values are practiced through active social engagement in addressing global challenges.

In Indonesia, climate change has increased the frequency of disasters such as floods, landslides, and droughts, with 95% of disasters in 2023 linked to climate change (BNPB, 2023). As a vast archipelagic nation, Indonesia is also highly vulnerable to rising sea levels that threaten coastal communities. In contrast, Turkey faces severe drought and water scarcity, affecting 45% of its territory and posing risks to food security. By 2050, average temperatures in Turkey may rise by 2°C, further stressing ecosystems. Raising climate awareness in both countries is thus essential to mitigate long-term impacts. In this context, social media plays a vital role in engaging youth through rapid, visually driven content like infographics and videos that encourage environmental action (Hajri, O., & Darmawan, 2024). Social media serves a dual function as both a marketing tool for awareness campaigns and an educational medium, especially for digitally engaged youth (Rahman, R. M., Taqwa, H., & Idris, 2022). Platforms like Instagram, Twitter, and TikTok offer interactive features such as 'share,' 'like,' and 'comment,' which facilitate collaboration in environmental campaigns and foster digital communities, according to Shofiyyah (2024). Visual appeal

significantly influences youth engagement, highlighting the need for environmental messages to align with current visual trends (Shofiyyah, N. A., Aulia, H., Nur Lathifah, R., & Vitriani, 2024).

Green knowledge sharing refers to the voluntary dissemination of environmental information on social media through personal posts or shared content. This activity enhances individual awareness and builds collective networks that encourage climate action, particularly among youth who prefer interactive digital platforms over traditional communication methods. In the marketing context, green campaigns on social media aim to build environmentally responsible branding and rely heavily on user engagement through sharing practices (Putri, 2023). The success of environmental campaigns on social media depends on active user participation, particularly through green knowledge sharing, where individuals disseminate eco-related content, recommendations, or calls to action (Suprobo, F. P., & Dewantara, 2019).

In the digital era, such behavior plays a vital role in raising awareness and promoting collective sustainability efforts (Ayuningtyas, W. D., Fadillah, D., Nurjanah, I., & Pratiwi, 2025). Influenced by attitudes, social norms, and perceived behavioral control, individuals with strong environmental beliefs are more likely to share information. According to social cognitive theory, people are shaped by their social environment, including digital exposure; thus, students who frequently encounter environmental content online tend to adopt more positive attitudes and engage in pro-environmental sharing (Saputra, R. H., & Nur Oktaviani, 2022). Recent studies also highlight that environmental awareness is shaped by education, culture, and digital media. For instance, sustainability-based education plays a key role in fostering awareness (Sampurno, M. B. T., Kusworo, T. C., & Iskandar, 2020) highlighting that sustainability-based education plays a crucial role in shaping environmental awareness. Amalia (2023) also found that traditional cultural values can enhance environmental concern. Meanwhile, social media serves as a primary tool for disseminating environmental information and encouraging digital participation in sustainability campaigns (Amalia, 2023). These findings suggest that education, culture, and social media work synergistically to enhance environmental awareness. In Indonesia, similar efforts have been undertaken by the Ministry of Environment and Forestry (KLHK), which has launched various environmental education programs to raise awareness among younger generations about the importance of preserving and protecting the environment (KLHK, 2021).

Contextual differences between Indonesia and Turkey, such as climate, biodiversity, and policy, shape how university students in both countries perceive and respond to climate change. Indonesia faces challenges like coastal flooding and biodiversity loss, while Turkey struggles with drought and air pollution. These variations also affect environmental education: Indonesia emphasizes conservation and disaster prevention, while Turkey focuses on waste and pollution control. Additionally, a study by (Mansyur, 2023) highlights that audience segmentation helps explain varying levels of environmental concern. Social media, therefore, plays a key role in targeting students with diverse backgrounds and awareness levels. However, evaluating how effectively these campaigns lead to actual behavioral change remains essential.

This study investigates the relationship between social media marketing and climate change awareness, with green knowledge sharing as a mediator, among students in Indonesia and Turkey. It also explores how culture, education, and media influence environmental engagement, offering insights for culturally adaptive climate communication strategies.

Research Methods

Population and Sample

The population of this study comprises active university students aged 18 to 30 years in Indonesia and Turkey. This age group is selected because young adults are generally the most active users of social media and are more likely to engage with digital content related to environmental issues, making them a relevant demographic for examining social media marketing, green knowledge sharing, and climate change awareness.

A total of 309 students participated in the study, with a relatively balanced composition of 152 students from Indonesia and 157 from Turkey, drawn from various public and private universities to ensure broader academic and regional representation. A non-probability quota sampling approach was applied to ensure the inclusion of active social media users who had prior exposure to environmental content online. While the sampling aimed to capture variation in digital behavior, it does not qualify as purposive sampling in the strict methodological sense, since it did not target individuals based on pre-identified characteristics (e.g., confirmed involvement in environmental organizations). To ensure relevance to the study's objectives, participants were asked screening questions regarding their frequency of social media use and prior interaction with environmental content. This strategy allowed for the inclusion of respondents who could meaningfully assess constructs such as:

1. Social Media Marketing (SMM) is students' exposure to and interaction with environmental campaigns or eco-themed digital content.
2. Green Knowledge Sharing (GKS): refers to their behavior in sharing, reposting, or commenting on green content online.
3. Climate Change Awareness (CCA): capturing their understanding of environmental issues, concern about climate change, and perceived personal responsibility.

This population enables the investigation of how these constructs interact in different cultural contexts and supports the study's aim to explore cross-cultural dynamics in digital environmental communication.

Research Type

This study adopts a quantitative research approach aimed at measuring the relationship between social media marketing, green knowledge sharing, and climate change awareness among university students in Indonesia and Turkey. Structural Equation Modeling (SEM) is used as the primary analytical approach to achieve this objective. SEM is chosen because it allows for the analysis of complex relationships between variables, including direct and indirect effects, which are crucial for understanding the mediating role of green knowledge sharing in this study. The SEM approach enables the testing of structural models that simultaneously incorporate causal relationships among latent variables.

This study employs a quantitative survey research design to collect data from students in Indonesia and Turkey. The survey method is used to analyze the relationships between social media marketing, green knowledge sharing, and climate change awareness. The study applies Structural

Equation Modeling (SEM) as the analytical technique to explore both direct and indirect relationships among the variables in the research model.

Data Collection Technique

Data is collected through an online survey using digital survey platforms (such as Google Forms), which are distributed to students in selected universities in Indonesia and Turkey. The survey is conducted in two languages, Bahasa Indonesia and Turkish, to ensure that participants fully understand each item. Before completing the questionnaire, students are provided with a brief explanation of the study's objectives, and their data confidentiality is guaranteed. Participants are required to provide voluntary consent before filling out the survey. The data collection period is expected to last three to four weeks to ensure sufficient respondents from both countries. All collected survey data were securely stored and treated with strict confidentiality for subsequent analysis. Before data collection, ethical clearance and approval were obtained from the relevant institutional review boards in Indonesia and Turkey to ensure compliance with academic research standards. Participants were informed about the study's objectives and provided informed consent voluntarily, with the right to withdraw at any time without penalty.

Research Instrument

The primary research instrument used in this study is a questionnaire based on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." The questionnaire is structured to measure the following variables:

1. Social Media Marketing – Measures students' exposure to environmental content on social media and their interaction with visual and interactive elements. (Example item: "I frequently see environmental content on social media.")
2. Green Knowledge Sharing – Assesses how frequently students share environmental information on social media. (Example item: "I often share information about the environment on social media.")
3. Climate Change Awareness – Evaluates students' understanding of climate change, its impacts, and their pro-environmental behavior. (Example item: "I am aware of the negative impacts of climate change.")

Instrument Validation and Language Adaptation

1. Instrument Validation
   a. Exploratory Factor Analysis (EFA) is conducted to assess the initial validity of the constructs.
   b. Confirmatory Factor Analysis (CFA) is used to confirm the measurement model.
   c. Expert review is conducted by psychometric and social research specialists.
   d. Back-translation method is applied to ensure equivalence in meaning between the two language versions.
   e. Cronbach's Alpha is calculated to assess reliability, with a minimum accepted value of 0.70 (Sarstedt, M., Ringle, C. M., & Hair, 2021).

2. Since the study was conducted among Indonesian and Turkish students, the questionnaire was translated into both Bahasa Indonesia and Turkish. The translation process follows a back-translation procedure to ensure the accuracy of meaning in both language versions. After translation, A pilot test was conducted with a sample of 30 students, 15 from Indonesia and 15 from Turkey, to identify potential language ambiguities and ensure the clarity and cultural relevance of the questionnaire items. The pilot results indicated that all items were generally well understood, with only minor adjustments required in wording for two items related to climate awareness in the Turkish version. Reliability analysis from the pilot yielded Cronbach's alpha values above 0.70 for all constructs, confirming acceptable internal consistency before full-scale distribution. Exploratory Factor Analysis (EFA) is conducted to confirm that each item correlates with the measured variable, while Cronbach's Alpha reliability analysis ensures an acceptable reliability level ≥0.70 (Sarstedt, 2021).

Data Analysis Technique

This study applies Partial Least Squares Structural Equation Modeling (PLS-SEM) as the primary analytical technique. SEM is chosen due to its ability to analyze latent variables and measure both direct and indirect effects, making it a suitable method for testing the mediating role of green knowledge sharing. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3.0. This approach was selected due to its suitability for predictive models, small to medium sample sizes, and its ability to evaluate both direct and indirect effects in complex models. Confirmatory Factor Analysis (CFA) was conducted to assess the measurement model, evaluating convergent and discriminant validity. Model fit was assessed using criteria such as Chi-square/df ≤ 3, RMSEA < 0.08, and CFI and TLI > 0.90. Bootstrapping techniques and the Sobel test were used to test mediation to evaluate the significance of indirect paths. Hypothesis testing was conducted using path coefficients, t-statistics, and p-values obtained via bootstrapping with 5,000 resamples.

Results and Discussion

The findings of this study resonate with previous research on Islamic educational institutions in Indonesia, which have successfully integrated environmental sustainability into their da'wah practices by aligning religious principles with ecological responsibility. Similarly, empowering university students to advocate for climate action through digital platforms reflects a contemporary form of *da'wah bil hal*, where Islamic values are actively applied to address global environmental challenges. Furthermore, the role of digital platforms in shaping social awareness has been evident in various contexts. Research on digital da'wah among Madurese women merchants shows how social media campaigns successfully promote religious moderation and community engagement(Ilaihi, W., Zuhriyah, L. F., & Yusuf, 2024). This finding supports the notion that empowering students through social media to advocate for climate awareness represents an extension of contemporary da'wah, where Islamic values are applied to broader societal issues.

The outer model in PLS-SEM is a part of the measurement model evaluation, which assesses the extent to which indicators or items within a construct can effectively represent the latent variable. One of the key aspects in evaluating the outer model is outer loading, which indicates the correlation between an indicator and the construct it measures. In practice, an outer loading value of ≥ 0.70 is

considered to have a strong contribution to the latent variable and is retained in the model. However, in certain cases, values between 0.40 – 0.69 may still be acceptable if they improve the overall reliability and validity of the model. Conversely, indicators with outer loading values below 0.40 are generally considered insufficiently strong to represent the construct and should be removed from the model (Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, 2021). The outer model diagram in SmartPLS used in this study is presented as follows:

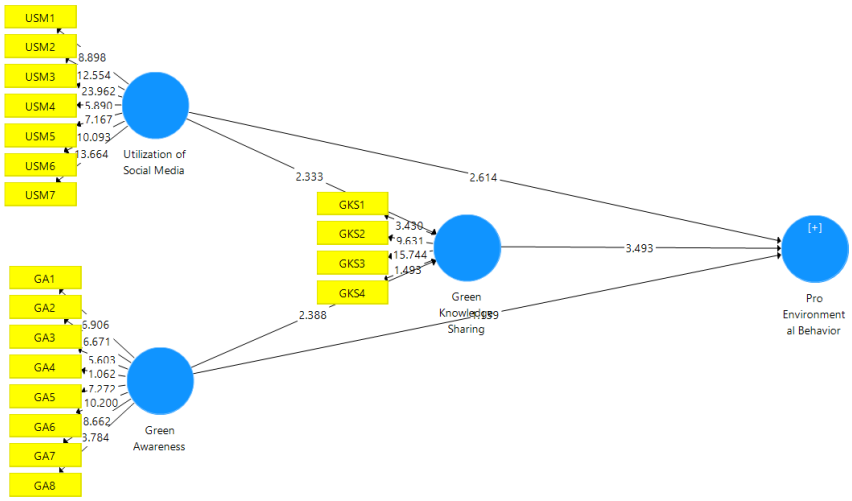

Figure 1 Outer Model Penelitian pada SmartPLS 3
Source: (Processed by the author, 2025)

Convergent Validity Test

Convergent validity is critical to evaluating the outer model in Partial Least Squares Structural Equation Modeling (PLS-SEM). It refers to the extent to which indicators within a construct are strongly interrelated and highly correlated, thereby confirming that the construct accurately reflects the concept being measured. Two primary indicators commonly used to assess convergent validity are outer loadings and the Average Variance Extracted (AVE) (Sarstedt, M., Ringle, C. M., & Hair, 2021).

Outer Loading Model 1

Outer loading measures the correlation between each indicator and the latent variable it represents. A high outer loading value indicates that the indicator strongly relates to its construct. In general, an indicator is considered to meet convergent validity if it has an outer loading value of ≥ 0.70, as this indicates that more than 50% of the variance in the indicator is explained by the construct. However, in certain cases, indicators with outer loading values between 0.40 – 0.69 may still be considered if they enhance the overall reliability and validity of the model. Conversely, an indicator with an outer loading value < 0.40 should be removed, as its contribution to the construct is too weak(Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, 2021). For this study, an outer loading threshold of ≥ 0.50 is used.

Outer Loading Test Results for Utilization of Social Media

Table 1Hasil Uji Outer Loading Utilization of Social Media

Variable	Item	Outer Loading	Passed/Not Passed
Utilization of Social Media	USM1	0,698	Passed
	USM2	0,820	Passed
	USM3	0,882	Passed
	USM4	0,584	Passed
	USM5	0,604	Passed
	USM6	0,763	Passed
	USM7	0,780	Passed

Source: (Processed by the author, 2025)

Indicators USM3 (0.882), USM2 (0.820), and USM7 (0.780) exhibit the highest outer loading values, suggesting a strong relationship with the latent variable. Meanwhile, USM4 (0.584) and USM5 (0.604) are retained despite being below 0.70, as they remain within the acceptable range and contribute to improving the model's reliability and validity. Meanwhile, USM4 (0.584) and USM5 (0.604) are retained despite being below 0.70, as they remain within the acceptable range and contribute to improving the model's reliability and validity. Therefore, all indicators in the Utilization of Social Media construct meet convergent validity and can be used for further analysis.

Results of the Outer Loading Test for Green Awareness

Table 2 Outer Loading Green Awareness Test Result

Variable	Item	Outer Loading	Passed/Not Passed
Green Awareness	GA1	0,599	Passed
	GA2	0,586	Passed
	GA3	0,500	Passed
	GA4	0,130	Not Passed
	GA5	0,646	Passed
	GA6	0,662	Passed
	GA7	0,679	Passed
	GA8	0,459	Not Passed

Source: (Processed by the author, 2025)

The outer loading analysis results for the Green Awareness variable show that most indicators meet the predefined criteria, with values above 0.50. Indicators GA5 (0.646), GA6 (0.662), and GA7 (0.679) have values close to the ideal threshold (≥ 0.70), while GA1 (0.599), GA2 (0.586), and GA3 (0.500) are retained despite being below the ideal threshold, as they still fall within the acceptable range.

However, two indicators, GA4 (0.130) and GA8 (0.459), fail to meet the minimum required threshold, making them unsuitable for inclusion in the model and subject to elimination. Thus, the Green Awareness construct remains valid for further analysis, provided that non-compliant indicators are refined or removed to enhance convergent validity.

Result of the Outer Loading Green Knowledge Sharing

Table 3. Result of the Outer Loading Green Knowledge Sharing

Variable	Item	Outer Loading	Passed/Not Passed
Green Knowledge Sharing	GKS1	0,535	Passed
	GKS2	0,786	Passed
	GKS3	0,823	Passed
	GKS4	0,191	Not Passed

Source: (Processed by the author, 2025)

The outer loading analysis for the Green Knowledge Sharing variable shows that most indicators meet the convergent validity criteria. Specifically, GKS2 (0.786) and GKS3 (0.823) have values above the ideal threshold (≥ 0.70), indicating a strong relationship with the latent variable. The indicator GKS1 (0.535) is retained despite being below 0.70, as it still falls within the acceptable range. However, the indicator GKS4 (0.191) has a value below the established minimum threshold (0.50), making it unsuitable for inclusion in the model, and it should be eliminated. Therefore, the Green Knowledge Sharing construct can still be used for further analysis, provided that the non-compliant indicator is removed to enhance the convergent validity of the model.

Evaluation of Outer Model 2 Values

The evaluation of the Outer Model 2 values in this study aims to assess the extent to which the indicators within the constructs being examined accurately represent the latent variables. Based on the outer loading analysis results, the majority of the indicators show values above the minimum threshold of 0.70, indicating a strong relationship between the indicators and the constructs they represent, thus meeting the convergent validity criteria. However, some indicators with outer loading values between 0.50 and 0.69 are retained, as they are theoretically relevant and improve the overall model's reliability and validity. On the other hand, indicators with outer loading values below 0.40 are identified as invalid and are recommended for removal due to their weak contribution in representing the construct.

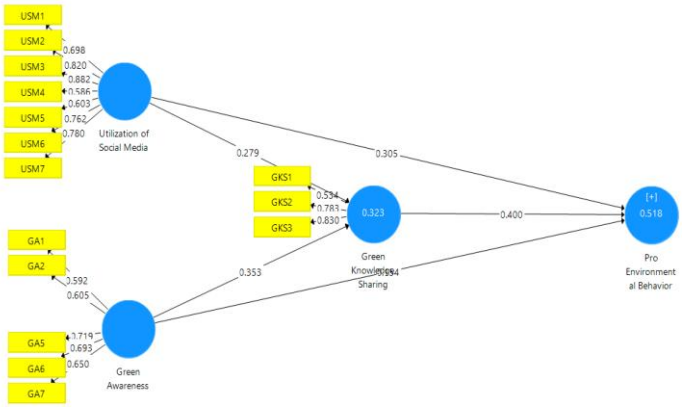

Figure 2. Result of The Second Outer Model Test

Table 4. Result of the Second Outer Model Test

Variable	Item	Outer Loading	Passed/ Not Passed
Utilization of Social Media	USM1	0,698	Passed
	USM2	0,820	Passed
	USM3	0,882	Passed
	USM4	0,586	Passed
	USM5	0,603	Passed
	USM6	0,762	Passed
	USM7	0,780	Passed
Green Awareness	GA1	0,598	Passed
	GA2	0,605	Passed
	GA3	0,458	Not Passed
	GA5	0,676	Passed
	GA6	0,678	Passed
	GA7	0,668	Passed
Green Knowledge Sharing	GKS1	0,538	Passed
	GKS2	0,783	Passed
	GKS3	0,829	Passed
Pro Environmental Behavior	Y	1,000	Passed

Source: (Processed by the author, 2025)

The results of the outer loading evaluation for Model 2 indicate that most indicators meet the convergent validity criteria. For the Utilization of Social Media construct, all indicators have values above 0.50; thus, they are considered acceptable. A similar result is found for the Green Knowledge Sharing construct, where all indicators meet the validity criteria. However, for the Green Awareness construct, the indicator GA3 (0.458) does not meet the minimum threshold and is therefore excluded from the model. Meanwhile, for the Pro Environmental Behavior construct, only one indicator (Y) has an outer loading of 1.000, indicating a perfect relationship with the latent construct. Thus, Model 2 can still be used for further analysis, provided that the non-compliant indicator is removed to improve the convergent validity of the model.

Evaluation of Outer Model 3 Values

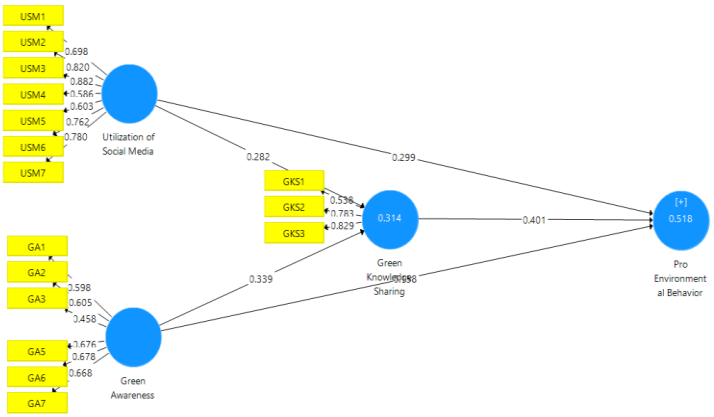

Figure 3. Result of The Third Outer Model Test

Table 5. Results of the Third Outer Model Test

Variable	Item	Outer Loading	Passed/Not Passed
Utilization of Social Media	USM1	0,698	Passed
	USM2	0,820	Passed
	USM3	0,882	Passed
	USM4	0,586	Passed
	USM5	0,603	Passed
	USM6	0,762	Passed
	USM7	0,780	Passed
Green Awareness	GA1	0,592	Passed
	GA2	0,605	Passed
	GA5	0,719	Passed
	GA6	0,693	Passed
	GA7	0,650	Passed
Green Knowledge Sharing	GKS1	0,534	Passed
	GKS2	0,783	Passed
	GKS3	0,830	Passed
Pro Environmental Behavior	Y	1,000	Passed

Source: (Processed by the author, 2025)

The results of the outer loading evaluation for Model 3 show that all indicators in the constructs of Utilization of Social Media, Green Awareness, Green Knowledge Sharing, and Pro Environmental Behavior have values above 0.50, and therefore, all are considered acceptable. For the Green Awareness construct, the indicators GA5 (0.719) and GA6 (0.693) have values that are close to or exceed the ideal threshold (≥ 0.70), while GA1 (0.592), GA2 (0.605), and GA7 (0.650) are retained, as they still fall within the acceptable range. Similarly, for the Green Knowledge Sharing construct, the indicators GKS2 (0.783) and GKS3 (0.830) have relatively high outer loading values, while GKS1 (0.534) is still within the acceptable range. The Pro Environmental Behavior construct has only one indicator (Y) with an outer loading of 1.000, indicating a perfect relationship with the latent construct. Thus, Model 3 meets the convergent validity criteria and can be used for further analysis without the need for indicator elimination.

Average Variance Extracted (AVE)

In addition to using outer loading, convergent validity in this study is also evaluated through the analysis of Average Variance Extracted (AVE). AVE is used to measure the extent to which the latent variable can explain the variance of the indicators used in the model, on average. The AVE calculation is performed by averaging the variance extracted by the construct from all the indicators it represents. A construct is said to have good convergent validity if the AVE value reaches or exceeds the minimum threshold of 0.50. An AVE value ≥ 0.50 indicates that the construct can explain more than 50% of the variance in its indicators, thus being considered converging valid.

Conversely, if the AVE value is below the threshold (< 0.50), the validity of the construct may be questionable. In such cases, further evaluation of the model is required, including possibly removing indicators with low outer loading values or improving the measurement model used. This

evaluation aims to ensure that the constructs used in the research accurately represent the concept being measured. The AVE calculation results for each construct in this study will be presented in the next section to demonstrate the extent to which each construct meets the convergent validity criteria.

Table 6. Values of AVE

Variabel	AVE	Keterangan
Green Awareness	0,566	Valid
Green Knowledge Sharing	0,529	Valid
Pro Environmental Behavior	1,000	Valid
Utilization of Social Media	0,548	Valid

Source: (Processed by the author, 2025)

Based on the results of the Average Variance Extracted (AVE) calculation shown in the table, all constructs in this study have AVE values above the 0.50 threshold, indicating that they meet the convergent validity criteria. The Green Awareness construct has an AVE value of 0.566, which means that more than 56.6% of the variance in the indicators of this construct can be explained by the latent variable being measured. Similarly, the Green Knowledge Sharing construct has an AVE value of 0.529, which is still within the acceptable range, and thus this construct is considered valid for measuring the targeted variable.

Furthermore, the Utilization of Social Media construct has an AVE value of 0.548, which also meets the convergent validity criteria. Meanwhile, the Pro Environmental Behavior construct has an AVE value of 1.000, indicating that the indicators used in this construct fully explain the variance they measure. These results suggest that the research model has good convergent validity, as each latent variable is able to explain more than 50% of the variance of the indicators it represents.

Discriminant Validity Test

In the process of testing discriminant validity, cross-loading is one of the methods used to evaluate how well the indicators in the model measure the intended construct without showing a higher correlation with other constructs. The standard commonly used in the literature to determine adequate discriminant validity is a cross-loading value above 0.70, as recommended by (Rasoolimanesh, 2022). This threshold indicates that the indicator has a strong association with the construct being measured, ensuring that the construct is unique and distinct from other constructs in the model.

However, in certain contexts, particularly in exploratory research or the early stages of measurement model development, a cross-loading value above 0.50 may still be considered acceptable. This tolerance allows flexibility in identifying relevant indicators without compromising the integrity of the overall model. Nevertheless, researchers are still encouraged to aim for the 0.70 threshold to ensure indicators' consistency and accuracy in reflecting the measured construct. Therefore, the application of the cross-loading threshold should be adjusted according to the research context and supported by strong theoretical justification to ensure optimal discriminant validity.

Table 7 Discriminant Validity Test Results

	Green Awareness	Green Knowledge Sharing	Pro Environmental Behavior	Utilization of Social Media
Green Awareness	0,654			
Green Knowledge Sharing	0,523	0,728		
Pro Environmental Behavior	0,548	0,631	1,000	
Utilization of Social Media	0,607	0,494	0,595	0,740

Source: (Processed by the author, 2025)

Based on the table above shows that the indicator correlation for each construct is higher compared to other constructs. Furthermore, the cross-loading values for each construct indicator are in accordance with the recommended threshold above 0.50. These results show that the data exhibit good discriminant validity.

Reliability Test

The reliability test is conducted to evaluate the internal consistency of an instrument in measuring a construct. It ensures that the items within each construct consistently reflect the underlying concept. Reliability is commonly assessed through Cronbach's Alpha and Composite Reliability.

While Cronbach's Alpha is widely used, it may underestimate reliability, especially with constructs measured by few items. Therefore, Composite Reliability is often preferred as it provides a more accurate representation of consistency, according to (Furadantin, 2018). The rule of thumb used to assess the reliability of a construct is that the composite reliability value must be greater than 0.7. A construct should be considered reliable to ensure that it demonstrates the instrument's accuracy, consistency, and precision in measuring a phenomenon. The following is the result of the composite reliability values in the table below:

Table 8. Reliability Test

	Cronbach's Alpha	Composite Reliability	Description
Green Awareness	0,733	0,788	Reliable
Green Knowledge Sharing	0,773	0,766	Reliable
Pro Environmental Behavior	1,000	1,000	Reliable
Utilization of Social Media	0,860	0,893	Reliable

Source: (Processed by the author, 2025)

Based on the reliability test results presented in the table above, all constructs in this study demonstrate strong reliability. This is evidenced by the Cronbach's Alpha and Composite Reliability values, which all exceed the minimum threshold of 0.70, as recommended by Furadantin (2018).

As shown in Table 8, all constructs exhibit Cronbach's Alpha and Composite Reliability values above the recommended threshold of 0.70, confirming the internal consistency and reliability of the instruments used in this study.

Results of Structural Model Testing (Inner Model)

The next step in the analysis is to examine the significance of the hypothesized relationships among the constructs, or to observe the effects between variables using path coefficients with the bootstrapping procedure. The bootstrapping output is then used to observe the magnitude of the T-statistic values.

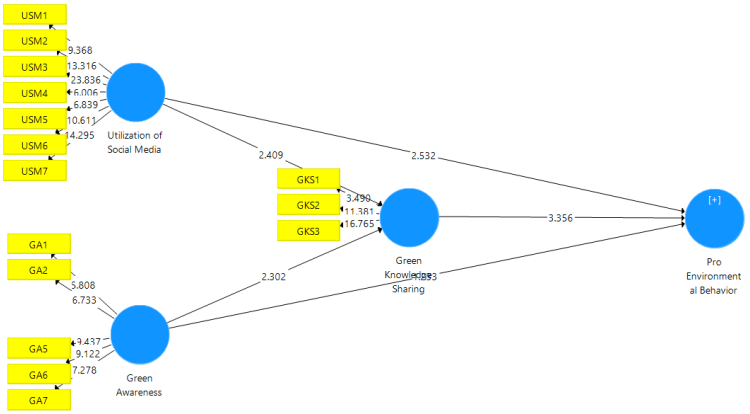

Figure 2. Structural Model Results Based on Inner Model Analysis

Direct Effect

Direct Effect Analysis is useful for testing hypotheses about the direct influence of an independent variable (exogenous) on a dependent variable (endogenous). The results of the data processing are presented in the table below as follows:

Table 9 Result

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	Status
Green Awareness >> Green Knowledge Sharing	0,353	2,302	0,022	Accepted
Green Awareness >> Pro Environmental Behavior	0,154	1,233	0,218	Rejected
Green Knowledge Sharing >> Pro Environmental Behavior	0,400	3,356	0,001	Accepted
Utilization of Social Media >> Green Knowledge Sharing	0,279	2,409	0,016	Accepted
Utilization of Social Media >> Pro Environmental Behavior	0,305	2,532	0,012	Accepted
Green awareness >> Green Knowledge Sharing >> Pro Environmental Behavior	0,141	1,841	0,066	Rejected
Utilization of Social Media >> Green Knowledge Sharing >> Pro Environmental Behavior	0,112	2,077	0,038	Accepted

Source: (Processed by the author, 2025)

The results of the path coefficient analysis can be interpreted by observing the original sample values to identify the relationships between the variables. Meanwhile, the significance level of the relationships between the variables is determined through the T-statistic values. The hypothesis testing in this study uses a significance level of 5% (two-tailed) with a 95% confidence level. Based on the calculations, the t-table value used as a reference to determine the significance of the relationships between the variables is 1.968. According to the data from the test results in the table above, a total of seven hypotheses were tested based on the results presented in Table 9. Five hypotheses showed statistically significant relationships ($p < 0.05$) and were accepted. Therefore, two hypotheses (H4 and H7) did not meet the significance threshold and were rejected. The following are the results of the hypothesis testing for each construct:

1. Green Awareness to Green Knowledge Sharing has a path coefficient value of 0.353, with a t-statistic value of 2.302 (greater than 1.968) and a P Value of 0.022. Since the P Value is < 5% (0.022 < 0.05), it can be concluded that green awareness has a positive and significant effect on green knowledge sharing. Thus, Hypothesis 1 (H1) is accepted.
2. Green Awareness to Pro Environmental Behavior has a path coefficient value of 0.154, with a t-statistic value of 1.233 (less than 1.968) and a P Value of 0.218. Since the P Value is > 5% (0.218 > 0.05), it can be concluded that green awareness does not affect pro-environmental behavior. Therefore, Hypothesis 2 (H2) is rejected. This result indicates that while environmental awareness is rising among students, this awareness is not always translated into real-world actions. According to the Value-Belief-Norm (VBN) Theory (Stern, 2000) individuals will exhibit pro-environmental behavior if they believe their actions have an impact and have strong moral norms. Ajzen (2020) explains that behavior is influenced not only by individual attitudes and perceived control but also by the strength of social norms (Ajzen, 2020). In this study, it appears that the prevailing social norms among students are not sufficiently strong to encourage action. Although students may recognize the importance of environmental protection, this awareness alone does not necessarily lead to actual behavioral change. Pai (2024) explains that an individual's intention to act is influenced by three main factors: attitude toward the behavior, subjective norms, and perceived behavioral control (Pai, C. J., Liao, B. A., Niu, E., & Fang, 2024). In this context, although students may demonstrate environmental awareness, the lack of control over external factors such as limited access to eco-friendly facilities or insufficient social support can hinder the translation of intention into actual behavior. This phenomenon, often referred to as the Intention–Behavior Gap, highlights the discrepancy between individuals' awareness or intentions and their actual actions. This finding aligns with Sigit (2019), who states that the Intention-Behavior Gap often occurs due to external factors such as the lack of supporting facilities and weak social norms (Sigit, D. V., Mulyani, M., & Kartowagiran, 2019). Limited access to eco-friendly facilities, weak social norms, and ingrained personal habits contribute to the gap between environmental awareness and actual behavior change. Lee (2024) emphasizes the role of education in shaping consumers' eco-friendly shopping behaviors (Lee, C. W., & Huang, 2024), highlighting that increased awareness and knowledge can lead to more sustainable purchasing decisions in both Indonesia and Taiwan. Ghahramani (2022) highlights the potential of social media in health promotion that extends beyond mere awareness creation (Ghahramani, A., de Cassia, M., & Pangaribuan,

2022). However, achieving tangible behavior change remains challenging in the absence of incentives or active community engagement.

Nazariyah (2024)underscores the pivotal role of digital communication in fostering public engagement during the 2024 election campaign through social media platforms (Nazariyah, 2024). Nevertheless, campaigns that are limited to one-way information dissemination without encouraging meaningful interaction are generally less effective in stimulating tangible public participation. Suparto (2024) emphasizes that social media plays a crucial role in increasing brand awareness through its wide and rapid dissemination of information(Suparto, 2024). However, to effectively implement pro-environmental behaviors, it is important for environmental awareness campaigns not to rely solely on social media as an information dissemination tool. Combining online efforts with offline programs can enhance audience engagement and facilitate the practical application of pro-environmental behaviors.

1. Green Knowledge Sharing to Pro Environmental Behavior has a path coefficient value of 0.400, with a t-statistic value of 3.356 (greater than 1.968) and a P Value of 0.001. Since the P-value is < 5% (0.001 < 0.05), it can be concluded that green knowledge sharing has a positive and significant effect on pro-environmental behavior. Thus, Hypothesis 3 (H3) is accepted.
2. Utilization of Social Media to Green Knowledge Sharing has a path coefficient value of 0.279, with a t-statistic value of 2.409 (greater than 1.968) and a P Value of 0.016. Since the P-value is < 5% (0.016 < 0.05), it can be concluded that the utilization of social media has a positive and significant effect on green knowledge sharing. Thus, Hypothesis 4 (H4) is accepted.
3. Utilization of Social Media to Pro Environmental Behavior has a path coefficient value of 0.305, with a t-statistic value of 2.532 (greater than 1.968) and a P Value of 0.012. Since the P Value is < 5% (0.012 < 0.05), it can be concluded that the utilization of social media has a positive and significant effect on pro-environmental behavior. Thus, Hypothesis 5 (H5) is accepted.
4. The mediation of green knowledge sharing between green awareness and pro-environmental behavior has a path coefficient value of 0.141, with a t-statistic value of 1.841 (less than 1.968) and a P Value of 0.066. Since the P Value is > 5% (0.066 > 0.05), it can be concluded that green knowledge sharing does not significantly mediate the relationship between green awareness and pro-environmental behavior. Thus, Hypothesis 6 (H6) is rejected.
5. The mediation of green knowledge sharing between the utilization of social media and pro-environmental behavior has a path coefficient value of 0.112, with a t-statistic value of 2.077 (greater than 1.968) and a P Value of 0.038. Since the P Value is < 5% (0.038 < 0.05), it can be concluded that green knowledge sharing significantly mediates the relationship between utilization of social media and pro-environmental behavior. Thus, Hypothesis 7 (H7) is accepted.

Conclusion

This study aimed to examine the relationship between social media marketing capabilities and climate change awareness, with green knowledge sharing as a mediating variable among university students in Indonesia and Turkey. The PLS-SEM analysis confirms that green knowledge sharing significantly mediates the relationship between social media utilization and pro-environmental

behavior. However, green awareness alone does not significantly influence behavior unless facilitated through active knowledge-sharing practices. The findings highlight that students exposed to environmental content on social media platforms are more likely to share green knowledge, which fosters pro-environmental actions. The accepted hypotheses H3 and H7 reinforce the critical role of green knowledge sharing in translating awareness and social media engagement into tangible behavior. Conversely, the rejection of H2 and H6 suggests that awareness without actionable communication strategies may not effectively drive environmental behavior. Culturally, the study underscores differences between Indonesia's collectivist tendencies and Turkey's more individualistic context, influencing environmental engagement styles. This supports the need for tailored environmental communication strategies. Influenced by community-driven campaigns, Indonesian students may require communal social media interactions, whereas Turkish students respond better to individual awareness stimuli. From a policy perspective, the findings provide actionable insights for educational institutions and environmental agencies to design localized and behavior-focused campaigns. Integrating social media with structured environmental education and peer-sharing platforms can bridge the intention–behavior gap in climate action, especially among the youth demographic aged 18–30. Future research should explore longitudinal models and integrate behavioral intention metrics to deepen understanding of long-term behavioral shifts. Additionally, expanding demographic diversity beyond university students may enhance generalizability.

References

Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. Human Behavior and Emerging Technologies. *2020*, *2*(4), 314–324.

Al-Jayyousi, O. R. (2016). *Islam and sustainable development*. Gower.

Amalia, Y. (2023). Peran kebudayaan dalam pembentukan kesadaran sosial dan lingkungan. *Jurnal Pendidikan Sosial Indonesia*, *1*(1), 9–18.

Andriani, A. D. (2023). Dakwah Virtual: Internet sebagai Reaktualisasi Sistem Komunikasi Dakwah di Era Digital. *Anida (Aktualisasi Nuansa Ilmu Dakwah)*, *23*(2), 175–188.

Ayuningtyas, W. D., Fadillah, D., Nurjanah, I., & Pratiwi, E. (2025). Peran media sosial dalam meningkatkan kesadaran lingkungan di kalangan milenial. *Pubmedia Social Sciences and Humanities*, *2*(3).

Bsoul, L., Omer, A., Kucukalic, L., & Archbold, R. H. (2022). Islam's perspective on environmental sustainability: A conceptual analysis. *Social Sciences*, *11*(6), 228.

Furadantin, N. R. (2018). Analisis data menggunakan aplikasi SmartPLS v. 3.2.7. *Jurnal Manajemen*, *1*(1), 1–18.

Ghahramani, A., de Cassia, M., & Pangaribuan, M. (2022). The potential of social media in health promotion beyond creating awareness: An integrative review. *BMC Public Health*, *22*(1), 2402.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24.

Hajri, O., & Darmawan, Y. (2024). The role of social media in engaging young people in environmental issues. *EDP Sciences*, *477*, 00079.

Ilaihi, W., Zuhriyah, L. F., & Yusuf, M. (2024). Digital da'wah on religious moderation for Madurese women merchants in Tapal Kuda, Indonesia. *Jurnal Ilmu Dakwah*, *44*(2), 259–274.

Karim, A., & Riyadi, A. (2024). Analyzing big data of da'wah manuscripts based on Dimensions: Mapping research on da'wah on social media. *Jurnal Ilmu Dakwah*, *44*(1), 1–14. https://doi.org/10.21580/JID.V44.1.22073

KLHK. (2021). *Program pendidikan lingkungan di Indonesia*.

Lee, C. W., & Huang, H. H. (2024). The impact of education on consumers' eco-friendly shopping habits towards sustainable purchases: Evidence from Indonesia and Taiwan. *Sustainability*, *16*(20), 8832.

Mangunjaya, F. M. (2022). Generasi terakhir: Aktivisme dunia Muslim mencegah perubahan iklim dan kepunahan lingkungan hidup. *LP3ES*.

Mansyur, I. (2023). *Pengaruh terpaan konten media sosial Instagram @pandawaragroup terhadap sikap followers*. Universitas Fajar.

Munib, M., Patrajaya, R., Ihsan, R. N., & Amin, M. (2022). Conservation environmental sustainability in the perspective of Islamic legal philosophy. *Samarah: Jurnal Hukum Keluarga Dan Hukum Islam*, *6*(2), 556–572.

Nazariyah, S. F. (2024). The role of digital communication in increasing public involvement in the 2024 election campaign on social media. *The Journal of Academic Science*, *1*(7), 898–905.

Pai, C. J., Liao, B. A., Niu, E., & Fang, W. T. (2024). Using the theory of planned behavior to examine the environmental behavior of roadrunners in Taiwan. *Discover Sustainability*, *5*(1), 1–19.

Putri, R. H. A. B. (2023). Strategi green marketing communication baterai isi ulang Smartools melalui media sosial (TikTok, Instagram & YouTube). *Journal of Social and Economics Research*, *5*(2), 732–747.

Rahman, R. M., Taqwa, H., & Idris, I. (2022). Optimalisasi wakaf produktif untuk memperkuat sistem ketahanan pangan. *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam*, *3*(5), 1147–1166.

Rasoolimanesh, S. M. (2022). Discriminant validity assessment in PLS-SEM: A comprehensive composite-based approach. *Data Analysis Perspectives Journal*, *3*(2), 1–8.

Riyadi, A., & Karim, A. (2023). Da'wah bil-hikmah: Tracing Sunan Kalijaga's footsteps in the transformation of Islamic society. *Jurnal Ilmu Dakwah*, *43*(2), 281–296. https://doi.org/10.21580/JID.V43.2.18468

Sahendra, Y., Azhari, S. R., Rahmat, R., Fadillah, S. A., Fauzi, Y., & Hikmat, A. (2023). Revitalisasi peran pemuda dalam gerakan sosial peduli perubahan iklim di era digital. *Jurnal Komunikasi Korporasi & Media (JASIMA)*, *4*(1), 1–14.

Sampurno, M. B. T., Kusworo, T. C., & Iskandar, M. A. (2020). Budaya media sosial, edukasi masyarakat, dan pandemi COVID-19. *SALAM Jurnal Sosial Dan Budaya Syar-I*, *7*(5), 529–542.

Saputra, R. H., & Nur Oktaviani, B. (2022). Pengaruh sikap individu, norma subjektif, dan persepsi kontrol perilaku terhadap niat bepergian. *Jurnal Fokus Manajemen Bisnis*, *12*(2), 218–227.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). *Partial least squares structural equation modeling*. *In C. Homburg, M. Klarmann, & A. Vomberg (Eds.), Handbook of market research (pp. 587–632)*. Springer International Publishing.

Shofiyyah, N. A., Aulia, H., Nur Lathifah, R., & Vitriani, K. M. (2024). Instagrammable culture: Implications of social media on the younger generation's perception of cultural art. Jurnal Mediakita. *Jurnal Komunikasi & Penyiaran Islam*, *8*(1), 16–38.

Sigit, D. V., Mulyani, M., & Kartowagiran, B. (2019). Environmental responsibility and pro-environmental behavior: Biology undergraduate students' profile. Biosfer. *Jurnal Pendidikan Biologi*, *12*(1), 1–13.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*(3), 407–424.

Suparto, Y. H. (2024). The role of social media in increasing brand awareness: A literature review. *Maneggio*, *1*(3), 126–134.

Suprobo, F. P., & Dewantara, M. R. (2019). *Monograf: Kapasitas dinamis kampung perkotaan dalam menuju sustainable green city: Studi kasus Kota Surabaya*. Media Sahabat Cendekia.