

Behavioral Drivers of Students' Intention for Sustainable Palm Oil

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ABSTRACT

While sustainable palm oil is central to Indonesia's climate agenda, behavioral engagement among youth remains underexplored. This study applies the Theory of Planned Behavior (TPB) to identify psychological drivers of students' intentions to promote sustainable palm oil practices within their home regions. We surveyed 150 university students originating from Riau, Jambi, and West Kalimantan via an online questionnaire and analyzed the data using Structural Equation Modeling with SmartPLS. The extended TPB model integrates sustainability knowledge and prosocial motivation as antecedents of attitude, while retaining attitude, subjective norm, and perceived behavioral control (PBC) as predictors of intention. Results indicate that knowledge and prosocial motivation significantly strengthen positive attitudes toward sustainable practices. In turn, attitude, subjective norm, and PBC strongly predict behavioral intention. Intention also mediates the relationship between these psychological factors and students' planned sustainability actions. The model explains 93.6% of the variance in behavioral intention ($R^2=0.936$), suggesting substantial explanatory power for youth engagement in resource-based communities. Theoretically, this research enriches TPB by incorporating prosocial motivation into sustainability behavior, clarifying how value laden drivers shape attitude formation and subsequent intention. Practically, findings offer actionable guidance for universities, local cooperatives, and policymakers to design youth-oriented interventions that build knowledge, leverage social influence, and reduce perceived barriers to action through curriculum modules, peer-led campaigns, and community partnerships. By positioning students as locally embedded catalysts, these interventions can translate intention into concrete advocacy and education activities that support responsible, certified palm oil. Overall, the study highlights how empowering students as sustainability multipliers can accelerate grassroots transitions consistent with Indonesia's climate and development goals, while providing a scalable behavioral framework for similar resource-dependent regions.

Keywords: Indonesia, prosocial motivation, student engagement, sustainable palm oil, theory of planned behavior

INTRODUCTION

Palm oil remains a cornerstone of Indonesia's agricultural economy, sustaining rural livelihoods, generating foreign exchange, and anchoring global supply chains. As the world's largest

producer, Indonesia depends heavily on palm oil for both economic growth and employment, particularly among millions of smallholders who manage vast plantation areas. Yet, the sector has long faced scrutiny for its association with deforestation, biodiversity loss, green-

house gas emissions, and social conflicts (Obidzinski *et al.* 2012; Heilmayr *et al.* 2020). In response, sustainability certification systems such as the Roundtable on Sustainable Palm Oil (RSPO) and the Indonesian Sustainable Palm Oil (ISPO) standard have emerged to balance environmental, economic, and social goals (Schouten and Glasbergen 2011; Hospes 2014). However, the diffusion of sustainable practices across remote rural communities remains inconsistent, reflecting gaps in awareness, accessibility, and behavioral adoption.

While most research and interventions focus on smallholders' compliance and institutional frameworks, a relatively neglected yet influential group consists of university students from palm-oil-producing regions such as Riau, Jambi, and West Kalimantan. Positioned between academic environments and rural households, students possess the potential to act as knowledge transmitters and behavioral multipliers individuals who can interpret sustainability concepts and introduce them within family and cooperative settings. Their community interactions, such as promoting good agricultural practices, organizing waste reduction initiatives, or explaining certification benefits, represent a grassroots extension of formal sustainability programs.

However, the theoretical understanding of how students form intentions to engage in such sustainability actions remains limited. Previous behavioral studies in the palm oil sector have largely concentrated on smallholders, producers, or consumers, leaving a significant theoretical gap concerning youth as emerging change agents. This study therefore responds to the need for a behavioral framework that captures students' psychological mechanisms including attitude, social norms, and perceived behavioral control in promoting sustainable palm oil within their communities. From a practical standpoint, existing sustainability

initiatives are often top-down and fail to leverage the bridging role of youth between academic institutions and local communities. Few community-based approaches explicitly integrate students into rural sustainability networks, even though they are strategically positioned to translate knowledge into family and cooperative practices. Addressing this practical gap, the present study applies the Theory of Planned Behavior (TPB) to explore how cognitive, motivational, and social factors drive students' engagement intentions. By focusing on students as locally embedded catalysts, this study offers insights into how behavioral intention can be transformed into tangible sustainability actions at the grassroots level.

The Theory of Planned Behavior (TPB) (Ajzen 1991) provides a robust framework to explain intention formation through three antecedents: attitude toward the behavior, subjective norm, and perceived behavioral control (PBC). Prior studies confirm that positive attitudes, supportive norms, and perceived capability predict sustainability-related intentions across contexts such as pro-environmental behavior (Lucarelli *et al.* 2020), renewable energy adoption (de Leeuw *et al.* 2015), and agricultural innovation (Djibo and Maman 2019). However, to enhance predictive precision in culturally and socially complex settings, scholars have proposed extending TPB with context-specific constructs (Fishbein and Ajzen 2010; Armitage and Conner 2001). Within palm-oil-producing regions, two factors stand out: sustainability knowledge, which reduces uncertainty and strengthens favorable attitudes, and prosocial motivation, which drives individuals to act for collective benefit despite limited personal gains (Grant 2007; Varni *et al.* 2024; Sundaraja *et al.* 2021). Recent research by Tabanao *et al.* (2025) further supports this integration, demonstrating that prosocial motivation and environmental knowledge jointly enhance youths' green behavioral intentions and complement each

other in fostering sustainability-oriented attitudes.

Despite growing recognition of youth participation in sustainability transitions, few studies investigate how these psychological mechanisms shape students' community engagement intentions within palm-oil contexts. Existing research predominantly examines green consumption (Nguyen *et al.* 2022), carbon-offset behavior (Li *et al.* 2025), or campus environmental participation (Hayadi and Hariguna 2025; Sun and Liu 2023; Assefa *et al.* 2025), overlooking rural-based initiatives. In collectivist societies like Indonesia, subjective norms and social expectations from families and community leaders are also likely to influence action, given the high value placed on social credibility and intergenerational trust (Molenaar *et al.* 2013). This underscores the relevance of investigating how attitudes, social pressures, and perceived control interact to predict students' sustainability intentions.

This study takes the Theory of Planned Behavior a step further. With data from 150 students in Riau, Jambi, and West Kalimantan, we examine how sustainability knowledge and prosocial motivation feed into attitudes, and how those attitudes together with norms and perceived control shape intention. We then ask a practical question: does intention show up as action? In our setting, action means very specific things circulating sustainability tips within families, helping cooperatives deliver brief trainings, and encouraging certification where feasible. We estimate the model with PLS-SEM and use the results to design youth-focused, low-cost interventions that rely on peer leadership and community-based learning rather than expensive top-down campaigns. Unlike previous TPB studies focusing on consumers or smallholders, this research uniquely positions university students from palm-oil-producing regions as bridges between academic knowledge

and rural sustainability practices. The findings contribute to understanding how youth-driven behavioral mechanisms can complement policy interventions and educational programs aimed at accelerating Indonesia's transition toward sustainable, certified palm oil.

MATERIALS AND METHODS

The study utilized a structured questionnaire to assess students' psychological and behavioral constructs related to their intention to promote sustainable palm oil practices. All items were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) adapted from previously validated instruments. The initial survey contained 28 items grouped into seven latent constructs and was designed following Nurhidayati and Sukri (2025) to ensure compatibility with structural equation modeling (SEM). Data were collected online via Google Forms to reach respondents across Riau, Jambi, and West Kalimantan.

Respondents were selected using purposive sampling based on their origin from palm-oil-producing regions, ensuring contextual relevance and sufficient representation of students with family involvement in the palm oil sector. Participation was voluntary, and informed consent was obtained from all respondents before completing the questionnaire.

Descriptive analyses were conducted in IBM SPSS Statistics 26, while model estimation and hypothesis testing employed SmartPLS 4.0, which is appropriate for exploratory research and small to medium sample sizes. Prosocial motivation complements the Theory of Planned Behavior by offering a moral and empathic foundation that explains why individuals act beyond self-interest. It emphasizes intrinsic concern for others, aligning with the collective orientation typical of Southeast Asian societies (Grant 2007; Rioux and Penner 2001).

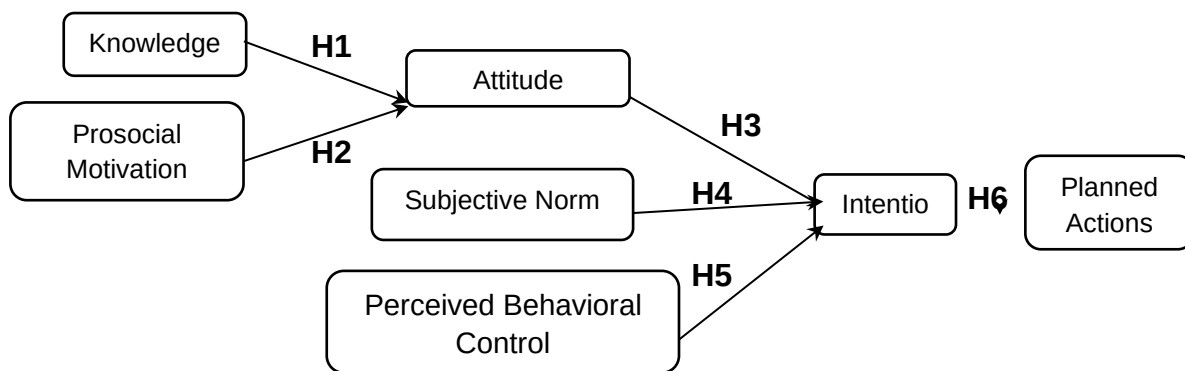


Figure 1 Conceptual Framework

In collectivist settings, social responsibility often mediates cognitive-behavioral processes, where moral obligation and group harmony influence individual decision-making (Triandis 1995). Hence, incorporating prosocial motivation and sustainability knowledge into TPB enhances the model's ability to capture context-specific behavioral drivers. Figure 1 outlines the framework guiding this study. The model draws from the Theory of Planned Behavior (Ajzen 1991), which links intention to attitude, social influence, and perceived control. To better reflect students' role in promoting sustainable palm oil, two new factors *sustainability knowledge* and *prosocial motivation* are added before attitude. Knowledge increases awareness and confidence in acting responsibly toward the environment, while prosocial motivation reflects a willingness to help others and contribute to collective goals, even without personal reward (Grant 2007; Varni et al. 2024; Sundaraja et al. 2021). In line with TPB, attitude, subjective norms, and perceived behavioral control are expected to shape students' intentions to engage in sustainability programs (H3–H5). Intention is then assumed to lead to real

RESULTS & DISCUSSION

Respondents Characteristics

Table 1 presents the demographic characteristics of the 150 student respondents who participated in this study. Most respondents were aged

above 22 years (77.33%), followed by those aged 21–22 years (20.00%), while smaller proportions were found among respondents aged 19–20 years (2.00%) and below 19 years (0.67%). This pattern indicates that the majority were senior students who may have gained broader academic exposure and awareness of sustainability-related issues. In terms of domicile, Jambi Province accounted for the largest share of respondents (48.67%), followed by West Kalimantan (30.00%) and Riau (21.33%). These provinces are among Indonesia's major palm-oil-producing regions, which provides the respondents with a direct understanding of the local context of palm oil cultivation. Regarding educational background, Table 1 also shows that respondents came from various universities. The largest groups were from Universitas Jambi (28.00%), Sekolah Tinggi Teknologi Kelapa Sawit (12.00%), IPB University (10.67%), and Universitas Riau (4.67%), while the remaining 44.66% represented other universities across Indonesia. All respondents (100%) reported that their families were involved in palm oil plantation activities and that they were familiar with the concept of sustainable palm oil and certification schemes such as ISPO and RSPO. Likewise, every respondent indicated active participation in campus or environmental organizations (100%), suggesting strong exposure to environmental and sustainability discussions within their academic environment. Taken together, these

Table 1 Respondents Characteristics.

Respondent Characteristics	Number of Respondents	Percentage (%)
<i>Age</i>		
> 19 years	1	0,67
19-20 years	3	2,00
21-22 years	30	20,00
> 22 years	116	77,33
Total	150	100,00
<i>Province (Domicile)</i>		
Riau	32	21,33
Jambi	73	48,67
West Kalimantan	45	30,00
Total	150	100,00
<i>University</i>		
Universitas Riau	7	4,67
Universitas Jambi	42	28,00
Sekolah Tinggi Teknologi Kelapa Sawit	18	12,00
IPB University	16	10,67
Other universities	67	44,66
Total	150	100,00
<i>Family Involvement in Palm Oil</i>		
Yes	150	100,00
No	0	0
Total	150	100,00
<i>Awareness of "Sustainable Palm Oil / ISPO-RSPO"</i>		
Yes	150	100,00
No	0	0
Total	150	100,00
<i>Active in Campus/Environmental Organization</i>		
Yes	150	100,00
No	0	0
Total	150	100,00

Source: Processed by the author (2025)

characteristics show that the respondents possess relevant background knowledge and personal connection to the palm oil sector, which makes them a suitable group for examining behavioral intentions toward promoting sustainable palm oil practices.

Measurement Model

The reflective measurement model was subjected to a comprehensive assessment encompassing indicator

reliability, internal consistency, and convergent as well as discriminant validity. In line with methodological guidelines by Hair *et al.* (2022), all standardized outer loadings exceeded the minimum acceptable value of 0.70 (ranging from 0.738 to 0.970), demonstrating that each observed indicator loaded strongly on its intended latent construct and contributed meaningfully to the construct's measurement (Table 2).

Table 2 Outer Loadings.

	Attitude	Intention	Knowledge	Perceived Behavioral Control	Planned Actions	Prosocial Motivation	Subjective Norm
ATT1	0.955						
ATT2	0.898						
ATT3	0.947						
INT1		0.952					
INT2		0.777					
INT3		0.903					
INT4		0.943					
KNOW1			0.817				
KNOW2			0.842				
KNOW3			0.853				
KNOW4			0.924				
KNOW5			0.937				
PA1					0.950		
PA2					0.968		
PA3					0.967		
PA4					0.663		
PBC1				0.937			
PBC2				0.856			
PBC3				0.738			
PM1						0.962	
PM2						0.958	
PM3						0.970	
PM4						0.956	
PM5						0.964	
SN1							0.861
SN2							0.928
SN3							0.921
SN4							0.796

Source: Processed by the author (2025)

Internal consistency reliability was established through Cronbach's alpha and composite reliability (CR) (Table 3), which ranged from 0.799 to 0.980 and from 0.883 to 0.984, respectively. These values surpass the recommended 0.70 threshold, confirming that the items capture the underlying conceptual

domain with a high degree of homogeneity. Similarly, the Average Variance Extracted (AVE) values ranged from 0.718 to 0.925, further substantiating convergent validity by showing that more than 50% of the variance in the indicators was accounted for by their respective constructs.

Table 3 Construct Reliability & Convergent Validity.

	Cronbach's Alpha	Rho A	Composite Reliability	Average Variance Extracted (AVE)
Attitude	0.926	0.928	0.953	0.871
Intention	0.916	0.928	0.942	0.803
Knowledge	0.924	0.936	0.943	0.767
Perceived Behavioral Control	0.799	0.836	0.883	0.718
Planned Actions	0.911	0.938	0.941	0.804
Prosocial Motivation	0.980	0.980	0.984	0.925
Subjective Norm	0.901	0.915	0.931	0.771

Source: Processed by the author (2025)

Discriminant validity was established through the Fornell Larcker criterion and the Heterotrait Monotrait (HTMT) ratio (Table 4 & Table 5). The

square roots of the AVEs consistently exceeded the corresponding inter-construct correlations, and all HTMT ratios remained below 0.90, thereby confirming that each construct was empirically distinct (Fornell and Larcker 1981; Henseler et al. 2015). Collectively, these results demonstrate that the measurement model achieved satisfactory levels of reliability and validity, providing a robust foundation for evaluating the structural model. Although

several HTMT ratios slightly exceeded 1.0 (e.g., 1.057 and 1.063), this does not indicate critical discriminant validity issues. As noted by Henseler et al. (2015), minor deviations can occur in small to medium samples with highly correlated constructs. Given the theoretical relatedness among attitude, intention, and perceived behavioral control in the extended TPB model, these values remain within acceptable bounds for exploratory behavioral research.

Table 4 Fornell-Larcker Criterion.

	Attitude	Intention	Knowledge	Perceived Behavioral Control	Planned Actions	Prosocial Motivation	Subjective Norm
Attitude	0.933						
Intention	0.712	0.896					
Knowledge	0.827	0.864	0.876				
Perceived Behavioral Control	0.726	0.915	0.906	0.848			
Planned Actions	0.685	0.969	0.874	0.908	0.897		
Prosocial Motivation	0.933	0.675	0.797	0.745	0.673	0.962	
Subjective Norm	0.791	0.954	0.856	0.893	0.948	0.753	0.878

Source: Processed by the author (2025)

Table 5 Heterotrait–Monotrait (HTMT).

	Attitude	Intention	Knowledge	Perceived Behavioral Control	Planned Actions	Prosocial Motivation	Subjective Norm
Attitude							
Intention	0.789						
Knowledge	0.874	0.944					
Perceived Behavioral Control	0.868	1.057	1.063				
Planned Actions	0.783	1.058	0.966	1.063			
Prosocial Motivation	0.978	0.725	0.815	0.869	0.753		
Subjective Norm	0.891	1.047	0.932	1.037	1.040	0.825	

Source: Processed by the author (2025)

Structural Model

Upon confirmation of the measurement model's adequacy, the structural model was assessed in terms of collinearity, explanatory power, and path

significance. The variance inflation factor (VIF) values ranged between 1.0 and 6.27, well below the critical limit of 10, indicating the absence of multicollinearity among predictor constructs (Table 6).

Table 6 Collinearity Statistics (Inner VIF).

	Attitude	Intention	Knowledge	Perceived Behavioral Control	Planned Actions	Prosocial Motivation	Subjective Norm
Attitude		2.681					
Intention					1.000		
Knowledge	2.743						
Perceived Behavioral Control		4.974					
Planned Actions							
Prosocial Motivation	2.743						
Subjective Norm		6.268					

Source: Processed by the author (2025)

The coefficient of determination (R^2) values (Table 7) for Attitude (0.890), Intention (0.936), and Planned Actions (0.940) suggest substantial explanatory power according to the benchmarks of Hair *et al.* (2022). This implies that the extended TPB model accounted for over 89% of the variance in all endogenous constructs, underscoring the model's robustness in explaining students' psychological and behavioral drivers. The standardized path coefficients demonstrate that the hypothesized relationships were largely supported, except for H3 (Attitude $\rightarrow$ Intention), which did not achieve statistical significance ($p > 0.05$) (Table 8). The model fit index (SRMR = 0.149), as shown in Table 9, exceeded the ideal threshold of 0.08 but remains acceptable for exploratory models with high construct complexity and limited sample size (Hair *et al.* 2022). This interpretation aligns with Henseler *et al.* (2015), who suggest that while SRMR values below 0.10 indicate good model fit, values up to 0.15 can still be considered acceptable in complex PLS-SEM models with multiple latent constructs. Although the model demonstrates a remarkably

high explanatory power ($R^2 = 0.936$), this result may also reflect the sample's homogeneity given that all respondents were active in environmental or student organizations. Future studies should mitigate potential common-method bias by diversifying data sources or applying marker-variable techniques to strengthen external validity.

Impact of Knowledge and Prosocial Motivation

The significant effects of knowledge and prosocial motivation on attitude (H1 and H2 supported) reinforce prior evidence that informational and altruistic drivers are essential antecedents of pro-environmental orientations (Grant 2007; Sundaraja *et al.* 2021; Varni *et al.* 2024). Students possessing greater awareness of sustainable palm oil practices and stronger community-oriented values tend to evaluate engagement more favorably. This finding underscores that both cognitive understanding and moral commitment are foundational in cultivating positive sustainability attitudes among youth.

Table 7 R-Square.

	R Square	R Square Adjusted
Attitude	0.890	0.888
Intention	0.936	0.935
Planned Actions	0.940	0.939

Source: Processed by the author (2025)

Table 8 Bootstrapping (Mean, STDEV, T-Values, P-Values).

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Attitude -> Intention	-0.130	-0.129	0.070	1.850	0.065
Intention -> Planned Actions	0.969	0.971	0.011	92.219	0.000
Knowledge_ -> Attitude	0.227	0.221	0.085	2.659	0.008
Perceived Behavioral Control -> Intention	0.324	0.325	0.079	4.089	0.000
Prosocial Motivation -> Attitude	0.752	0.759	0.083	9.022	0.000
Subjective Norm -> Intention	0.767	0.768	0.087	8.766	0.000

Source: Processed by the author (2025)

Table 9 Model Fit.

	Saturated Model	Estimated Model
SRMR	0.148	0.149
d_ULS	8.884	8.976

Source: Processed by the author (2025)

Role of Social Norms and Perceived Behavioral Control

Both subjective norm and perceived behavioral control emerged as significant and strong predictors of intention (H4 and H5 supported), reaffirming their central role in TPB frameworks. The high magnitude of the subjective norm path ($\beta = 0.767$, $p < 0.001$) indicates that familial

and community expectations exert a powerful influence on students' decision-making processes, consistent with collectivist behavioral patterns where conformity and social validation guide action. Similarly, perceived behavioral control reflects students' confidence in their ability to act on sustainability goals, amplified by institutional and social support.

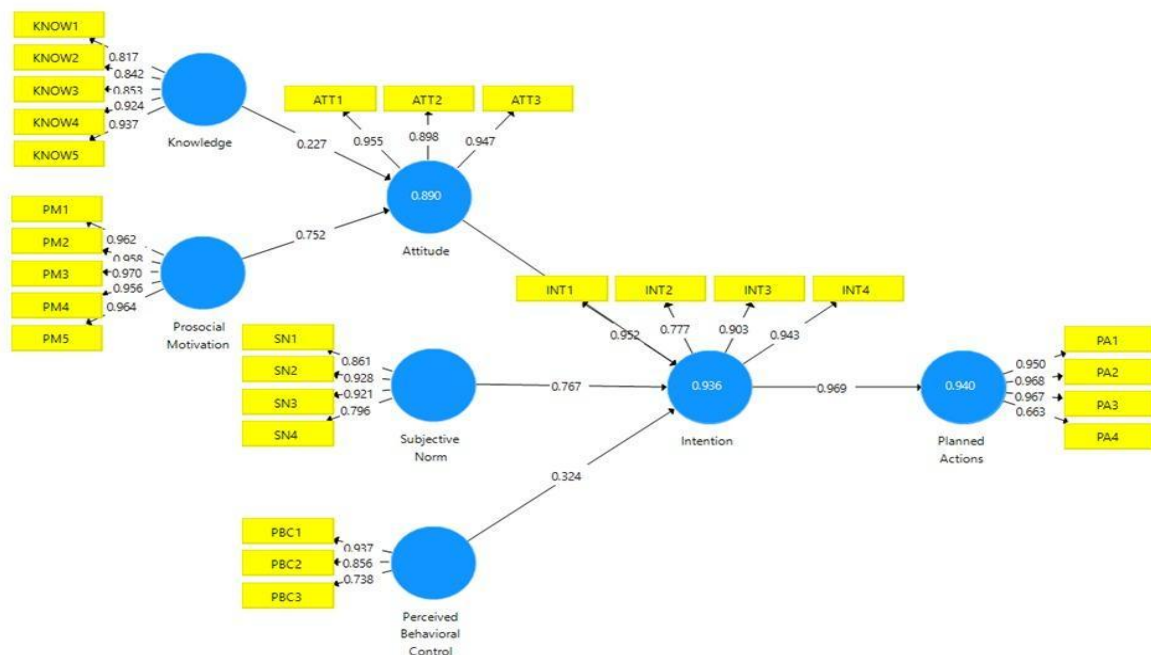


Figure 2 Structural Model with Standardized Path Coefficients. β = standardized coefficients; R^2 values shown within each construct (Attitude = 0.89, Intention = 0.936, Planned Action = 0.94).

Source: Processed by the author (2025)

Implications for Sustainability Education

These findings carry important implications for sustainability education and community-based interventions. Universities and cooperatives can enhance students' behavioral engagement by integrating sustainability knowledge into curricula, promoting peer-led learning, and fostering collaboration with local institutions. Such initiatives strengthen social endorsement while empowering students to translate pro-environmental attitudes into real-world advocacy within palm-oil-producing communities. Consistent with these findings, Hsieh *et al.* (2023) highlighted that youth-led, community-based sustainability education can effectively connect behavioral intention with tangible agricultural and environmental actions, reinforcing the importance of participatory learning models in local contexts.

The results provide substantial empirical support for the extended Theory of Planned Behavior (TPB), elucidating how cognitive, motivational, and social factors interact to shape students' engagement intentions toward sustainable palm oil practices. The significant effects of knowledge and prosocial motivation on attitude (H1 and H2 supported) reinforce prior evidence that informational and altruistic drivers are essential antecedents of pro-environmental orientations (Grant 2007; Sundaraja *et al.* 2021; Varni *et al.* 2024).

Students possessing greater awareness of sustainable palm oil practices and stronger community-oriented values tend to evaluate engagement more favorably. This finding underscores that both cognitive understanding and moral commitment are foundational in cultivating positive sustainability attitudes among youth.

In contrast, the non-significant path between attitude and intention (H3 not supported) diverges from the classical TPB proposition (Ajzen 1991). This suggests that, within collectivist cultural contexts such as Indonesia, individual

attitudes may not directly translate into behavioral intention unless supported by perceived social legitimacy and enabling conditions. This aligns with research emphasizing the moderating influence of sociocultural context in shaping the attitude intention link (Molenaar *et al.* 2013; Lucarelli *et al.* 2020). This finding is also consistent with Hofstede's (2011) collectivism framework, where conformity and social approval often outweigh personal attitudes in shaping behavioral intentions. In such contexts, students may support sustainability ideals yet still rely on family or community endorsement before taking concrete action (Schwartz 2012).

Both subjective norm and perceived behavioral control emerged as significant and strong predictors of intention (H4 and H5 supported), reaffirming their central role in TPB frameworks. The high magnitude of the subjective norm path ($\beta=0.767$, $p<0.001$) indicates that familial and community expectations exert a powerful influence on students' decision-making processes, consistent with collectivist behavioral patterns where conformity and social validation guide action. Similarly, the positive effect of perceived behavioral control highlights that students' sense of self-efficacy stemming from access to knowledge, resources, or institutional support substantially enhances their willingness to engage in sustainability promotion. In palm-oil-producing provinces such as Riau, Jambi, and West Kalimantan, family collectives and local leaders play decisive roles in shaping normative expectations. This socio-cultural context amplifies the influence of subjective norms, as students' behavior often aligns with family expectations and communal approval within tightly knit rural networks.

Finally, the exceptionally strong association between intention and planned actions ($\beta=0.969$, $p<0.001$) validates intention as the most proximal determinant of behavior, consistent with Ajzen (1991) theoretical formulation. This relationship underscores that students

who demonstrate higher engagement intention are markedly more likely to articulate concrete plans for sustainability advocacy, such as family education, cooperative participation, or certification promotion in their home communities.

Taken together, these findings indicate that while cognitive and moral antecedents shape favorable attitudes, the translation of such attitudes into actionable intentions is contingent upon the interplay of social reinforcement and perceived behavioral control. This underscores the importance of cultivating collective motivation and structural support mechanisms to foster youth-driven sustainability engagement in palm oil producing regions.

CONCLUSION

This study set out to examine the psychological and social determinants of students' intention to promote sustainable palm oil practices in Indonesia, employing an extended Theory of Planned Behavior (TPB) framework that incorporated knowledge of sustainable practices and prosocial motivation as additional antecedents. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the study analyzed responses from 150 university students originating from key palm-oil-producing provinces.

The results reveal that knowledge and prosocial motivation significantly enhance students' attitudes toward sustainability, whereas attitude alone does not directly predict behavioral intention. Instead, intention is strongly shaped by subjective norm and perceived behavioral control emphasizing the decisive roles of social approval and perceived capability in driving engagement. Furthermore, intention emerged as a powerful predictor of planned actions, confirming its mediating role between psychological predispositions and tangible behavioral outcomes.

These findings contribute theoretically by extending TPB to better

capture the dynamics of youth engagement within collectivist contexts, where social legitimacy and interdependence guide environmental action. Practically, the results highlight that fostering sustainability among young people requires not only awareness campaigns but also supportive ecosystems that reinforce social endorsement and empower individual agency. From an industry perspective, the findings offer valuable implications for palm oil stakeholders including plantation cooperatives, certification bodies (ISPO and RSPO), and educational institutions to develop integrated youth engagement programs. Such initiatives can strengthen knowledge transfer within smallholder families, support local compliance with sustainability standards, and enhance the social diffusion of responsible palm oil practices at the community level. Encouraging student-led outreach, capacity-building workshops, and peer-to-peer learning can accelerate the mainstreaming of certified sustainable palm oil across regions.

Overall, this research underscores that students when equipped with relevant knowledge, prosocial motivation, and supportive community structures can act as strategic change agents in advancing sustainable palm oil transitions. Strengthening their role through collaborative university community industry initiatives held substantial promise for embedding sustainability values into everyday practices at the grassroots level.

This study did not control for demographic variations such as gender, academic field, or year of study, which may influence students' attitudes and intention formation. Addressing these demographic dimensions could provide deeper insight into behavioral heterogeneity among youth in future analyses.

Ultimately, this study reframes sustainability not merely as a technical or economic issue, but as a behavioral and cultural challenge where empowering

youth as normative and motivational catalysts can accelerate sustainable transformation in Indonesia's palm oil heartlands.

Future studies could broaden the measurement of planned actions to include digital advocacy, social media campaigns, and collaboration with NGOs or community-based organizations. Such indicators would better capture modern forms of student engagement in sustainability promotion.

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