

Sustainable consumption awareness and behavioral activation among Generation Z: An extended norm activation model within the triple bottom line framework

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Abstract. Sustainable consumption behavior plays a crucial role in addressing ecological degradation and resource depletion. This study examines the psychological mechanisms underlying sustainable consumption among Indonesian Generation Z using the Norm Activation Model (NAM) integrated with the Triple Bottom Line (TBL) framework, encompassing environmental, social, and economic dimensions. A quantitative cross-sectional survey was conducted with 316 respondents from 26 provinces in Indonesia. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess direct and mediating relationships among awareness of sustainable consumption, ascription of responsibility, personal norms, and sustainable consumption behavior. The results indicate that awareness of sustainable consumption significantly influences responsibility attribution, personal norms, and sustainable consumption behavior, both directly and indirectly. Ascription of responsibility and personal norms function as significant mediators, supporting the hierarchical activation process proposed by NAM. Awareness of sustainable consumption demonstrates the strongest total effect on behavior ($\beta_{total} = 0.915$), highlighting its central role in activating moral responsibility and normative commitment. These findings confirm the relevance of NAM in explaining sustainable consumption within a multidimensional sustainability context and provide practical implications for sustainability education, policy design, and communication strategies targeting younger generations.

1 Introduction

Global environmental degradation has increasingly been recognized as one of the most critical challenges of the twenty-first century. Excessive consumption patterns, driven by

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population growth, urbanization, and lifestyle changes, have significantly exceeded the Earth's ecological capacity. Sustainable consumption has therefore become a central element in sustainability discourse, as it directly addresses the role of individual consumption behavior in shaping environmental, social, and economic outcomes. Sustainable consumption refers to the use of goods and services that satisfy basic needs and improve quality of life while minimizing resource use, environmental degradation, and waste generation across the life cycle, without compromising the needs of future generations [1].

The urgency of sustainable consumption is further emphasized by empirical evidence showing that household consumption accounts for a substantial share of global environmental impacts. Previous studies have estimated that more than 70% of global greenhouse gas emissions are associated with household consumption activities [2]. These findings highlight that sustainability challenges are not solely the responsibility of producers or policymakers, but are also deeply rooted in everyday consumption decisions at the household level. Consequently, understanding the mechanisms that shape individual and family consumption behavior is crucial for advancing sustainability transitions.

Sustainable consumption is inherently multidimensional, encompassing environmental protection, social well-being, and economic stability. The triple bottom line (TBL) framework—comprising *planet, people, and profit*—provides a comprehensive conceptual foundation for capturing these interrelated dimensions [3]. While the TBL concept was initially developed to evaluate organizational sustainability performance, its application has been extended to consumer behavior research to explain how consumption choices can simultaneously influence ecological outcomes, social equity, and economic efficiency [4]. From a consumer perspective, sustainable consumption involves not only reducing environmental harm, but also promoting social responsibility and long-term economic resilience through responsible consumption practices.

Despite increasing public awareness of sustainability issues, numerous studies consistently report a significant attitude–behavior gap in sustainable consumption. Consumers often express strong pro-sustainability attitudes but fail to enact corresponding behaviors in their daily consumption practices [5]. This phenomenon has been documented across various domains, including ethical consumption, sustainable fashion consumption, tourism and travel behavior, and general sustainable consumption behavior [6]. The persistence of this gap suggests that positive attitudes toward sustainability do not automatically translate into actual behavior, indicating the need for theoretical approaches that account for internal cognitive and moral processes.

Among contemporary consumer segments, Generation Z has attracted increasing scholarly attention due to its relatively high awareness of environmental and social issues. Empirical evidence suggests that Generation Z exhibits stronger sustainability-oriented values compared to older generations [7]. Findings from the generational sustainability survey [8] reveal that 17% of Generation Z report being very or extremely aware of global environmental practices, a proportion that exceeds that of Millennials (15%), Generation X (10%), and Baby Boomers (4%). In addition, as active participants in family systems, Generation Z individuals may influence household consumption decisions through daily interactions and intergenerational value transmission [9]. From a family systems perspective, consumption decisions are rarely made in isolation; instead, they are shaped by shared norms, values, and responsibilities within the household. This highlights the importance of examining sustainable consumption behavior not only at the individual level, but also within the broader family context.

Nevertheless, despite their high level of sustainability awareness, Generation Z consumers are not immune to the attitude–behavior gap. Industry reports indicate that Generation Z consumers often engage in unsustainable consumption practices, such as fast fashion, despite expressing strong concerns about environmental and social issues [10]. This

inconsistency underscores the complexity of sustainable consumption behavior and reinforces the need for theoretical frameworks capable of explaining why awareness and positive attitudes do not consistently result in sustainable action.

To address this issue, moral-normative theories have been widely applied in sustainability research. The Norm Activation Model (NAM) proposed by Schwartz [11] provides a robust framework for explaining altruistic and pro-social behavior. According to NAM, behavior is driven by personal norms, which are activated through awareness of the consequences of one's actions and the attribution of responsibility for those consequences. The model has been extensively used to explain various forms of pro-environmental behavior [12]. However, traditional applications of NAM tend to emphasize environmental consequences, thereby overlooking the social and economic dimensions that are integral to sustainability.

To overcome this limitation, the present study extends the NAM framework by integrating the triple bottom line perspective. Specifically, the construct of awareness of consequences is reconceptualized as *awareness of sustainable consumption*, which incorporates environmental (planet), social (people), and economic (profit) considerations. In addition, this study adopts sustainable consumption behavior (SCB) as a multidimensional dependent variable, consisting of quality of life, care for environmental well-being, and care for future generations [13]. These dimensions collectively reflect the core principles of sustainability and align with the TBL framework.

By applying the modified NAM framework to Generation Z consumers, this study seeks to provide a more comprehensive understanding of the cognitive–normative mechanisms underlying sustainable consumption behavior. The findings are expected to contribute to sustainability research by extending the application of NAM beyond purely environmental behavior and by offering empirical insights that may inform policy interventions, educational programs, and consumer awareness initiatives aimed at promoting responsible consumption among younger generations.

Therefore, this study aims to analyze sustainable consumption behavior among Generation Z consumers by applying a modified Norm Activation Model grounded in the triple bottom line framework. Specifically, this study seeks to examine the roles of sustainable consumption awareness, responsibility attribution, and personal norms in shaping sustainable consumption behavior, both directly and indirectly. By adopting a multidimensional perspective on sustainability, this research provides empirical insights into the cognitive–normative mechanisms underlying responsible consumption decisions.

2 Methods

2.1 Research design, location, and time

This study employed a quantitative explanatory research design grounded in the Norm Activation Model to examine the psychological mechanisms underlying sustainable consumption behavior among Generation Z consumers. A cross-sectional survey approach was adopted to collect data at a single point in time. Data collection was conducted online to enable participation from respondents across multiple regions in Indonesia. The survey was administered between May and June 2025.

2.2 Sampling technique

The study population comprised Generation Z consumers in Indonesia, defined as individuals born between 1997 and 2012. The inclusion criteria were: (1) belonging to Generation Z, (2)

residing in Indonesia, and (3) willingness to voluntarily complete an online questionnaire. A non-probability voluntary sampling technique was employed.

The minimum sample size was determined following commonly used guidelines for Partial Least Squares Structural Equation Modeling (PLS-SEM), including the 10-times rule, which considers the maximum number of structural paths and indicators in the model. Based on this guideline, a minimum sample size of 285 respondents was required. A total of 316 valid responses were obtained and included in the analysis, exceeding the minimum requirement for robust model estimation.

2.3 Data collection procedure

Primary data were collected using a self-administered online questionnaire distributed through social media platforms, including WhatsApp, Instagram, and Twitter. The questionnaire consisted of two main sections: (1) respondent demographic characteristics (age, gender, education level, income, and domicile), and (2) measurement items for the core study variables, namely sustainable consumption awareness, ascription of responsibility, personal norms, and sustainable consumption behavior. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection.

2.4 Variable measurement

Awareness of sustainable consumption was operationalized using an instrument adapted from Balderjahn et al [4] and subsequently modified for this study. The instrument encompasses three dimensions (environmental, social, and economic) and includes 19 indicators. Ascription of responsibility and personal norms were each measured using seven indicators adapted from established Norm Activation Model literature [14].

Sustainable consumption behavior was operationalized as a multidimensional construct based on the triple bottom line framework, encompassing environmental, social, and economic dimensions. This construct was measured using 24 indicators adapted from the sustainable consumption behavior scale developed by Quoquab *et al.* [13]. All items were assessed using a five-point Likert scale. For sustainable consumption awareness, ascription of responsibility, and personal norms, the scale ranged from 1 (strongly disagree) to 5 (strongly agree), whereas sustainable consumption behavior was measured using a frequency-based scale ranging from 1 (never) to 5 (always).

2.5 Data analysis

Data analysis was conducted using Microsoft Excel, SPSS version 25, and SmartPLS version 3. The analytical procedure involved data cleaning, coding, scoring, and statistical analysis. Descriptive statistics were used to summarize respondent characteristics and to classify variable levels into low, moderate, and high categories.

Spearman's rank correlation analysis was applied to examine the relationships between respondent characteristics and key psychological variables due to the ordinal nature and non-normal distribution of the data. Structural Equation Modeling based on Partial Least Squares (PLS-SEM) was employed to test direct, indirect, and total effects among constructs, as well as the mediating roles of ascription of responsibility and personal norms. PLS-SEM was selected because it is appropriate for analyzing complex, prediction-oriented models with non-normal data and mediation effects, consistent with this study's theoretical extension of the Norm Activation Model within the Triple Bottom Line. The measurement model was specified as reflective, with reliability and validity established through outer loadings,

composite reliability, AVE, and discriminant validity tests. The initial SEM model can be seen in Figure 1

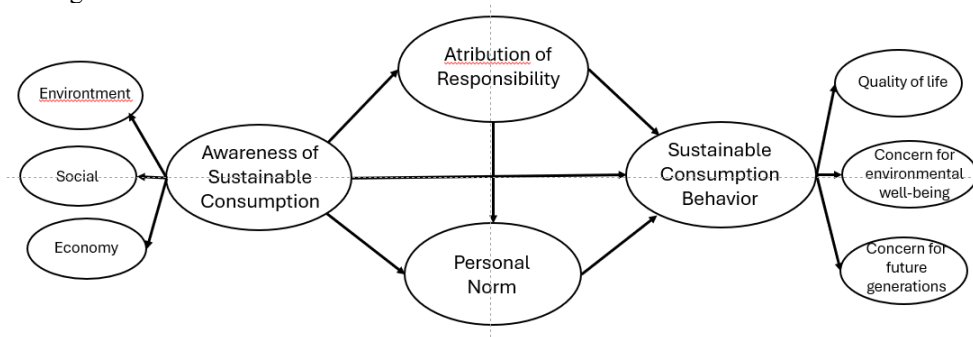


Fig. 1. Initial structural model

2.6 Research hypotheses

The present study builds upon the Norm Activation Model [11] which posits that individuals’ pro-social behaviors are driven by the activation of personal norms through awareness of consequences and ascription of responsibility. In the context of sustainable consumption, awareness of sustainability issues—encompassing environmental, social, and economic dimensions as suggested by the Triple Bottom Line framework [3] is expected to enhance individuals’ sense of responsibility and moral obligation. Prior studies [12][14] have consistently demonstrated that awareness and responsibility attribution significantly influence personal norms and, ultimately, pro-environmental behavior. Therefore, the proposed hypotheses extend NAM by incorporating sustainable consumption awareness as an antecedent to responsibility, personal norms, and behavior among Generation Z consumers.

The proposed hypothesis is as follows:

- H1: Sustainable consumption awareness positively affects ascription of responsibility.
- H2: Sustainable consumption awareness positively affects personal norms.
- H3: Sustainable consumption awareness positively affects sustainable consumption behavior.
- H4: Ascription of responsibility positively affects personal norms.
- H5: Ascription of responsibility positively affects sustainable consumption behavior.
- H6: Personal norms positively affect sustainable consumption behavior.

3 Results

3.1 Sample characteristics

This study involved 316 Generation Z respondents from 26 provinces in Indonesia. The sample was predominantly female (63.9%) and largely consisted of young adults aged 18–28 years (92.7%). Most respondents had attained undergraduate education (69.3%) and were students or university attendees (63.9%). In terms of monthly income or allowance, the majority fell within the range of IDR 500,000–2,000,000. More than two-thirds of respondents resided on Java Island. Overall, the sample reflects the demographic profile of urban and semi-urban Generation Z consumers in Indonesia.

3.2 Descriptive analysis of sustainable consumption constructs

Respondents generally demonstrated moderate to high levels of sustainable consumption awareness, responsibility attribution, personal norms, and sustainable consumption behavior (Table 1).

Table 1. Distribution of respondents by category and descriptive statistics

Variable	Low n (%)	Medium n (%)	High n (%)	Min–Max	Mean ± SD
Sustainable consumption awareness	46 (14.6)	114 (36.1)	156 (49.4)	9.21–100.00	73.79 ± 19.71
Ascription of responsibility	49 (15.5)	143 (45.3)	124 (39.2)	7.14–100.00	72.24 ± 19.93
Personal norms	45 (14.2)	110 (34.8)	161 (50.9)	7.14–100.00	75.25 ± 20.32
Sustainable consumption behavior	47 (14.9)	124 (39.2)	145 (45.9)	10.42–100.00	73.84 ± 19.58

The highest proportion of respondents was observed in the high category for personal norms (50.9%) and sustainable consumption awareness (49.4%), indicating a relatively strong moral and cognitive orientation toward sustainability issues. Sustainable consumption behavior was also predominantly categorized as high (45.9%), although a considerable proportion of respondents remained in the moderate category (39.2), suggesting that behavioral implementation has not fully matched awareness and moral commitment. The relatively large standard deviations across variables indicate substantial heterogeneity among respondents, highlighting differing levels of internalization of sustainability-related values.

3.3 Relationships between consumer characteristics and NAM variables

Spearman correlation analysis revealed significant associations between selected consumer characteristics and the latent variables of the modified NAM (Table 2). Gender was positively associated with responsibility attribution and personal norms, indicating stronger moral responsibility among female respondents. Education level showed consistent positive correlations with sustainable consumption awareness, responsibility attribution, personal norms, and sustainable consumption behavior, suggesting that higher educational attainment enhances both cognitive awareness and behavioral engagement in sustainability. Age was positively related to sustainable consumption behavior, while income was significantly associated only with responsibility attribution. Additionally, respondents residing on Java Island tended to exhibit higher levels of sustainable consumption awareness and personal norms compared to those living outside Java.

Table 2. Spearman correlation coefficients between consumer characteristics and study variables

Characteristics	Awareness	Responsibility	Personal norms	Sustainable Consumption Behavior
Gender (male = 0, female = 1)	0.07	0.14*	0.12*	0.04
Age (years)	0.15**	0.16	0.14*	0.13
Education (level)	0.16	0.14	0.16**	0.15*
Income (range)	0.05	0.16**	0.07	0.10
Residence (outside Java = 0, Java = 1)	0.24**	0.13	0.21	0.13

Note: ρ = Spearman’s rank correlation coefficient.
 $p < 0.05$ (two-tailed); ** $p < 0.01$ (two-tailed).

3.4 Structural model results

The structural equation model (Figure 2) demonstrated substantial explanatory power across endogenous constructs. The coefficient of determination (R^2) values indicate that the model explains 72.6% of the variance in responsibility attribution, 84.7% in personal norms, and 87.6% in sustainable consumption behavior, reflecting a strong overall model fit.

All hypothesized direct relationships were found to be positive and statistically significant ($p < 0.05$). Specifically, sustainable consumption awareness exhibited a strong and significant direct effect on responsibility attribution ($\beta = 0.852$), indicating that higher awareness substantially enhances individuals' perceived responsibility toward sustainability.

Additionally, awareness positively influenced personal norms ($\beta = 0.483$), suggesting that cognitive understanding translates into stronger internal moral obligations. Furthermore, awareness directly affected sustainable consumption behavior ($\beta = 0.511$), highlighting its critical role as both a cognitive and behavioral driver. Responsibility attribution also showed a significant positive influence on personal norms ($\beta = 0.474$), supporting the theoretical assumption that perceived responsibility reinforces moral norms. In addition, responsibility attribution had a direct, albeit weaker, effect on sustainable consumption behavior ($\beta = 0.158$).

Finally, personal norms were found to significantly predict sustainable consumption behavior ($\beta = 0.303$), indicating that internalized moral obligations play an important mediating role in shaping pro-environmental actions. Overall, these findings confirm that awareness operates as a key antecedent, influencing behavior both directly and indirectly through responsibility attribution and personal norms, consistent with norm-based behavioral frameworks.

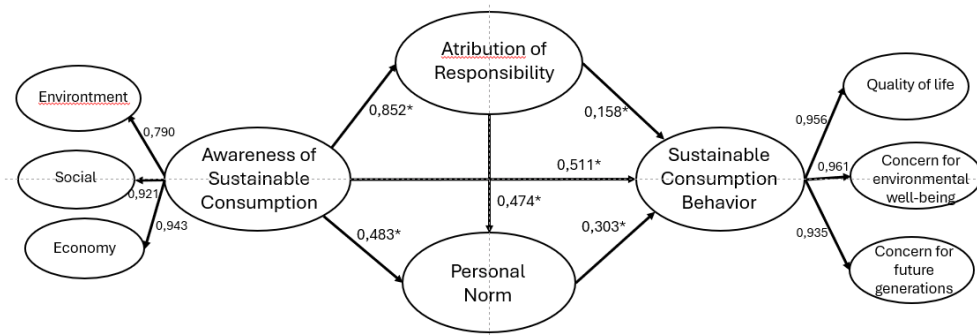


Fig. 2. Structural Model with Standardized Path Coefficients

Mediation analysis further revealed that responsibility attribution and personal norms played significant mediating roles in the model. Sustainable consumption awareness influenced sustainable consumption behavior indirectly through responsibility attribution and personal norms, both individually and sequentially. The total effect of sustainable consumption awareness on sustainable consumption behavior was substantial ($\beta = 0.915$), indicating that awareness functions as a key antecedent that activates moral responsibility and personal norms, ultimately leading to sustainable consumption behavior (Table 3).

Table 3. Structural model results (direct, indirect, and total effects)

Path	Direct effect (β)	Indirect effect (β)	Total effect (β)	t-value	p-value	Decision
Awareness → Responsibility	0.852	–	0.852	37.97	<0.001	Supported
Awareness → Personal norms	0.483	0.404	0.886	9.34	<0.001	Supported
Awareness → SCB	0.511	0.404	0.915	8.85	<0.001	Supported
Responsibility → Personal norms	0.474	–	0.474	9.04	<0.001	Supported
Responsibility → SCB	0.158	0.144	0.302	2.77	0.006	Supported
Personal norms → SCB	0.303	–	0.303	4.68	<0.001	Supported

Note: Indirect effects were tested using bootstrapping procedures. SCB = sustainable consumption behavior.

4 Discussion

This study demonstrates that Indonesian Generation Z exhibits moderate to high levels of sustainable consumption awareness, responsibility attribution, personal norms, and sustainable consumption behavior. However, a closer examination of the findings reveals patterns that are particularly characteristic of Generation Z as a digitally embedded and value-driven cohort.

The Spearman correlation analysis provides a more detailed understanding of the relationships between demographic characteristics and these variables. Gender shows a significant association with responsibility attribution and personal norms, suggesting that female Generation Z consumers tend to exhibit stronger moral responsibility and normative orientation. This aligns with prior research indicating that young women are generally more responsive to ethical and pro-social consumption issues, particularly in domains such as environmental protection and social justice. Within the context of Generation Z, this tendency may be amplified by greater engagement with sustainability narratives circulating on social media platforms, where moral framing and identity expression are highly salient.

Age is significantly correlated with sustainable consumption behavior, supporting previous findings that increasing maturity enhances the internalization of moral norms. Educational attainment is significantly associated with all examined variables, confirming its pivotal role in shaping awareness, responsibility attribution, personal norms, and sustainable consumption behavior [13].

Income is only significantly related to responsibility attribution and shows no direct association with sustainable consumption behavior, indicating that normative values and moral considerations play a more decisive role in sustainable actions than economic status alone. [8] Domicile (Java Island versus outside Java Island) is significantly associated with awareness and personal norms. This finding may be explained by disparities in digital infrastructure access and digital literacy between urban and rural areas in Indonesia, which influence the formation of individual awareness and moral norms. However, these spatial differences do not consistently translate into variations in responsibility attribution or actual sustainable consumption behavior. Furthermore, domicile is closely linked to education and income levels, suggesting that its influence on the Norm Activation Model (NAM) variables may occur through both direct and indirect pathways.

This study provides empirical evidence on the psychological mechanisms underlying sustainable consumption behavior among Generation Z consumers in Indonesia by applying a modified Norm

From a theoretical perspective, the findings provide strong support for the applicability of the Norm Activation Model within a Generation Z context. Sustainable consumption awareness emerges as a central activating factor that influences both responsibility attribution and personal norms, ultimately driving behavior. However, the exceptionally high total effect of awareness ($\beta = 0.915$) suggests that, for Generation Z, awareness is not merely a cognitive construct but also a socially mediated and identity-relevant factor. In other words, awareness may function as part of a broader value system shaped by digital communication, social influence, and generational identity.

The integration of the Triple Bottom Line framework further enriches the explanatory capacity of the model by capturing the multidimensional nature of sustainability as perceived by Generation Z. Unlike earlier generations that may prioritize environmental concerns, Generation Z appears to adopt a more holistic understanding of sustainability, encompassing social justice and economic considerations [7]. This multidimensional awareness is particularly relevant in explaining why sustainable consumption decisions among Generation Z are often negotiated between ethical ideals and practical constraints [9].

From a practical standpoint, the findings suggest that sustainability interventions targeting Generation Z should move beyond traditional information-based approaches. Given the strong role of personal norms and responsibility, strategies that emphasize moral engagement, identity alignment, and social influence are likely to be more effective. For example, leveraging peer influence, social media campaigns, and value-based messaging may help bridge the gap between awareness and behavior [15]. Additionally, framing sustainability in ways that resonate with everyday consumption realities, such as affordability, convenience, and lifestyle compatibility, may enhance behavioral adoption among this cohort.

Several limitations should be acknowledged. The cross-sectional design limits causal inference, and reliance on self-reported data may introduce social desirability bias. Future research should consider longitudinal or experimental designs to capture behavioral dynamics over time and explore the role of external influences such as peer norms, digital engagement, and perceived greenwashing. Expanding the analysis to specific consumption domains may also provide deeper insights into how Generation Z negotiates sustainability in different contexts.

5 Conclusion and recommendations

This study demonstrates that sustainable consumption behavior among Indonesian Generation Z is shaped by an interconnected psychological process involving awareness of sustainable consumption, responsibility attribution, and personal norms. All hypothesized relationships within the adapted Norm Activation Model are empirically supported, with awareness emerging as the most influential antecedent of sustainable consumption behavior, both directly and through mediated pathways.

From a practical perspective, the findings suggest that interventions aimed at promoting sustainable consumption among Generation Z should prioritize the development of multidimensional awareness, particularly emphasizing economic rationality alongside environmental and social considerations. The strong contribution of the economic dimension indicates that framing sustainability in terms of utility, necessity, and financial prudence may be especially effective for this demographic group.

For policymakers and educators, sustainability campaigns should move beyond moral appeals alone and integrate messages that resonate with everyday economic decision-making.

Such strategies may enhance resistance to greenwashing by fostering a more critical and holistic understanding of sustainability.

Future research is encouraged to expand the demographic scope beyond Generation Z and to include more geographically diverse samples. Methodologically, qualitative approaches could provide deeper insights into the internalization of moral norms and responsibility. Further extensions of the model may incorporate external social influences, such as peer norms or perceived greenwashing, and examine specific consumption domains to refine understanding of sustainable consumption behavior.

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