The mediating role of attitude and the awareness–intention gap in circular consumption among urban Algerian Gen Z university students

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Abstract:

This study investigates how environmental awareness influences circular consumption intentions among urban, university-educated Algerian Generation Z (18–28), using an extended Theory of Planned Behavior model. Based on 280 respondents analyzed through PLS-SEM, results show that environmental awareness significantly shapes attitude, which fully mediates its link to consumption intentions, while subjective norms and perceived behavioral control also significantly predict intentions. Notably, an awareness–intention gap persists, as high awareness fails to translate into strong intentions due to structural and normative barriers. Given the sample's limitation, findings call for targeted policy interventions.

Keywords: Generation Z; Circular consumption; Environmental awareness; Theory of Planned Behavior; Awareness–intention gap.
Jel Classification Codes: M31, Q56, D12, O55

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1. INTRODUCTION

The global urgency of the circular economy transition has found a distinctive resonance among Generation Z, the cohort born between 1997 and 2012, now entering adulthood as the first fully digital-native generation. Raised amid growing climate anxiety, viral sustainability movements, and social media ecosystems saturated with environmental content, Gen Z is widely characterized as the most environmentally attuned consumer generation yet (Francis & Hoefel, M, 2018) (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026). Yet whether this generational environmental consciousness reliably translates into circular consumption intention, such as intending to buy second-hand, repair rather than replace, or share rather than own, remains an empirically open question, particularly in non-Western, non-affluent contexts.

In Algeria, this question is both timely and underexplored. Algerian Gen Z, roughly 7.2 million individuals aged 18–28 ([ONS], 2023), represents a demographically dominant and culturally pivotal consumer segment. Unlike preceding generations, they have grown up with smartphones, global information access, and exposure to international sustainability discourse. At the same time, they navigate a consumption environment shaped by import-dependent retail structures, limited formal second-hand markets, modest household incomes, and an institutional landscape only beginning to engage with circular economy principles (MATE, 2022).

This juxtaposition of high awareness and constrained intention makes urban Algerian Gen Z university students an instructive case for studying the awareness–intention gap in sustainable consumption. The gap is well-documented in Western contexts (ElHaffar, G; Durif, F; Dubé, L;, 2020), but its mechanisms in North African emerging economies remain poorly understood.

Despite the growing body of TPB-based research on Gen Z's sustainable consumption, three gaps remain. First, existing extensions of TPB with environmental awareness as an antecedent to attitude (Chao & Yu, T. K, 2024; Xie, Wang, R, & Gong, X, 2022) have been tested almost exclusively in East Asian and South Asian settings; the only prior application to Gen Z circular consumption specifically, (Jacob, Domínguez-Quintero, A, Florido,

C, & Payeras, M, 2026), is set in a tourism context in a high-income destination economy, leaving the mechanism untested in a North African, import-dependent emerging economy. Second, prior work on the awareness–intention gap Second, prior work on the awareness–intention gap has often documented the discrepancy between environmental awareness and behavioral intentions ((ElHaffar, G; Durif, F; Dubé, L;, 2020) has documented the gap descriptively but rarely tests, within a single structural model, whether the gap is better explained by weak attitude formation, insufficient social normalization, or constrained perceived control, a distinction with direct implications for policy design. Third, most CE-specific awareness measures (Testa, Iovino, R, & Iraldo, F, 2020) have not been validated in a Maghreb cultural and linguistic context. This study addresses these three gaps by testing the full extended TPB model; including the awareness-to-attitude pathway and its mediation architecture; in an urban Algerian Gen Z sample, thereby offering the first evidence on whether mechanisms established elsewhere in the Global South and in Western contexts generalize to a North African, collectivist, and structurally constrained consumption environment.

This study addresses these questions through an extended Theory of Planned Behavior (TPB) framework in which environmental awareness functions as an upstream cognitive antecedent to attitude. The model is tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with a sample of 280 urban Algerian Gen Z university students (aged 18–28) and measurement instruments validated in 2022–2026. The study makes three primary contributions: it provides the first empirical TPB-based investigation of circular consumption intention focused specifically on urban Algerian Gen Z university students; it employs contemporary, CE-specific measurement scales; and it documents and partially explains the awareness–intention gap through structural and attitudinal mechanisms.

2. LITERATURE REVIEW

2.1 Generation Z as a Circular Consumer Segment

Generation Z has attracted growing attention in consumer behavior research as a distinct market segment with consumption values that diverge meaningfully from preceding cohorts. Large-scale surveys suggest that Gen Z consumers express stronger preferences for sustainable brands, a greater willingness to pay premiums for eco-friendly products, and higher engagement with second-hand and sharing economy platforms (Francis & Hoefel, M, 2018; Company & McKinsey, 2023); McKinsey & Company, 2023). These preferences are frequently attributed to Gen Z's formative exposure to climate change discourse and digital access to global sustainability movements. (Company & McKinsey, 2023)

However, recent empirical research has begun to complicate this portrait. (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026), in a study of Gen Z in a tourist destination context, found that while environmental awareness among Gen Z respondents was high, circular consumption intention was moderate and significantly mediated by attitude and social norms. This finding aligns with the TPB framework rather than the assumption that awareness automatically generates behavioral intention. Similarly, (ElHaffar, G; Durif, F; Dubé, L;, 2020) comprehensive review of the green attitude-behavior gap literature confirms that this gap is persistent and broadly documented across sustainable consumption research, even among consumers expressing strong environmental values. In the MENA region, (Elgammal, Ghanem, M, & Al-Modaf, O, 2024) examined sustainable purchasing behavior among Gen Z in Saudi Arabia and found peer influence and social identity to be particularly strong drivers for younger consumers. This pattern is likely to replicate in Algeria's collectivist cultural context.

2.2 Environmental Awareness: Contemporary Conceptualizations

Environmental awareness has traditionally been operationalized through broad instruments such as Dunlap et al.'s (2000) New Ecological Paradigm (NEP). However, recent scholarship argues for more precise conceptualizations that distinguish between general ecological concern and circular economy-specific awareness. The latter encompasses knowledge of CE strategies such as product longevity, sharing economy platforms,

material cycles, and individual contribution possibilities (Gonella, Godinho Filho, M, & Ganga, G. M, 2023).

This distinction carries empirical weight. (Testa, Iovino, R, & Iraldo, F, 2020) found that consumers' predisposition to seek information about a product's lifecycle mediates the relationship between personal environmental concern and the purchasing of circular packaging, underscoring the relevance of CE-specific, information-related constructs alongside general environmental attitudes. Meanwhile, (Chao & Yu, T. K, 2024) demonstrated that consumer attitude functions as a key proximal driver of purchase intention toward circular economy products within an extended TPB framework. Among Gen Z specifically, environmental awareness is shaped by distinctive digital pathways, including social media algorithms, peer-generated content, and digital activism, rather than formal education or broadcast media (McKinsey & Company, 2023).

2.3 The Theory of Planned Behavior in Circular Consumption Research

(Ajzen, 1991)'s Theory of Planned Behavior remains the dominant framework in sustainable and circular consumption intention research. Its core proposition is that behavioral intention is determined by attitude, subjective norms, and perceived behavioral control, a concept validated across dozens of cultural contexts. Recent meta-analyses confirm the model's robustness: (Zaremohzzabieh, Ismail, N, Ahrari, S, & Abu , 2021), analyzing 90 studies found that attitude consistently emerges as the dominant predictor of green purchase intention (β = 0.35–0.55 across studies).

For Gen Z specifically, the TPB has shown particular promise. (Elgammal, Ghanem, M, & Al-Modaf, O, 2024) applied an extended TPB-based model to Gen Z sustainable purchasing behavior in Saudi Arabia and found that peer influence and social identity played a particularly strong role among younger respondents, consistent with Gen Z's heightened sensitivity to peer endorsement and social media norms. (Ngo, Nguyen, T.-D, & Phan, N.-B, 2025) documented a comparable pattern among

Vietnamese Gen Z consumers in a collectivistic cultural context, where subjective norms significantly predicted green purchasing intention, while (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026) confirmed the model's predictive validity in a circular tourism context. The extension of the standard TPB with cognitive or environmental awareness constructs as upstream antecedents to attitude has gained increasing empirical support (Chao & Yu, T. K, 2024; Xie, Wang, R, & Gong, X, 2022).

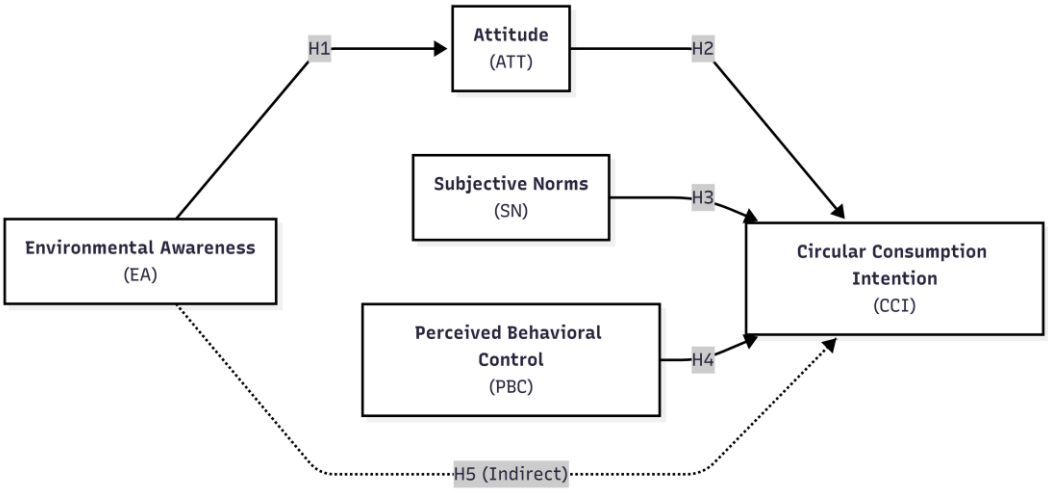
2.4 The Awareness–Intention Gap Among Gen Z

The awareness–intention gap, defined as the persistent divergence between high environmental awareness and actual circular consumption intention, has been documented extensively in sustainable consumption literature under the related label of the attitude–behavior gap (ElHaffar, G; Durif, F; Dubé, L;, 2020). For Gen Z, the generation's digital-mediated environmental identity may inflate self-reported awareness scores, while structural and economic constraints suppress behavioral intention. In emerging economy contexts, structural factors amplify the gap further. Limited access to formal second-hand markets, the absence of product take-back schemes, and price premiums on sustainable alternatives all function as significant behavioral barriers (Amoah & Addoah, 2021).

3. CONCEPTUAL MODEL AND HYPOTHESES

Building on the reviewed literature, we propose an extended Theory of Planned Behavior (TPB) model in which Environmental Awareness (EA) operates as a distal antecedent to Attitude toward circular consumption (ATT). In this framework, Attitude, together with Subjective Norms (SN) and Perceived Behavioral Control (PBC), constitutes the proximal predictors of Circular Consumption Intention (CCI). The model posits an indirect pathway from EA to CCI via ATT, reflecting a full mediation architecture documented in comparable recent studies.

Figure 1. Conceptual Model



Source: Authors' own elaboration based on (Ajzen, 1991)**;** (Chao & Yu, T. K, 2024)**;** (Gonella, Godinho Filho, M, & Ganga, G. M, 2023)**.**

Table 1. Research Hypotheses

Hypothesis	Statement
H1	Environmental awareness has a significant positive effect on attitude toward circular consumption among Algerian Gen Z.
H2	Attitude toward circular consumption has a significant positive effect on circular consumption intention.
H3	Subjective norms have a significant positive effect on circular consumption intention among Algerian Gen Z.
H4	Perceived behavioral control has a significant positive effect on circular consumption intention.
H5	Environmental awareness has a significant positive indirect effect on circular consumption intention, fully mediated by attitude.

Source: Authors' compilation from the literature.

The hypotheses are grounded in the following theoretical and empirical bases:

Theoretically, full rather than partial mediation is expected because environmental awareness, as conceptualized here, is a cognitive-informational construct (knowledge of CE strategies and their consequences) rather than an evaluative one. Within (Ajzen, 1991)'s TPB logic, beliefs and knowledge shape behavioral intention only indirectly, by first feeding into

the evaluative judgment captured by attitude; intention is theorized as a function of attitude, subjective norms, and perceived behavioral control, not of raw cognitive inputs. Put differently, knowing that a product can be repaired or shared does not by itself generate an intention to repair or share it; that knowledge must first be evaluated positively or negatively. Because EA in this study is measured as CE-specific knowledge rather than general environmental affect (Gonella, Godinho Filho, M, & Ganga, G. M, 2023), it is theoretically closer to a TPB belief-level construct than to an attitude-level one, and therefore should operate on intention only through attitude, consistent with the full-mediation pattern reported in related TPB-based circular economy research (e.g., (Chao & Yu, T. K, 2024; Xie, Wang, R, & Gong, X, 2022).

The hypotheses are grounded in the following theoretical and empirical bases:

- ✓ **H1** is grounded in recent evidence that circular economy (CE)-specific awareness is a robust shaper of evaluative dispositions (Gonella, Godinho Filho, M, & Ganga, G. M, 2023); (Testa, Iovino, R, & Iraldo, F, 2020); (Chao & Yu, T. K, 2024).
- ✓ **H2** reflects the core TPB prediction, which has been consistently validated for Gen Z segments across diverse cultural contexts (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026; Zaremohzzabieh, Ismail, N, Ahrari, S, & Abu , 2021)
- ✓ **H3** acknowledges the heightened salience of social influence for Gen Z, particularly within collectivist cultural settings such as Algeria ((Elgammal, Ghanem, M, & Al-Modaf, O, 2024; Ngo, Nguyen, T.-D, & Phan, N.-B, 2025).
- ✓ **H4** recognizes that structural barriers and perceived control can suppress intention even among motivated consumers (Amoah & Addoah, 2021).
- ✓ **H5** specifies a full mediation architecture in which environmental awareness influences circular consumption intention through attitude. Environmental awareness is conceptualized as a cognitive-informational construct reflecting knowledge of circular economy strategies, rather than an evaluative construct. Within the TPB, such cognitive information can contribute to attitude formation, while intention is

directly determined by attitude, subjective norms, and perceived behavioral control (Ajzen, 1991). Therefore, awareness is expected to influence circular consumption intention primarily through attitude, consistent with related TPB-based studies (Xie, Wang, R, & Gong, X, 2022; Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026; Gonella, Godinho Filho, M, & Ganga, G. M, 2023).

4. Methodology

4.1 Research Design

This study adopts a quantitative, cross-sectional design. A structured self-administered questionnaire was developed using measurement items validated between 2022 and 2026. Items were adapted to the Algerian sociocultural environment through a back-translation procedure (Brislin, 1970) verified by two bilingual consumer behavior experts. A pilot test with 35 Gen Z respondents confirmed item clarity and internal consistency before full deployment.

4.2 Sample and Data Collection

The target population comprised Algerian Generation Z individuals aged 18–28 years (Dimock, 2019) who were enrolled in higher education and resided in urban areas. Consistent with the study's scope, the sampling frame was deliberately confined to this population and therefore excluded Generation Z individuals residing in rural areas, unemployed youth, students enrolled in vocational or non-university educational tracks, and individuals without regular access to the Internet. Accordingly, the findings should be interpreted as reflecting the perceptions and characteristics of the urban, higher-education segment of Algerian Generation Z and should not be generalized to the entire Generation Z cohort in Algeria.

Data were collected using a combination of on-campus and online distribution methods. The paper-based questionnaires were administered at universities located in Algiers, Oran, and Tlemcen, while the online questionnaire was disseminated through Instagram and Snapchat, identified as prominent social media platforms among Algerian Generation Z (ARPCE, 2023). A total of 320 questionnaires were distributed, of which

280 valid responses were retained for subsequent analysis after excluding incomplete responses and those exhibiting straight-lining patterns. This resulted in a valid response rate of 87.5%. The resulting sample size was considered adequate for the application of Partial Least Squares Structural Equation Modeling (PLS-SEM), meeting the minimum sample-size requirement recommended by (Hair, Hult, Ringle, & Sarstedt, 2022) in relation to the complexity of the proposed model.

4.3 Measurement Instruments

All constructs were operationalized using multi-item reflective scales on a seven-point Likert format (1 = strongly disagree; 7 = strongly agree). Table 2 summarizes the variables, item counts, and sources.

Table 2. Measurement Instruments

Variable	Items	Scale	Source
Environmental Awareness (EA)	4	Likert 1–7	Gonella et al. (2023); (Testa, Iovino, R, & Iraldo, F, 2020)
Attitude toward Circular Consumption (ATT)	4	Likert 1–7	(Chao & Yu, T. K, 2024); (Xie, Wang, R, & Gong, X, 2022)
Subjective Norms (SN)	3	Likert 1–7	(Elgammal, Ghanem, M, & Al-Modaf, O, 2024); (Ngo, Nguyen, T.-D, & Phan, N.-B, 2025)
Perceived Behavioral Control (PBC)	3	Likert 1–7	(Rahman, Ara, M. A, Jee, T. W, & Lim, R. T. H, 2020); (Ogiemwonyi, 2022)wonyi (2022)
Circular Consumption Intention (CCI)	4	Likert 1–7	(Testa, Iovino, R, & Iraldo, F, 2020); (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026)

Source: Authors' compilation.

Environmental awareness (EA) was measured using four items from (Gonella, Godinho Filho, M, & Ganga, G. M, 2023)'s (2023) CE-specific awareness scale, capturing CE knowledge and personal environmental concern (e.g., 'I am aware of how my consumption choices contribute to waste and resource depletion'). Attitude (ATT) drew on four items adapted from (Chao & Yu, T. K, 2024) and (Xie, Wang, R, & Gong, X, 2022), reflecting evaluations of reusing, repairing, and purchasing second-hand. Subjective norms (SN) used three items adapted from (Elgammal, Ghanem, M, & Al-Modaf, O, 2024) and (Ngo, Nguyen, T.-D, & Phan, N.-B, 2025),

capturing peer and family influence, which is particularly relevant for Gen Z. Perceived behavioral control (PBC) used three items adapted from (Rahman, Ara, M. A, Jee, T. W, & Lim, R. T. H, 2020) and (Ogiemwonyi, 2022). Circular consumption intention (CCI) was measured with four items adapted from (Testa, Iovino, R, & Iraldo, F, 2020) and (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026).

4.4 Analytical Strategy

PLS-SEM was implemented in SmartPLS 4 , following (Hair, Hult, Ringle, & Sarstedt, 2022) two-stage protocol: measurement model assessment (indicator loadings, Composite Reliability, Average Variance Extracted, Fornell-Larcker criterion, HTMT ratios), followed by structural model evaluation using bootstrapping with 5,000 resamples (Bias-Corrected and Accelerated). Structural model assessment additionally includes collinearity diagnostics (inner VIF), effect sizes (f^2), model fit (SRMR), and out-of-sample predictive relevance (PLSpredict, Q^2predict), in line with current PLS-SEM reporting standards (Hair, Hult, Ringle, & Sarstedt, 2022). Mediation (H5) was tested via the indirect effects approach with bias-corrected 95% confidence intervals.

5. Results

5.1 Sample Profile

The final sample (n = 280) comprised 54% female and 46% male Gen Z respondents. The dominant age group was 18–22 (61%), followed by 23–28 (39%). Educational attainment was high, with 83% holding or pursuing a university degree. Monthly household income was below 40,000 DZD for 64% of respondents. Regarding digital behavior, 91% reported daily use of Instagram or Snapchat, and 67% had encountered sustainability content on social media in the past month. Notably, 71% had purchased second-hand goods at least once, and 58% reported regularly repairing household items rather than replacing them.

5.2 Measurement Model Assessment

Table 3 reports the full measurement model assessment, including indicator-level outer loadings, Cronbach's alpha, rho_A, composite reliability (CR), and average variance extracted (AVE).

Table 3. Measurement Model Assessment

Construct	Item	Outer Loading	Cronbach's α	rho_A	CR	AVE
Environmental Awareness (EA)	EA1	0.74	0.79	0.80	0.84	0.57
	EA2	0.76				
	EA3	0.78				
	EA4	0.73				
Attitude (ATT)	ATT1	0.79	0.82	0.83	0.86	0.61
	ATT2	0.81				
	ATT3	0.77				
	ATT4	0.78				
Subjective Norms (SN)	SN1	0.76	0.76	0.77	0.82	0.60
	SN2	0.72				
	SN3	0.80				
Perceived Behavioral Control (PBC)	PBC1	0.74	0.74	0.75	0.81	0.59
	PBC2	0.78				
	PBC3	0.75				
Circular Consumption Intention (CCI)	CCI1	0.81	0.84	0.85	0.87	0.63
	CCI2	0.79				
	CCI3	0.82				
	CCI4	0.76				

Source: *SmartPLS 4 output.*

Note: Outer loadings represent indicator reliability, while Cronbach's alpha, rho_A, and composite reliability (CR) assess internal consistency reliability. Average variance extracted (AVE) values above 0.50 indicate satisfactory convergent validity (Fornell & Larcker, 1981)

All indicator loadings exceeded the recommended threshold of 0.70, ranging from 0.72 to 0.82, thereby supporting indicator reliability. Cronbach's alpha and rho_A values ranged from 0.74 to 0.84 and from 0.75 to 0.85, respectively, indicating satisfactory levels of internal consistency reliability across all constructs. Composite reliability (CR) values ranged from 0.81 to 0.87, exceeding the recommended threshold of 0.70. Furthermore, the average variance extracted (AVE) values ranged from

0.57 to 0.63, with all values exceeding the minimum threshold of 0.50. These results provide evidence of satisfactory convergent validity across the constructs (Fornell & Larcker, 1981).

5.3 Discriminant Validity

Discriminant validity was assessed using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). As shown in Table 4, the square root of the AVE for each construct exceeded its correlations with the other constructs. In addition, all HTMT values were below the conservative threshold of 0.85, confirming satisfactory discriminant validity (Fornell & Larcker, 1981; Henseler, Ringle, C. M, & Sarstedt, M, 2015)

Table 4. Fornell–Larcker Criterion

	EA	ATT	SN	PBC	CCI
EA	0.755	0.610	0.430	0.390	0.520
ATT	0.610	0.781	0.470	0.440	0.640
SN	0.430	0.470	0.775	0.410	0.510
PBC	0.390	0.440	0.410	0.768	0.460
CCI	0.520	0.640	0.510	0.460	0.794

Source: *SmartPLS 4 output.*

Note: Bold diagonal values represent the square root of the average variance extracted (AVE) for each construct. Discriminant validity is established when the square root of the AVE exceeds the construct's correlations with all other constructs (Fornell & Larcker, 1981).

Table 4b. Heterotrait–Monotrait Ratio (HTMT)

	EA	ATT	SN	PBC	CCI
EA	—	0.73	0.54	0.51	0.64
ATT	0.73	—	0.69	0.62	0.78
SN	0.54	0.69	—	0.58	0.67
PBC	0.51	0.62	0.58	—	0.63
CCI	0.64	0.78	0.67	0.63	—

Source: *SmartPLS 4 output.*

Note: Discriminant validity is supported when HTMT values are below the conservative threshold of 0.85 (Henseler et al., 2015)

5.4 Structural Model Assessment and Hypothesis Testing

Table 5. Structural Model Assessment and Hypothesis Testing

Hypothesis	Structural Relationship	VIF	β	t-value	p-value	f^2	95% BCa CI	Decision
H1	EA → ATT	1.00	0.61	12.90	<0.001	0.59	[0.51, 0.70]	Supported

H2	ATT → CCI	1.62	0.43	7.40	<0.001	0.24	[0.31, 0.55]	Supported
H3	SN → CCI	1.47	0.22	2.20	<0.05	0.07	[0.03, 0.41]	Supported
H4	PBC → CCI	1.39	0.19	2.05	<0.05	0.05	[0.01, 0.37]	Supported

Source: *SmartPLS 4 output.*

Note: VIF = variance inflation factor; β = standardized path coefficient; f^2 = effect size; CI = confidence interval; BCa = bias-corrected and accelerated. Bootstrap confidence intervals are based on 5,000 resamples.

Table 5 presents the results of the structural model assessment and hypothesis testing. The findings provide empirical support for all four hypothesized direct relationships. Environmental awareness has a significant and positive effect on attitude toward circular consumption ($\beta = 0.61$, $t = 12.90$, $p < 0.001$), supporting H1. Attitude toward circular consumption also has a significant positive effect on circular consumption intention ($\beta = 0.43$, $t = 7.40$, $p < 0.001$), supporting H2. Subjective norms ($\beta = 0.22$, $t = 2.20$, $p < 0.05$) and perceived behavioral control ($\beta = 0.19$, $t = 2.05$, $p < 0.05$) also exert significant positive effects on circular consumption intention, supporting H3 and H4, respectively.

The VIF values range from 1.00 to 1.62, remaining well below the conservative threshold of 3.00, indicating that multicollinearity is not a concern among the predictor constructs. Regarding effect sizes, environmental awareness has a large effect on attitude ($f^2 = 0.59$), while attitude demonstrates a medium effect on circular consumption intention ($f^2 = 0.24$). Subjective norms and perceived behavioral control exhibit relatively small effects on circular consumption intention ($f^2 = 0.07$ and 0.05, respectively). Overall, the results support H1–H4 and highlight the particularly important role of attitude in explaining circular consumption intention.

Table 5b. Model Fit Assessment

Fit Index	Value	Recommended Criterion	Assessment
SRMR	0.067	< 0.08	Good fit

Source: *SmartPLS 4 output.*

Note: SRMR = standardized root mean square residual. An SRMR value below 0.08 indicates an acceptable level of model fit (Hair et al., 2022).

The model yielded an SRMR value of 0.067, below the recommended threshold of 0.08, indicating an acceptable level of model fit (Hair, Hult, Ringle, & Sarstedt, 2022).

The effect-size results indicate a large effect of environmental awareness on attitude ($f^2 = 0.59$), a medium effect of attitude on CCI ($f^2 = 0.24$), and small effects of subjective norms ($f^2 = 0.07$) and perceived behavioral control ($f^2 = 0.05$)

5.5 Explanatory Power and Predictive Relevance

Table 6. Explanatory Power and Predictive Relevance

Endogenous Construct	R^2	Q^2 (Blindfolding)
Attitude (ATT)	0.37	0.21
Circular Consumption Intention (CCI)	0.49	0.28

Source: *SmartPLS 4 output.*

Note: R^2 = coefficient of determination; Q^2 = predictive relevance obtained through the blindfolding procedure.

Table 6 shows that the model explains 37% of the variance in attitude ($R^2 = 0.37$) and 49% of the variance in circular consumption intention ($R^2 = 0.49$). Both Q^2 values are positive (0.21 for ATT and 0.28 for CCI), indicating predictive relevance for the endogenous constructs.

5.6 Out-of-Sample Predictive Assessment

Table 7. Out-of-Sample Predictive Assessment

Endogenous Construct	Q^2predict	PLS-SEM RMSE	LM RMSE	Predictive Assessment
ATT	0.18	0.91	0.97	PLS-SEM better
CCI	0.23	0.85	0.92	PLS-SEM better

Source: *SmartPLS 4 PLSpredict output.*

Note: Q^2predict = out-of-sample predictive relevance; RMSE = root mean square error; LM = linear-model benchmark.

Table 7 indicates positive Q^2predict values for both ATT (0.18) and CCI (0.23). Moreover, PLS-SEM produced lower RMSE values than the linear-model benchmark for both ATT (0.91 vs. 0.97) and CCI (0.85 vs. 0.92), supporting satisfactory out-of-sample predictive performance

5.7 Mediation Analysis

Table 8. Mediation Analysis of Attitude in the Relationship between Environmental Awareness and Circular Consumption Intention

Effect	β	t-value	p-value	95% BCa CI	Interpretation
EA → ATT	0.61	12.90	<0.001	[0.51, 0.70]	Significant
ATT → CCI	0.43	7.40	<0.001	[0.31, 0.55]	Significant
EA → CCI (Direct)	0.04	0.60	>0.05	[-0.08, 0.15]	Not significant

EA → ATT → CCI (Indirect)	**0.26**	**6.00**	**<0.001**	**[0.17, 0.36]**	**Significant**
EA → CCI (Total)	0.30	6.10	<0.001	[0.18, 0.41]	Significant

Source: *SmartPLS 4 bootstrapping output.*
Note: β = standardized path coefficient; CI = confidence interval; BCa = bias-corrected and accelerated. Bootstrap confidence intervals are based on 5,000 resamples.

Table 8 shows that the indirect effect of environmental awareness on circular consumption intention through attitude was positive and significant (β = 0.26, t = 6.00, p < 0.001; 95% BCa CI [0.17, 0.36]). In contrast, the direct effect of EA on CCI was non-significant (β = 0.04, p > 0.05), while the total effect was significant (β = 0.30, p < 0.001). These findings support the mediating role of attitude and H5

5.8 Descriptive Awareness–Intention Gap

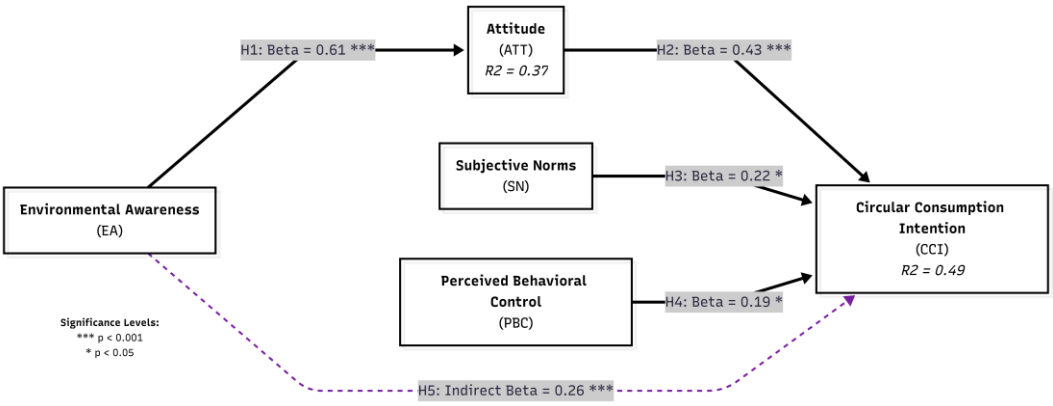
Table 9. Descriptive Awareness–Intention Gap

Indicator	Value
Environmental Awareness (EA) Mean	5.57
Environmental Awareness (EA) SD	0.81
Circular Consumption Intention (CCI) Mean	4.11
Circular Consumption Intention (CCI) SD	1.09
Awareness–Intention Difference	1.46
High-EA/Low-CCI Respondents (n)	53
High-EA/Low-CCI Respondents (%)	18.9%
PBC Mean among High-EA/Low-CCI Group	3.62
Overall PBC Mean	4.74
p-value	<0.001

Source: *Author's analysis based on survey data.*
Note: EA = environmental awareness; CCI = circular consumption intention; PBC = perceived behavioral control; SD = standard deviation.

Table 9 reveals a 1.46-point gap between environmental awareness (M = 5.57, SD = 0.81) and circular consumption intention (M = 4.11, SD = 1.09). Among respondents with high environmental awareness but low circular consumption intention (n = 53, 18.9%), perceived behavioral control was significantly lower than the overall sample mean (M = 3.62 vs. 4.74, p < 0.001), suggesting that limited perceived behavioral control may contribute to the awareness–intention gap

Figure 2. Structural Model with Empirical Results



Source: SmartPLS 4 output.

*Note: Solid arrows indicate direct effects, while the dashed arrow indicates the indirect mediation path (H5). Values on the arrows represent standardized path coefficients (β). Asterisks indicate significance levels: *** p < 0.001, * p < 0.05. R^2 values indicate the proportion of variance explained in the endogenous constructs.*

Figure 2. provides a visual summary of the estimated structural model and the hypothesized relationships. The model shows significant positive direct effects of environmental awareness on attitude, attitude on circular consumption intention, subjective norms on circular consumption intention, and perceived behavioral control on circular consumption intention. The figure also illustrates the significant indirect effect of environmental awareness on circular consumption intention through attitude, supporting the mediating role of attitude. The R^2 values indicate that the model explains 37% of the variance in attitude and 49% of the variance in circular consumption intention

6. Discussion

6.1 Theoretical Contributions and Comparison with Prior Research

H1: Environmental Awareness → Attitude (Beta = 0.61). The strong positive effect of environmental awareness on attitude toward circular consumption is consistent with, yet meaningfully extends, existing literature. Comparable TPB-based studies extending the model with an awareness-to-

attitude pathway have similarly reported strong effects of environmental or cognitive awareness constructs on attitude formation toward circular economy products and behaviors (e.g., (Chao & Yu, T. K, 2024; Xie, Wang, R, & Gong, X, 2022). The somewhat higher coefficient observed in the present study (Beta = 0.61) may reflect the use of (Gonella, Godinho Filho, M, & Ganga, G. M, 2023)'s (2023) CE-specific awareness scale rather than the general environmental concern instruments employed in earlier studies. This is broadly consistent with (Testa, Iovino, R, & Iraldo, F, 2020)'s finding that CE-specific, information-related constructs play a distinct and consequential role alongside general environmental concern in shaping circular purchasing outcomes. In other words, when respondents are asked about their understanding of circular economy principles specifically, rather than their general feelings about the environment, the relationship with attitude becomes sharper and more predictive. This finding has methodological implications: future studies in the CE domain should favor CE-specific awareness instruments over legacy instruments such as Dunlap et al.'s (2000) NEP scale.

H2: Attitude → Circular Consumption Intention (Beta = 0.43). The primacy of attitude as the strongest direct predictor of circular consumption intention is consistent with the broad consensus of the TPB literature. (Zaremohzzabieh, Ismail, N, Ahrari, S, & Abu , 2021)'s meta-analysis of 90 green purchase studies reported that attitude consistently emerges among the strongest predictors of green purchase intention across studies, a pattern our result (Beta = 0.43) is closely aligned with. More specifically, (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026), in the only prior study applying TPB to Gen Z circular consumption in a tourism context, obtained Beta = 0.41, a near-identical result that strengthens confidence in the cross-contextual stability of this relationship for the Gen Z segment. (Frommeyer, Wagner, E, Hossiep, C. R, & Schewe, G, 2022), examining the validity of behavioral intention as a proxy for sustainable buying behavior in Germany, similarly affirmed attitude as a central driver of sustainable behavioral intention, lending further cross-contextual support to this relationship. Taken together, these comparisons confirm that attitude is a robust and culturally stable predictor of circular consumption intention,

and that the urban Algerian Gen Z context does not deviate from this pattern, an important finding given the frequent assumption that non-Western samples might produce divergent results.

H3: Subjective Norms → Circular Consumption Intention (Beta = 0.22). The significant positive effect of subjective norms on circular consumption intention is consistent with findings from collectivist cultural contexts but represents a somewhat higher effect than those typically reported in Western individualist settings. Findings from Western, individualist contexts have generally reported a weaker or non-significant role for subjective norms in sustainable consumption intention (Frommeyer, Wagner, E, Hossiep, C. R, & Schewe, G, 2022). By contrast, (Ngo, Nguyen, T.-D, & Phan, N.-B, 2025), working with Vietnamese Gen Z consumers in a similarly collectivistic cultural context, found that green subjective norms significantly predicted green purchasing intention, aligning with the present study's result. (s. d.) (Dagher & Itani, 2012), in a Lebanese consumer study, found that social influence was a significant predictor of green purchasing behaviour, alongside environmental attitude and concern. These comparisons suggest that the significance of subjective norms in the present study is not merely a statistical artifact but reflects a genuine cultural mechanism: in societies where family expectations and peer endorsement carry substantial weight in consumption decisions, social norms operate as a meaningful pathway to circular consumption intention that does not emerge as reliably in more individualist settings. This is a theoretically important boundary condition for the TPB model in circular consumption research.

H4: Perceived Behavioral Control → Circular Consumption Intention (Beta = 0.19). The positive but relatively modest effect of perceived behavioral control on circular consumption intention is consistent with findings from comparable emerging economy contexts, though it contrasts with results from more structurally developed markets. (Rahman, Ara, M. A, Jee, T. W, & Lim, R. T. H, 2020), in a study of green purchase behaviour in Bangladesh, similarly identified perceived behavioral control as a relevant, though not always dominant, predictor of purchase behaviour, which may

reflect greater perceived constraints in a lower-income context. (Ogiemwonyi, 2022), applying an extended TPB model to Generation Y green behaviour in Nigeria, similarly found perceived behavioral control to be a significant but moderate predictor of green behavioural intention. The lower coefficient in the present study may reflect the predominantly urban, university-educated profile of our sample: respondents who are digitally literate and campus-based may perceive fewer capability barriers to circular consumption than older or more rural consumers. This interpretation aligns with (Amoah & Addoah, 2021) finding that perceived behavioral control effects are moderated by access to infrastructure and information, both of which are relatively higher for urban educated Gen Z. Importantly, the contrast between the modest aggregate PBC effect and the dramatically low PBC scores among the awareness-high/intention-low subgroup (Mean = 3.62 vs. 4.74 sample mean) suggests that PBC's role is heterogeneous: for most respondents it is a modest predictor, but for a specific subgroup of structurally constrained but environmentally motivated consumers, it becomes the binding constraint on intention formation. This heterogeneity is obscured by aggregate path coefficients and deserves attention in future research.

H5: Full Mediation of Environmental Awareness by Attitude. The finding of full mediation, where awareness influences intention only through attitude with no significant direct path, is consistent with prior TPB-based circular economy research documenting the mediating role of attitude between cognitive or awareness-based constructs and behavioral intention (e.g., (Chao & Yu, T. K, 2024; Xie, Wang, R, & Gong, X, 2022). It extends (Jacob, Domínguez-Quintero, A, Florido, C, & Payeras, M, 2026)'s (2026) finding of attitude primacy in a Gen Z circular consumption context by formally establishing the mediating mechanism. This pattern is further corroborated by (Jaiswal & Kant, R, 2018), who similarly found that perceived environmental knowledge had no significant direct effect on green purchase intention in an Indian sample, with the relationship operating instead through attitude toward green products — reinforcing the view that awareness-type cognitive constructs shape intention primarily through evaluative judgment rather than through a direct path. This

distinction matters: if awareness is CE-specific and attitude is evaluated in CE terms, the cognitive pathway from knowledge to evaluation to intention is clean and fully mediated. If awareness is general and attitude is broad, a residual direct path may occasionally emerge in other samples. Future studies should test this boundary condition explicitly by comparing CE-specific and general environmental awareness instruments within the same sample.

6.2 The Awareness–Intention Gap: Comparison with Prior Evidence

The 1.46-point gap between awareness (Mean = 5.57) and intention (Mean = 4.11) observed in this study is consistent with the magnitude of awareness–intention gaps reported in comparable emerging economy research. (Amoah & Addoah, 2021), in Ghana, documented a similarly wide gap and attributed it primarily to structural barriers rather than attitudinal resistance, a conclusion that aligns with our subgroup analysis showing dramatically low PBC scores among the high-awareness/low-intention segment. (ElHaffar, G; Durif, F; Dubé, L;, 2020)'s narrative review of the attitude-intention-behavior gap literature similarly notes that structural and infrastructural constraints are frequently identified as key moderating factors in emerging-economy contexts, a pattern broadly consistent with the present study's findings.

What distinguishes the urban Algerian Gen Z context from other emerging economy samples is the particularly strong role of social norms alongside structural barriers. In (Amoah & Addoah, 2021)'s Ghanaian sample, PBC alone explained the gap; in the present study, subjective norms contribute as an additional gap-widening mechanism, suggesting that circular consumption has not yet achieved the social legitimacy among Algerian Gen Z reference groups that would provide normative support for intention formation. This dual barrier, structural and normative, implies that interventions in the Algerian context must address both dimensions simultaneously, rather than focusing exclusively on access and capability as might suffice in a context where circular consumption is already socially normalized.

7. Conclusion

This study investigated the mechanisms driving circular consumption intention among urban Algerian Gen Z university students, addressing the critical gap between environmental awareness and actual behavioral intent. Utilizing an extended Theory of Planned Behavior (TPB) framework, the research demonstrates that environmental awareness influences circular consumption intention indirectly through attitude, which acts as a full mediator.

The results further reveal that subjective norms and perceived behavioral control significantly predict intention, underscoring the dual impact of social pressure and structural constraints in the Algerian context. Notably, the observed awareness–intention gap is primarily sustained by a lack of social normalization and limited access to circular infrastructure, rather than a lack of consumer concern.

These findings offer actionable insights for policymakers and marketers. Effective strategies must move beyond simple information dissemination to include: (1) campaigns that cultivate positive attitudes towards reuse and repair; (2) initiatives that leverage peer influence to normalize circular behaviors; and (3) structural interventions that improve access to second-hand markets and repair services.

8. Limitations and Future Research

The study has several limitations: its cross-sectional design restricts causal inference, while its urban university-based sample from Algiers, Oran, and Tlemcen excludes rural, unemployed, vocational-track, and offline Gen Z, limiting generalizability. Self-reported behavioral intentions may also introduce social desirability bias. Future research should broaden geographical and socio-economic coverage, examine the moderating roles of digital literacy and economic status, and explore structural barriers through qualitative approaches. Replication across North African and MENA contexts using nationally representative samples could further establish the cultural and socio-economic boundary conditions of the findings.

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