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Transforming Sustainability Into Customer Loyalty: Strategic Role of Customer Relationship Management (CRM) Capability in Indonesian Manufacturing Industri

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Abstract

Background: Sustainability-based practices are increasingly relevant to business-to-business manufacturing, but their contribution to customer loyalty remains uncertain.
Objective: This study examines Sustainability-Based Practices, Customer Satisfaction, Customer Loyalty, and Customer Relationship Management (CRM) Capability in Indonesian manufacturing relationships.
Methods: A quantitative cross-sectional survey of procurement decision-makers was analyzed using partial least squares structural equation modeling (PLS-SEM).
Results: Sustainability-Based Practices positively influence Customer Satisfaction ($\beta = 0.378$; $p < 0.001$), and Customer Satisfaction positively influences Customer Loyalty ($\beta = 0.312$; $p = 0.030$). The direct relationship between Sustainability-Based Practices and Customer Loyalty is not significant ($\beta = 0.096$; $p = 0.458$). CRM Capability does not significantly moderate either proposed relationship ($p = 0.675$ and $p = 0.286$). The reported indirect effect concerns CRM Capability through Customer Satisfaction ($\beta = 0.109$; $p = 0.050$), which is borderline under the stipulated $p < 0.05$ criterion and does not establish mediation of sustainability effects.
Conclusion: Customer satisfaction is associated with the relational value of sustainability practices, but sustainability does not directly predict loyalty in the reported model. Manufacturing suppliers should connect sustainability initiatives with customer-relevant performance. Interpretation requires caution because of measurement-validity concerns and unavailable verification of the original indirect-effect output.

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INTRODUCTION

In industrial business-to-business (B2B) markets, assessments of manufacturing suppliers increasingly extend beyond financial outcomes to include their environmental conduct and social responsibilities. Responsible sourcing thus involves interconnected environmental, social, and economic practices (Azevedo et al., 2011; Bonfanti et al., 2022; Fonseca et al., 2024; Turker, 2009). Yet adopting such practices does not necessarily yield predictable improvements in commercial relationships. Buyers must also consider price, product standards, dependable delivery, service performance, risk exposure, and contractual duties (Arthur et al., 2024; Liu et al., 2020). These operational requirements shape whether sustainability-related efforts matter to decisions about maintaining a supplier relationship.

This raises the question of whether suppliers' sustainability initiatives are reflected in customer loyalty or whether other aspects of the purchasing experience intervene. Responsible conduct alone may be insufficient when buyers perceive shortcomings in reliability, service, or overall relationship quality. For manufacturers operating in Indonesia, procurement evaluations combine sustainability requirements with day-to-day commercial priorities. Accordingly, a model limited to the direct link between sustainability and loyalty would leave out the customer judgments and organizational processes that may contribute to continuing relationships.

Several theoretical perspectives help frame this question. Under Behavioral Reasoning Theory, the arguments supporting or discouraging a decision contribute to how individuals assess available choices (Claudy et al., 2013; Fabio et al., 2025; Westaby, 2005). Sustainability may therefore strengthen the case for selecting a supplier without ensuring ongoing loyalty. Research on relational exchange similarly identifies satisfaction as relevant to sustained buyer–supplier ties (dan Dey, 2022; Morgan & Hunt, 1994; Oliver, 1999). Considered together, these perspectives point toward the overall evaluation of supplier performance as a necessary part of understanding loyalty.

The Resource-Based View provides an organizational complement to these behavioral explanations: value can arise from the way firms deploy their capabilities within routine activities (Barney, 1991; Cao et al., 2022). In particular, CRM Capability involves managing customer information, interactions, and responsiveness to buyer needs (Malodia et al., 2025; Trainor et al., 2014; Wang & Feng, 2012). Such processes could support communication about responsible practices and service adjustments. Their existence, however, does not establish that CRM changes the association of sustainability with satisfaction or the association of satisfaction with loyalty; these proposed interaction effects require empirical examination.

An unresolved issue is how sustainability, customer evaluations, and CRM operate together in Indonesian manufacturing relationships. Earlier theoretical arguments make favorable outcomes plausible but do not determine whether sustainability predicts loyalty independently of satisfaction or whether CRM strengthens the proposed links. Assuming that sustainability spending or CRM investment must increase repeat orders could therefore mislead supplier decisions. Testing these separate paths is necessary to distinguish supported findings from expectations grounded only in theory.

The study's contribution is an integrated assessment of Sustainability-Based Practices, Customer Satisfaction, Customer Loyalty, and CRM Capability among Indonesian B2B manufacturing buyers. Within one framework, it considers the direct paths, the indirect association reported in the findings, and two CRM interactions. This distinction prevents customer satisfaction from being conflated with actual loyalty and avoids assuming that CRM necessarily intensifies either relationship. The available indirect-effect table concerns CRM Capability → Customer Satisfaction → Customer Loyalty; without a separate estimate, it cannot verify an indirect sustainability → satisfaction → loyalty effect.

The analysis addresses the links of Sustainability-Based Practices with both Customer Satisfaction and Customer Loyalty, the satisfaction–loyalty link, and CRM Capability's possible moderation of two specified relationships. It also considers the indirect path identified in the existing results. Conceptually, the study differentiates customers' evaluations from enduring purchase relationships; for suppliers, it offers a basis for considering sustainability and customer-management activities alongside the operational benefits valued in procurement.

At the theoretical level, the study seeks to clarify the extent to which Behavioral Reasoning Theory and the Resource-Based View help explain customer evaluations without assuming that favorable evaluations necessarily lead directly to loyalty. The managerial implication is to assess sustainability and CRM initiatives through customer satisfaction, service reliability, risk management, and relationship performance rather than treating either initiative as an automatic source of loyalty. Guided by these considerations, the hypotheses are: H1, Sustainability-Based Practices positively influence Customer Satisfaction; H2, Customer Satisfaction positively influences Customer Loyalty; H3, Sustainability-Based Practices positively influence Customer Loyalty; H3a, Customer Satisfaction mediates the reported relationship between CRM Capability and Customer Loyalty; H4, CRM Capability positively moderates the relationship between

Sustainability-Based Practices and Customer Satisfaction; and H5, CRM Capability positively moderates the relationship between Customer Satisfaction and Customer Loyalty. H3a follows the path displayed in Table 11 and remains subject to verification against the original SmartPLS output. The research problem and its proposed relationships are summarized in Figure 1.



Figure 1. Problem Tree Analysis.

METHOD

A cross-sectional quantitative explanatory design was used to investigate relationships among Sustainability-Based Practices, Customer Satisfaction, Customer Loyalty, and CRM Capability in Indonesian B2B manufacturing. Survey-based relationships were estimated with SmartPLS using partial least squares structural equation modeling (PLS-SEM). This analytical approach permits concurrent estimation of multiple latent constructs and the proposed indirect and interaction relationships, and is commonly used in prediction-oriented models without requiring strict multivariate normality (Hair et al., 2022; Kosasih et al., 2024).

Eligible participants were purchasing managers or buyer representatives employed by Indonesian manufacturing firms and engaged in assessing or choosing suppliers. The purposive selection requirements were at least two years of relevant procurement work, participation in supplier decisions, and awareness of sustainability criteria in purchasing. Although the sampling plan specified a minimum target of 210 people, the manuscript does not report the number of usable responses. The target must therefore not be presented as the final sample analyzed.

The questionnaire used five-point Likert responses to capture the four study constructs. Environmental, social, and economic dimensions represented Sustainability-Based Practices (Azevedo et al., 2011; Bonfanti et al., 2022; Turker, 2009). Items assessing Customer Satisfaction drew on Oliver (1999) dan Dey (2022) and Fornell et al. (1996); Customer Loyalty items were adapted from Oliver (1999) dan Dey (2022), Zeithaml et al. (1996), and Chaudhuri & Holbrook (2001). CRM Capability covered information management as well as customer interaction and responsiveness, drawing on Trainor et al. (2014), Wang & Feng (2012) and Ferrer-Estévez & Chalmeta (2023). Expert review and an initial test involving 20 respondents were used to consider the clarity and suitability of the questionnaire.

An online questionnaire was distributed through industry associations and professional contacts during a six-week collection window. Assessment proceeded from indicator quality to the proposed structural relationships. Indicator loadings were considered satisfactory at 0.70 or above; values between 0.40 and 0.70 could be retained where theoretically defensible and compatible with construct reliability and convergence. Cronbach's alpha and composite reliability

were judged against 0.70, while an AVE of at least 0.50 was required. Distinctiveness was considered using Fornell–Larcker and HTMT assessments (Hair et al., 2019; Henseler et al., 2015; Panzeri et al., 2024). Structural paths, R^2, f^2, and Q^2 were assessed with 5,000 bootstrap resamples (Hair et al., 2022; Koyongian & Mandagi, 2026). Bootstrapping addressed the proposed indirect association, and a product-indicator procedure addressed CRM interactions. The specified controls were firm size, manufacturing segment, and relationship duration; the stated common-method checks were Harman's single-factor test and full-collinearity VIF below 3.3 (Kock, 2015; Rasoolimanesh, 2022).

RESULTS AND DISCUSSION

Results

SmartPLS-based PLS-SEM analysis was organized into measurement assessment followed by examination of the structural relationships. First, the reported indicator and construct statistics were considered for reliability and validity. The subsequent stage addressed the hypothesized paths involving Sustainability-Based Practices, Customer Satisfaction, Customer Loyalty, and CRM Capability, together with predictor collinearity, indirect associations, interaction effects, explained variance (R^2), and predictive relevance (Q^2).

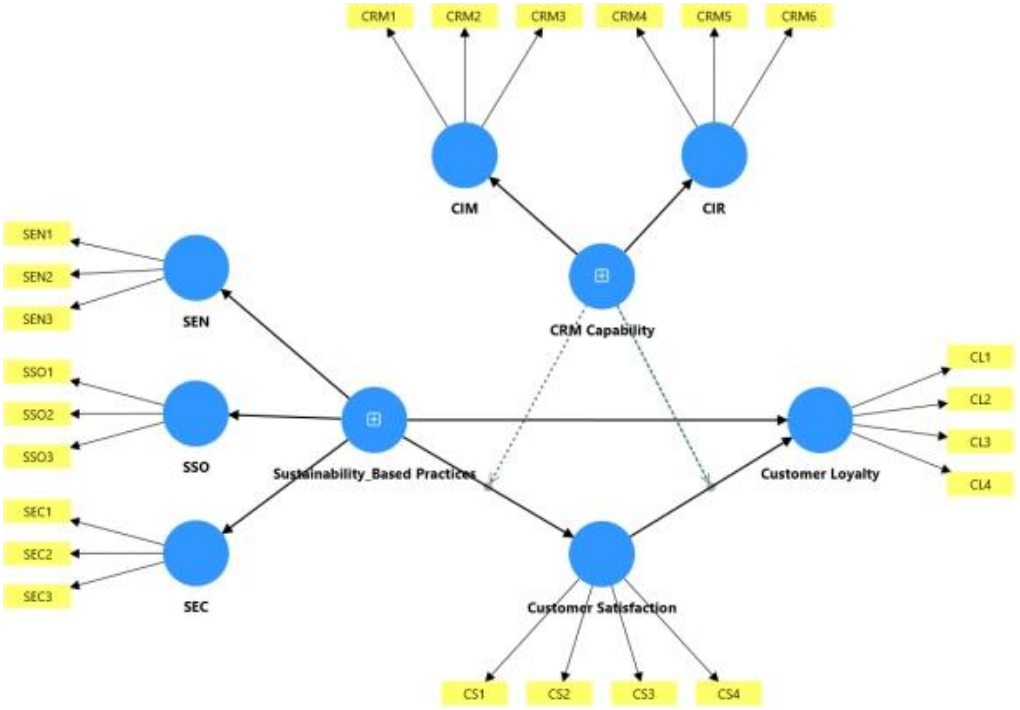


Figure 2. Structural Model of the Study

Measurement Model Evaluation

Assessment of the measurement component focused on whether the indicators adequately represented their designated latent variables. The reported evidence covers both convergence within a construct and separation across constructs. Outer loadings, Cronbach's alpha, composite reliability, and AVE informed the former assessment; cross-loadings, the Fornell–Larcker comparison, and HTMT informed the latter.

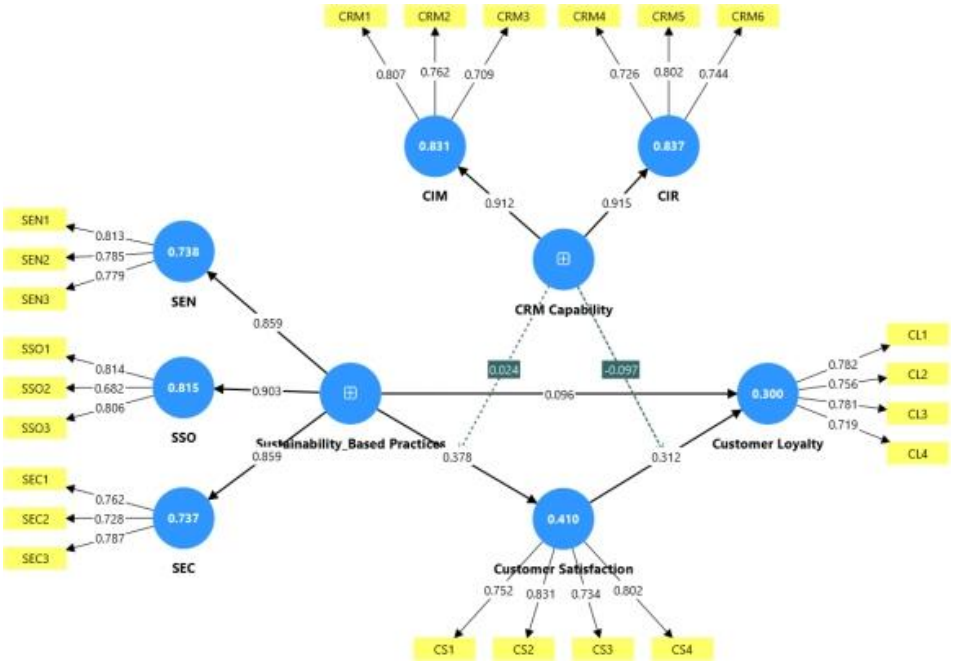


Figure 3. PLS-SEM Full Model

Outer loadings were considered in evaluating indicator convergence. Although the preferred value was 0.70, a theoretically necessary indicator in the 0.40–0.70 interval could be retained provided the associated reliability and AVE remained acceptable. Every reported indicator was above 0.60. In particular, SSO2 loaded at 0.682 and was retained to represent social sustainability; Sustainability-Based Practices had reported composite reliability of 0.882 and AVE of 0.500. These values support the stated retention decision but do not resolve the separate HTMT concerns about discriminant validity.

Table 1
Outer Loadings of Sustainability-Based Practices

Construct Dimension	Indicator	Loading Factor
Environmental sustainability	SEN1	0.813
	SEN2	0.785
	SEN3	0.779
Social sustainability	SSO1	0.814
	SSO2	0.682
	SSO3	0.806
Economic sustainability	SEC1	0.762
	SEC2	0.728
	SEC3	0.787

The outer loadings presented in Table 1 extend from 0.682 to 0.813. SSO2 has a loading of 0.682, below the preferred 0.70 threshold. Its retention preserves representation of social sustainability, and the reported overall reliability and convergent validity for Sustainability-Based Practices (Composite Reliability = 0.882; AVE = 0.500) meet the study thresholds. Nevertheless, the sub-0.70 loading and the HTMT results warrant cautious interpretation.

Table 2
Outer Loadings of CRM Capability

Construct Dimension	Indicator	Loading Factor
Customer Information Management	CRM1	0.807
	CRM2	0.762

Construct Dimension	Indicator	Loading Factor
Customer Interaction & Responsiveness	CRM3	0.709
	CRM4	0.726
	CRM5	0.802
	CRM6	0.744

According to Table 2, every indicator of CRM Capability have outer loading values above 0.60, ranging from 0.709 to 0.807. These results indicate adequate indicator-level convergent validity, and all indicators are retained for subsequent analysis.

Table 3
Outer Loadings of Customer Satisfaction

Latent Variable	Indicator	Loading Factor
Customer Satisfaction	CS1	0.752
	CS2	0.831
	CS3	0.734
	CS4	0.802

As reported in Table 3, all indicators of Customer Satisfaction have outer loading values above 0.60, ranging from 0.734 to 0.831. Therefore, the indicators meet the stated criterion for indicator-level convergent validity.

Table 4
Outer Loadings of Customer Loyalty

Latent Variable	Indicator	Loading Factor
Customer Loyalty	CL1	0.782
	CL2	0.756
	CL3	0.781
	CL4	0.719

The values in Table 4 show that all indicators of Customer Loyalty have outer loading values above 0.60, ranging from 0.719 to 0.782. Therefore, the indicators meet the stated criterion for indicator-level convergent validity.

Table 5
Construct Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
CRM Capability	0.782	0.847	0.500
Customer Loyalty	0.759	0.845	0.577
Customer Satisfaction	0.787	0.862	0.610
Sustainability Based Practices	0.849	0.882	0.500

Table 5 provides the evidence for internal consistency and convergence at construct level. Across constructs, Cronbach's alpha spans 0.759–0.849 and composite reliability spans 0.845–0.882; corresponding AVE values lie between 0.500 and 0.610. Thus, the reported statistics meet the study's stated cutoffs of 0.70 for reliability and 0.50 for AVE. The result supports acceptable reliability and convergent validity on these criteria, without settling the distinctiveness issues addressed separately below.

Discriminant Validity

Discriminant validity concerns the empirical separation of each construct from the other constructs in the research model. In this study, discriminant validity is examined through cross-loadings, the Fornell–Larcker criterion, and the Heterotrait–Monotrait ratio (HTMT).

At the indicator level, discriminant validity is examined through cross-loadings. Each indicator should load more strongly on its associated construct than on other constructs. Table 6 presents the corresponding results.

Table 6
Cross Loadings

	Customer Loyalty	CIM	CIR	Customer Satisfaction	SEC	SEN	SSO
CL1	0.782	0.349	0.460	0.429	0.362	0.320	0.353
CL2	0.756	0.181	0.269	0.352	0.271	0.180	0.161
CL3	0.781	0.243	0.235	0.376	0.154	0.108	0.252
CL4	0.719	0.296	0.384	0.307	0.347	0.331	0.388
CRM1	0.331	0.807	0.455	0.354	0.484	0.297	0.494
CRM2	0.299	0.762	0.597	0.459	0.414	0.226	0.360
CRM3	0.192	0.709	0.463	0.344	0.308	0.220	0.290
CRM4	0.441	0.531	0.726	0.436	0.448	0.326	0.390
CRM5	0.366	0.526	0.802	0.398	0.463	0.316	0.409
CRM6	0.233	0.460	0.744	0.360	0.388	0.427	0.359
CS1	0.275	0.310	0.306	0.752	0.273	0.368	0.382
CS2	0.384	0.492	0.419	0.831	0.429	0.478	0.501
CS3	0.435	0.364	0.405	0.734	0.224	0.328	0.372
CS4	0.407	0.405	0.489	0.802	0.441	0.438	0.412
SEC1	0.316	0.403	0.355	0.259	0.762	0.348	0.477
SEC2	0.184	0.398	0.476	0.297	0.728	0.490	0.542
SEC3	0.377	0.411	0.465	0.453	0.787	0.465	0.554
SEN1	0.329	0.177	0.335	0.343	0.477	0.813	0.577
SEN2	0.317	0.365	0.495	0.523	0.511	0.785	0.562
SEN3	0.101	0.228	0.266	0.368	0.371	0.779	0.429
SSO1	0.317	0.385	0.367	0.489	0.576	0.626	0.814
SSO2	0.250	0.404	0.405	0.401	0.527	0.404	0.682
SSO3	0.336	0.379	0.414	0.344	0.497	0.486	0.806

Table 6 shows that each indicator has a higher loading on its associated construct than on the other constructs. Therefore, the cross-loading criterion provides evidence of indicator-level discriminant validity.

Discriminant validity is further assessed using the Fornell–Larcker criterion. For each construct, the square root of AVE is expected to exceed its correlations with the other constructs.

Table 7
Fornell–Larcker Discriminant Validity

	CIM	CIR	Customer Loyalty	Customer Satisfaction	SEC	SEN	SSO
CIM	0.761						
CIR	0.669	0.758					
Customer Loyalty	0.363	0.460	0.760				
Customer Satisfaction	0.511	0.526	0.487	0.781			
SEC	0.532	0.573	0.385	0.448	0.760		
SEN	0.326	0.467	0.324	0.521	0.576	0.793	
SSO	0.504	0.510	0.393	0.538	0.693	0.665	0.770

Table 7 indicates that the square root of the AVE for each construct is greater than its correlations with the other constructs. Thus, the Fornell–Larcker criterion is satisfied for the constructs presented in the model.

Discriminant validity is also assessed using the Heterotrait–Monotrait ratio (HTMT). HTMT helps identify possible conceptual overlap between constructs, with values below 0.90 generally considered indicative of satisfactory discriminant validity.

Table 8
HTMT Discriminant Validity

	CIM	CIR	Customer Loyalty	Customer Satisfaction	SEC	SEN	SSO	Sustainability Based Practices
CIM								
CIR	1.051							
Customer Loyalty	0.501	0.636						
Customer Satisfaction	0.706	0.736	0.613					
SEC	0.833	0.900	0.542	0.612				
SEN	0.484	0.696	0.408	0.688	0.847			
SSO	0.784	0.802	0.536	0.741	1.075	0.959		
Sustainability Based Practices	0.705	0.809	0.501	0.692	1.175	1.102	1.203	

The HTMT matrix in Table 8 reveals a less favorable assessment than the cross-loading and Fornell–Larcker results. Although some comparisons fall below 0.90, multiple values exceed that reference point among CRM and sustainability dimensions. The criterion is therefore not satisfied throughout the measurement model, suggesting that parts of the construct structure may overlap conceptually. This limitation must be taken into account when interpreting the reported structural paths.

Overall, the cross-loading and Fornell–Larcker assessments provide evidence of discriminant validity, while the HTMT results indicate that discriminant validity should be interpreted with caution, particularly among several lower-order dimensions.

Structural Model Evaluation

The structural assessment considers the hypothesized construct relationships alongside their explanatory and predictive properties. It covers the degree of collinearity among predictors, bootstrap-based direct and indirect paths, the two proposed CRM interaction terms, R^2, and Q^2.

Collinearity Assessment

Potential collinearity is examined through the Variance Inflation Factor (VIF) to determine whether excessive correlations among predictor constructs may distort the structural model. VIF values below 5.00 indicate that there are no serious collinearity concerns.

Table 9
Collinearity Assessment

Construct Variable	VIF
CRM Capability -> Customer Loyalty	1.829
CRM Capability -> Customer Satisfaction	1.617
CRM Capability x Customer Satisfaction -> Customer Loyalty	1.131
CRM Capability x Sustainability_Based Practices -> Customer Satisfaction	1.197
Customer Satisfaction -> Customer Loyalty	1.721
Sustainability_Based Practices -> Customer Loyalty	1.894
Sustainability_Based Practices -> Customer Satisfaction	1.679

For the predictors listed in Table 9, VIF statistics range between 1.131 and 1.894. None approaches the stated cutoff of 5.00, so these reported estimates do not suggest serious predictor collinearity in the structural assessment.

Direct Effects and Hypothesis Testing

Direct relationships are assessed through the path coefficient (β), standard deviation, t-statistic, and p-value obtained through bootstrapping. Statistical significance is established when the p-value is below 0.05.

Table 10

Direct Effects

Hypothesis	Structural Relationship	Original Sample (O)	Standard Deviation (STDEV)	T statistics (|O/STDEV|)	P values
1	Sustainability_Based Practices -> Customer Satisfaction	0.378	0.094	4.008	0.000**
2	Customer Satisfaction -> Customer Loyalty	0.312	0.144	2.169	0.030**
3	Sustainability_Based Practices -> Customer Loyalty	0.096	0.129	0.742	0.458

*Note: * Significant at α = 0.10; ** Significant at α = 0.05.*

The findings suggest that Sustainability-Based Practices have a positive and statistically significant effect on Customer Satisfaction (β = 0.378; t = 4.008; p < 0.001). Accordingly, the evidence supports H1.

Customer Satisfaction also has a positive and statistically significant effect on Customer Loyalty (β = 0.312; t = 2.169; p = 0.030). Accordingly, H2 receives empirical support.

In contrast, Sustainability-Based Practices do not have a statistically significant direct effect on Customer Loyalty (β = 0.096; t = 0.742; p = 0.458). Thus, the evidence does not support H3.

Taken together, the direct-path estimates support an association between sustainability practices and customer satisfaction, as well as an association between satisfaction and loyalty. They do not support a separate direct association between sustainability practices and loyalty in this model.

Indirect Effects and Mediation Analysis

Bootstrapping is used to assess the indirect relationship to determine whether the effect of an antecedent construct on an outcome construct occurs through Customer Satisfaction.

Table 11

Indirect Effects

Hypothesis	Structural Relationship	Original Sample (O)	Standard Deviation (STDEV)	T statistics (|O/STDEV|)	P values
3a	CRM Capability -> Customer Satisfaction -> Customer Loyalty	0.109	0.056	1.960	0.050**

*Note: * Significant at α = 0.10; ** Significant at α = 0.05.*

Table 11 reports an indirect coefficient of 0.109 (t = 1.960; p = 0.050) for CRM Capability → Customer Satisfaction → Customer Loyalty. Because p = 0.050 is at the stated 0.05 decision boundary, this result is borderline and cannot be described unambiguously as significant under a strict p < 0.05 criterion. The reported numerical values are retained without modification.

The reported indirect path concerns CRM Capability, not Sustainability-Based Practices. Accordingly, Table 11 cannot establish that Customer Satisfaction mediates the relationship between Sustainability-Based Practices and Customer Loyalty. The original SmartPLS specific-indirect-effects output was not provided with the manuscript, so the identity of the originally estimated path cannot be independently authenticated using the available material.

H3a is therefore assessed only in relation to the path explicitly displayed in Table 11 and is treated as inconclusive at the strict 5% significance threshold. No indirect coefficient or significance decision is attributed to the Sustainability-Based Practices → Customer Satisfaction → Customer Loyalty path without its corresponding original output.

Moderation Effects

Interaction terms are used to evaluate the proposed moderating role of CRM Capability to determine whether CRM Capability changes the strength of the relationships between the predictor and outcome constructs.

Table 12

Moderation Effects

Hypothesis	Structural Relationship	Original Sample (O)	Standard Deviation (STDEV)	T statistics (|O/STDEV|)	P values
4	CRM Capability x Sustainability_Based Practices -> Customer Satisfaction	0.024	0.058	0.420	0.675
5	CRM Capability x Customer Satisfaction -> Customer Loyalty	-0.097	0.091	1.068	0.286

*Note: * Significant at α = 0.10; ** Significant at α = 0.05.*

The results show that the interaction between CRM Capability and Sustainability-Based Practices does not significantly affect Customer Satisfaction (β = 0.024; t = 0.420; p = 0.675). Consequently, H4 is not supported.

This result suggests that CRM Capability does not significantly change the strength of the relationship between Sustainability-Based Practices and Customer Satisfaction. The positive relationship between Sustainability-Based Practices and Customer Satisfaction therefore does not statistically vary according to the level of CRM Capability in the sample.

The interaction between CRM Capability and Customer Satisfaction also does not have a statistically significant effect on Customer Loyalty (β = −0.097; t = 1.068; p = 0.286). Consequently, H5 is not supported.

Although the interaction coefficient is negative, the effect is not statistically significant. Therefore, there is insufficient empirical evidence to conclude that CRM Capability changes the strength of the relationship between Customer Satisfaction and Customer Loyalty.

Overall, the moderation analysis does not provide empirical support for the proposed moderating role of CRM Capability in either relationship.

Coefficient of Determination (R^2)

The coefficient of determination (R^2) represents the share of variance in an endogenous construct that is explained by its predictor constructs.

Table 13

Coefficient of Determination

Construct	R-square
Customer Loyalty	0.300
Customer Satisfaction	0.410

According to Table 13, the model explains 30.0% of the observed variance in Customer Loyalty (R^2 = 0.300) and 41.0% in Customer Satisfaction (R^2 = 0.410). The respective unexplained shares are 70.0% and 59.0%. Thus, the included predictors account for part, but not all, of the differences in the two outcomes; additional influences remain outside the specified model.

Predictive Relevance (Q^2)

The reported predictive-relevance statistic is Q^2 = 0.587. Because this value is positive, it indicates predictive relevance under the criterion applied in the manuscript. It is not an explained-variance percentage: that interpretation belongs to R^2 rather than Q^2.

Goodness of Fit

No independently substantiated global fit indicator is available for the estimated PLS-SEM model. The earlier GoF calculation combined composite reliability with R^2 and is not relied upon here as proof of model fit. Interpretation instead rests on the documented path estimates, VIF values, explained variance, and predictive-relevance statistic; the data therefore do not justify a categorical claim of medium overall fit.

The structural estimates distinguish supported associations from unsupported ones. Sustainability-Based Practices predict Customer Satisfaction, and satisfaction predicts loyalty, whereas the direct sustainability–loyalty path and both proposed CRM moderating paths do not reach significance. Customer Satisfaction accordingly appears relevant to the relational value associated with sustainability in the reported model, but the results do not establish CRM moderation.

Discussion

The Effect of Sustainability-Based Practices on Customer Satisfaction

The first result establishes that Sustainability-Based Practices have a positive and statistically significant effect on Customer Satisfaction (β = 0.378; t = 4.008; p < 0.05). This result suggests that sustainability-based practices are relevant to how procurement professionals evaluate their relationships with suppliers in the Indonesian manufacturing context.

Behavioral Reasoning Theory offers one interpretation of the positive sustainability–satisfaction association: customers assess supplier practices partly through reasons they regard as favorable or unfavorable (Claudy et al., 2013; Fabio et al., 2025; Westaby, 2005). Environmental and social measures may improve the grounds on which procurement personnel judge a supplier, especially where they are connected to responsible operations, lower perceived risk, dependable service, and compatibility with buyer objectives. This interpretation explains the observed evaluation pattern without establishing a causal mechanism.

A related interpretation follows the Resource-Based View (Barney, 1991; Cao et al., 2022). Sustainable routines may contribute to customer value when integrated into actual operations and governance rather than presented as isolated claims. For industrial purchasers, perceived supplier performance can therefore incorporate sustainability alongside quality and delivery requirements. Such integration may help explain why respondents who rated sustainability practices favorably also reported greater satisfaction.

Thus, the significant relationship between Sustainability-Based Practices and Customer Satisfaction suggests that sustainability initiatives can contribute to positive customer evaluations when they are reflected in substantive business practices and relationship value.

The Effect of Customer Satisfaction on Customer Loyalty

The second result indicates that Customer Satisfaction has a positive and statistically significant effect on Customer Loyalty (β = 0.312; t = 2.169; p < 0.05). This result demonstrates that satisfaction is an important determinant of loyalty in B2B manufacturing relationships.

Relationship marketing theory places emphasis on favorable experiences that help sustain business ties (Aydın, 2025; Morgan & Hunt, 1994). In this setting, satisfaction with both supplier delivery and the broader working relationship may coincide with contract renewal, continued purchasing arrangements, and willingness to recommend the supplier. The positive coefficient

found in the model is consistent with this account, although the cross-sectional design does not establish the temporal order of these behaviors.

Loyalty in organizational purchasing encompasses more than the frequency of repeat orders. Preferences for an incumbent supplier, a continuing partnership, readiness to cooperate, and supportive referrals are also relevant (dan Dey, 2022; Dick & Basu, 1994; Oliver, 1999). The observed satisfaction–loyalty association is consequently consistent with the idea that accumulated evaluations of the supplier relationship are related to longer-term relational intentions.

The finding also suggests that loyalty in B2B manufacturing may depend more strongly on customers' evaluation of the overall relationship experience than on individual supplier attributes alone. Even when sustainability practices are valued, customers are more likely to maintain long-term relationships when those practices are accompanied by satisfactory supplier performance and relationship experiences.

The Non-Significant Direct Effect of Sustainability-Based Practices on Customer Loyalty

The third result indicates that Sustainability-Based Practices do not have a statistically significant direct effect on Customer Loyalty ($\beta = 0.096$; $t = 0.742$; $p > 0.05$). Thus, the evidence does not support H3.

This finding is important because it indicates that sustainability-based practices alone do not automatically generate customer loyalty in B2B manufacturing relationships. The result challenges the assumption that the adoption of sustainability practices will directly lead customers to maintain long-term relationships with suppliers.

Industrial purchasing often differs from consumer purchasing because multiple organizational participants consider commercial constraints. Price, product conformance, delivery dependability, contractual responsibilities, perceived risk, and service provision may all influence supplier retention (Arthur et al., 2024; Liu et al., 2020). Sustainability may strengthen a supplier's evaluation on one dimension without outweighing these other considerations. This offers a plausible, although untested, explanation for the absence of a statistically significant direct sustainability–loyalty path.

Viewed through Behavioral Reasoning Theory, sustainability-based practices may provide positive reasons for favorable supplier evaluations, but these reasons may need to be translated into a satisfactory overall relationship experience before they contribute to stronger relational outcomes. This interpretation is consistent with the significant relationship between Sustainability-Based Practices and Customer Satisfaction and the significant relationship between Customer Satisfaction and Customer Loyalty.

Therefore, the non-significant direct effect does not imply that sustainability is irrelevant to customer relationships. Rather, the finding suggests that sustainability may create relational value through customer evaluations and satisfaction rather than through a direct path to loyalty.

The Mediating Role of Customer Satisfaction

The indirect-effect analysis reported in the current results shows a statistically significant indirect effect with a path coefficient of 0.109, a t-statistic of 1.960, and a p-value of 0.050. However, Table 11 specifies the tested indirect relationship as CRM Capability → Customer Satisfaction → Customer Loyalty.

Accordingly, this result indicates that Customer Satisfaction mediates the relationship between CRM Capability and Customer Loyalty, based on the structural relationship currently reported in the analysis. The finding suggests that CRM capability may contribute to customer loyalty indirectly when its implementation improves the customer's overall satisfaction with the business relationship.

The indirect-effect analysis reports $\beta = 0.109$, $t = 1.960$, and $p = 0.050$ for CRM Capability → Customer Satisfaction → Customer Loyalty. This result is borderline at the stipulated $p < 0.05$ threshold and does not represent an indirect Sustainability-Based Practices pathway.

The table is consistent with a possible indirect association between CRM Capability and Customer Loyalty through Customer Satisfaction; however, $p = 0.050$ does not provide

unambiguous support under the stated strict significance criterion. The original SmartPLS output is unavailable for further verification.

The Moderating Role of CRM Capability

The findings suggest that CRM Capability does not significantly moderate the relationship between Sustainability-Based Practices and Customer Satisfaction ($\beta = 0.024$; $t = 0.420$; $p = 0.675$). Consequently, H4 is not supported.

This result suggests that the positive relationship between Sustainability-Based Practices and Customer Satisfaction does not statistically vary according to the level of CRM Capability. In other words, higher CRM Capability does not significantly strengthen or weaken the contribution of sustainability-based practices to customer satisfaction in the sample.

A plausible interpretation relates to that procurement professionals may evaluate sustainability practices primarily based on their substantive implementation and observable outcomes rather than on the firm's customer relationship management mechanisms. If sustainability practices directly affect operational reliability, risk management, compliance, or business alignment, their contribution to customer satisfaction may occur independently of CRM capability.

The result provides an important qualification to the Resource-Based View. Although CRM Capability can represent an organizational capability for managing customer information and interactions, the existence of such a capability does not necessarily mean that it will strengthen the effect of every other organizational practice. The value of CRM may depend on how it is integrated with the specific resources and activities through which customer value is created.

The second moderation result shows that CRM Capability does not significantly moderate the relationship between Customer Satisfaction and Customer Loyalty ($\beta = -0.097$; $t = 1.068$; $p = 0.286$). Consequently, H5 is not supported.

Although the interaction coefficient is negative, the effect is statistically insignificant. Therefore, there is insufficient empirical evidence to conclude that CRM Capability changes the strength of the relationship between Customer Satisfaction and Customer Loyalty.

This result suggests that customer satisfaction contributes to loyalty regardless of the level of CRM Capability observed in the sample. Once customers experience a satisfactory supplier relationship, the continuation of that relationship may depend more strongly on the quality and consistency of supplier performance than on the firm's CRM capability.

Taken together, the moderation results suggest that CRM Capability does not function as a significant boundary condition in either of the proposed relationships. Therefore, firms should not assume that simply increasing CRM capability will automatically amplify the relationship between sustainability and satisfaction or between satisfaction and loyalty.

Overall Discussion

The pattern across the model is differentiated rather than uniformly positive. Sustainability-Based Practices are associated with greater Customer Satisfaction, and satisfaction is positively associated with Customer Loyalty. Yet neither the direct sustainability–loyalty relationship nor the two proposed CRM interaction effects has statistical support. The study therefore separates the value customers perceive from sustainability activities from evidence concerning the continuation of supplier relationships.

Among Indonesian manufacturing buyers, the results position overall satisfaction with a supplier as more closely related to loyalty than sustainability practices considered in isolation. Sustainability still matters in the reported estimates through its positive association with satisfaction. Its relational importance should therefore be discussed with reference to buyer evaluations rather than interpreted as automatic retention.

For supplier managers, an appropriate response is to make sustainability activities relevant to identifiable buyer needs. Delivery reliability, product and service quality, compliance, manageable risks, and fit with purchasing objectives are examples already emphasized in the study. CRM processes may support these efforts, but the non-significant interactions caution against assuming that investments in CRM alone will increase the strength of the observed

relationships.

The evidence also offers context-specific insight into B2B relationships in an emerging manufacturing market. In an environment where procurement decisions may be strongly influenced by performance, cost, reliability, risk, and contractual considerations, sustainability can contribute to favorable supplier evaluations without necessarily becoming a direct determinant of loyalty. This highlights the importance of understanding the mechanisms through which sustainability practices influence customer relationships rather than assuming a direct sustainability-to-loyalty relationship.

Theoretical Implications

First, the study differentiates the relationship of sustainability practices with satisfaction from their relationship with loyalty. A positive sustainability–satisfaction coefficient occurs alongside a non-significant direct coefficient for loyalty. The contrast suggests that sustainability-related assessments and retention outcomes should be treated as distinct empirical questions within B2B relationship research.

Second, the observed association between Customer Satisfaction and Customer Loyalty places customers' evaluations at the center of the reported relational results. This accords with scholarship linking assessments of supplier interactions and performance to continued relationships (dan Dey, 2022; Morgan & Hunt, 1994; Oliver, 1999), while remaining an association rather than proof of a causal transformation of supplier attributes into loyalty.

Third, the estimates offer evidence from Indonesian manufacturing purchasing relationships. In this setting, commercial decisions involve performance-related and contractual considerations, and the results indicate that sustainability aligns with satisfaction even though a direct link with loyalty is not established. This contextual distinction contributes to discussion of sustainability in industrial buyer–supplier relationships.

The findings also provide an important qualification to the proposed role of CRM Capability. Although CRM Capability represents an organizational capability for managing customer information, interactions, and responsiveness, its proposed moderating role is not empirically supported in either the Sustainability-Based Practices–Customer Satisfaction relationship or the Customer Satisfaction–Customer Loyalty relationship. This suggests that the existence of CRM capability does not necessarily alter the strength of these relationships in the studied context.

Practical Implications

In terms of managerial practice, the findings provide several implications for manufacturing companies seeking to translate sustainability investments into stronger customer relationships.

First, the non-significant direct sustainability–loyalty coefficient cautions suppliers against expecting retention solely from responsible-business initiatives. The practical value of these initiatives should instead be demonstrated through outcomes buyers can assess, such as dependable operations, manageable risk, service performance, compliance, and alignment with procurement priorities.

Second, sustainability programs should be evaluated from the buyer's perspective. Since the sustainability–satisfaction coefficient is positive and significant, manufacturers have reason to examine whether their initiatives deliver observable benefits to customers rather than merely satisfying internal or external compliance requirements.

Third, Customer Satisfaction merits attention as one indicator of relationship performance. Its positive association with loyalty suggests that buyer feedback can complement sustainability and operational metrics. Feedback from procurement personnel may clarify which supplier practices are experienced as valuable and which require improvement.

Fourth, increasing CRM Capability should not be treated as sufficient to intensify sustainability–satisfaction or satisfaction–loyalty relationships. Neither interaction was significant in the reported analysis. CRM activities are therefore best considered alongside efforts to improve the underlying service and supplier value rather than as a guaranteed mechanism for stronger loyalty.

Finally, communication about sustainability initiatives should be transparent and

supported by observable evidence of implementation. Firms should communicate sustainability initiatives in ways that clearly demonstrate their relevance to customer requirements and business outcomes. This approach may help customers better recognize the value of sustainability practices within the broader supplier relationship.

CONCLUSION

In the reported Indonesian manufacturing model, Sustainability-Based Practices show a positive association with Customer Satisfaction ($\beta = 0.378$; $p < 0.001$), and satisfaction is likewise positively associated with Customer Loyalty ($\beta = 0.312$; $p = 0.030$). A separate direct sustainability–loyalty association is not supported ($\beta = 0.096$; $p = 0.458$), nor are the two CRM Capability interactions ($p = 0.675$ and $p = 0.286$). The indirect estimate in Table 11 instead specifies CRM Capability → Customer Satisfaction → Customer Loyalty ($\beta = 0.109$; $p = 0.050$); it lies at the decision boundary and cannot establish mediation of sustainability effects. Accordingly, the findings distinguish sustainability-related customer evaluations from loyalty itself and offer qualified evidence relevant to Behavioral Reasoning Theory and the Resource-Based View, without demonstrating CRM moderation.

For manufacturing suppliers, the results favor sustainability efforts that produce benefits recognizable in customer relationships, including reliable deliveries, service quality, transparent communication, and risk management. Customer feedback remains important in determining whether such benefits are perceived. The cross-sectional approach and purposive selection limit causal and population-wide conclusions. Interpretation is further constrained by HTMT values above recommended thresholds, the unreported number of valid survey responses, and unavailable original SmartPLS output for verifying the indirect path. Subsequent work should report the analyzed sample, reassess construct distinctiveness, examine mediation with traceable model outputs, and extend testing across different buyers and longitudinal periods.

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AUTHOR CONTRIBUTION STATEMENT

All authors contributed to the development of this research. Agus Tandi, as the first author, was responsible for initiating the research concept, developing the research framework, collecting and analyzing the data, interpreting the results, and preparing the initial manuscript draft. Askar Baura and Shahnaz Alina Putri Nasution contributed to the development of the research ideas, academic supervision, methodological refinement, validation of the research findings, and final revision of the manuscript. All authors have read and approved the final version of the manuscript for publication and take responsibility for the integrity, accuracy, and transparency of all aspects of the research.

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