LAN TABUR: Jurnal Ekonomi Syariah
Journal homepage: https://lan-tabur.unikhams.ac.id/index.php/LT

Corporate Social Responsibility Influences Green Innovation through Company's Ability in companies in Indonesia

Yona Octiani Lestari[1*], Eka Ananta Sidharta[2*], Nur Fadjrih Asyik[3*], Rusdiyanto[4*]

[1]Universitas Islam Malang Maulana Malik Ibrahim Malang, Indonesia
[2]Universitas Negeri Malang, Indonesia and Universitas Internasional Semen Indonesia
[3]Indonesian College of Economics Surabaya (STIESIA), Indonesia
[4]Universitas Wijaya Putra, Indonesia

ARTICLE HISTORY

Received:
28 July 2026
Revised
10 Agustus 2026
Accepted:
10 September 2026
Online available:
21 September 2026

Keywords:
CSR;
Green Innovation;
Company's Aility;
Indonesia;
SEM-PLS;
SmartPLS

*Correspondence:
Yona Octiani Lestari[1*]
E-mail:
yona@akuntansi.uin-malang.ac.id

ABSTRACT

This study examines the mediating role of organizational capacity in the relationship between CSR and green innovation. This study is important for understanding how CSR can encourage environmentally friendly innovation through the strengthening of internal organizational capacity. Data from structured online questionnaire (distributed digitally) comprising 151 recycling firms from 13 regions in Indonesia was used in this quantitative study. PLS-SEM was performed with SmartPLS to test the mediating role of company capabilities in the CSR-to-green innovation relationship. Analyses included confirmatory factor analysis (CFA), correlation analysis, multicollinearity tests, reliability analysis, predictive relevance (Q^2) for the model, common method bias tests, and structural model (bootstrapped path coefficients) tests. Our empirical findings confirm that company capabilities serves as an essential mediation for CSR and green innovation relationships in the recycling sector in Indonesia. These findings underscore the urgent need for long-term commitment and strategic alignment to tackle the high upfront costs and barriers to changes in sustainable practices among recycling firms in developing economies, particularly Indonesia. CSR has a positive and significant effect on green innovation, with company capabilities acting as a mediator that strengthens this relationship. These findings confirm that CSR can serve as a strategic resource for fostering environmentally friendly innovation and improving firm competitiveness. This study is limited to green innovation as a mediating variable and uses cross-sectional data. Therefore, future research is recommended to include additional mediating variables, such as economic, environmental, and technological factors, and to adopt a longitudinal design to examine the relationships among variables more comprehensively and dynamically

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

1. Introduction

Real-time innovations in operation, finance, competitiveness and product are necessary for modern businesses, all while minimizing detrimental environmental externalities. At present, environmental imperatives have moored global economic narratives on sustainability for longevity (Rajak et al., 2022). The Triple Bottom Line approach states that sustainability aims to balance economic, social and ecological aspects to achieve growth that meets the needs of the present without sacrificing the ability of future generations to satisfy their own needs (Giddings et al., 2002). Some manufacturing firms have incorporated sustainable practices in strategic actions. Individual acts of participation in sustainability initiatives are deeply impacted by personal sustainability mindfulness and attitudes (Rosati et al., 2018). It embeds the CSR efforts in corporate responsibility to promote the wellness of society and progressive growth (L. Han et al., 2025). Green innovation is an evolutionary stage ending corporate social responsibility as the most important strategic lever for sustained sustainability (driven by product, process, and governance innovation) (Wu & Tham, 2023). Specifically, recycling is a primary technique to curb resource depletion and mitigate environmental deterioration (Korhonen et al., 2018).

Stakeholder theory suggests that organisations have an obligation to consider the different interests of multiple constituents, including consumers, staff, local communities and the larger environment (Freeman et al., 2010). Corporate competencies are shown in the setting of CSR the most direct indicator of good corporate behavior playing a central role in this domain of Indonesia recycling industry (Almasyhari et al., 2025). Sustainable organizational practices along with green innovation reinforce sustainable stakeholder relationships and competitive advantage (Liu et al., 2022), which in turn leads to superior organizational performance (Ahmed et al., 2020). In the 40th session of the UNESCO General Conference in 2019, Indonesia reiterated its commitment to green innovation efforts. Data from the Ministry of Industry and Indonesian Recycling Association also indicate that the sector has the potential to process 2.54 million tonnes of waste on an annual basis, and provides around 3 million job possibilities (Waluyo, 2024). However, the National Waste Management Information System records the total waste generation, which approaches 33 million tons each year with 40.06% left unhandled (Gutama & Iresha, 2023). These statistics indicate continuing issues with national waste management and comprehensive social responsibility practices. Eco-sustainability approaches have been widely investigated in many settings such as listed corporations on the Pakistan Stock Exchange , Pakistani manufacturers , manufacturing companies in Ecuador , and CSR-rated entities on the Indonesia Stock Exchange. In addition, scholars have studied Indonesian small and medium enterprises, as well as service sector organisations in the Maldives and Morocco (Pablo & Sarsale, 2026). However, these studies largely focus on sustainability impacts on firm capabilities, CSR and green innovation, but explore the social dimension less. In the present study, the research targets the recycling sector in Indonesia to filling the literatures gaps in a holistic sustainability perspective, because the literatures gaps are interesting to be the attention.

The following part details the theoretical background and development of the hypothesis. Then an entire description of data collection methods and research methodology is presented. This is followed by an interpretation of its main results through a thorough topical analysis. This final part discusses limitations of the studies, theoretical and practical implications, and suggestions for future research.

2. Literature Review

The stakeholder theory believes that corporations are responsible for taking care of the requirements and interests of different stakeholder groups such customers, employees, communities and the natural environment (Freeman et al., 2010). This research views business Social

Responsibility as a tangible expression of business accountability to stakeholders, focusing on recycling programs in Indonesia (Sidharta et al., 2025) And by implementing sustainability principles and green innovation, companies are able to enhance stakeholder relations and internal capabilities (Faraz et al., 2025). This contribution then enhances firm performance because satisfied stakeholders and secure environments ensure the continuity of operations and the effective realization of corporate objectives (SUJARTO & CHARIRI, 2025).

According to stakeholder theory, organisations need to integrate the varied expectations of all stakeholders into their strategic decision-making frameworks, hence positioning the execution of CSR as a crucial part of strategic management (Freeman et al., 2010). Amidst the global climate crisis, organizational capabilities play a vital mediating role between CSR and green innovation. Strong capabilities drive firms to respond to stakeholder pressures effectively, which in turn facilitates sustainable green innovations and creates value for all stakeholders (M. A. Hossain et al., 2025).

Green innovation is the extent to which a business incorporates social, economic, and environmental factors into its evaluation frameworks (Dwikat et al., 2023). The main components of sustainability for the company are environmental performance, which is reflected in the reduction of the consumption of natural resources in production processes as well as in the usage of renewable resources (Sarfraz et al., 2023). Economic execution is examined by total compensation development, piece of the pie, and clients development (Khan et al., 2024), in the mean time social execution is connected to commitments to local area prosperity, representative prosperity, and offering safe and healthy work environment (Elshaer et al., 2023). CSR embodies a moral obligation towards green innovation, environmental sustainability, and social welfare (Elkington, 1997). CSR programs address environment, social and product issues (Singh et al., 2020). In addition, superior performance of firm can be achieved when firm relatively utilizes a strategy of cost leadership, differentiation or market focus (Porter, 2008).

CSR implementation was found to benefit green innovation (Sabihaini et al., 2024). Growing implements that the increase of extended financial increase through online systems device now not solely promoting efficient utilization of resources, lowering emissions, and minimization of waste however it is additionally a essential dimension of CSR (Hamdi et al., 2025). According to (Laily et al., 2025) Complementing the efforts of competitive strategies applied in firms, competition is based on competitive strategies featuring cost leadership, product differentiation, and innovative approaches to create a sustainable competitive advantage beyond simply addressing the fast-growing challenges simultaneously (Sabihaini et al., 2024) dynamic market characterized by crises (Kumar & Sharma, 2021). These strategies not only provide new market prospects but also enhance corporate reputation and brand equity (Adewole, 2022). They also lead to better financial performance and improve the level of competitiveness both at the national and international level (Suthar et al., 2026). For firms, this means that incorporating CSR into successful competitive strategies must be a priority to ensure sustainable development and long-term competitive advantage in a rapidly changing business environment (Cao et al., 2022).

The implementation of corporate social responsibility activities strongly encourages green innovation (B. Han et al., 2025). This relationship happens because CSR practices promote waste reduction, resource utilisation, and the application of environmental technology, which result in lower operational costs and more productivity (Anzola-Román et al., 2024). However, the effect of CSR on green innovation is not necessarily direct, but typically mediated by specific company competencies that allow organisations to utilise the benefits of green innovation for improved competitive value (Sidharta et al., 2026). Through the combination of these competences, enterprises are able to incorporate CSR into their operations more thoroughly, which results in maximising cost efficiencies and gaining a larger market share (Nollet et al., 2016). Therefore, internal organisational skills

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

enhance this mediating mechanism, as well as the total economic benefits from the relationship between CSR and green innovation (Padilla-Lozano & Collazzo, 2021).

We base this mediation model on stakeholder theory, which provides that firms should respond to multiple stakeholder interests in their strategic decision-making (Freeman et al., 2010). As mediators, corporate capabilities allow organizations to appropriately meet stakeholder expectations, while further reinforcing the connection between corporate social responsibility (CSR) and success in green innovation (Jones et al., 2018). Organizational capabilities, therefore, act like strategic bridges through which CSR generates value for the organization (Weerakoon & McMurray, 2024). The study draws on this framework and formulates the following hypotheses.

H1: CSR has a positive influence on CA
H2: CA have a positive impact on GI
H3: CSR has a positive impact on GI
H4: CSR positively impacts GI through the mediating role of CA.

Based on theoretical synthesis and empirical evidence contributed through four tested hypotheses using the results of the SmartPLS algorithm, we applied the conceptual framework of the study. The Overall model as illustrated by the following figure in which CSR has a positive effect on sustainable performance mediated by green innovation in recycling companies in Indonesia as the research outcome. PLS-SEM AnalysisThe PLS analysis indicates that path coefficients are significant and the mediating effect of green innovation has been recognized for the three critical relationships, so that the research framework can be expressed as follows:

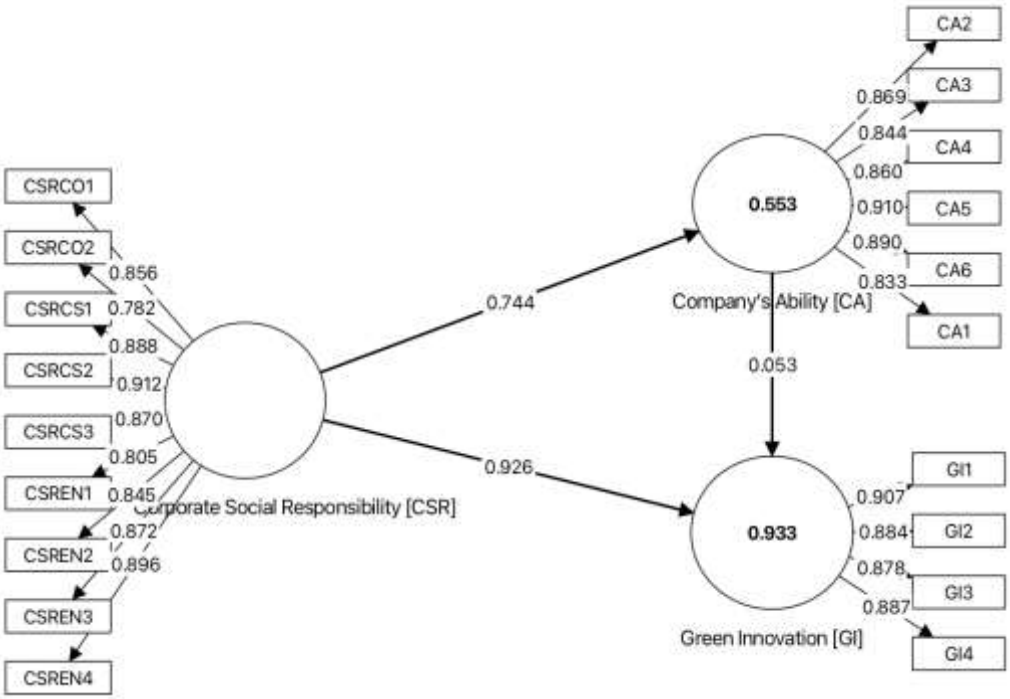


Figure 1: Research Model Framework (SmartPLS Algorithm Results).

3. Methodology

This quantitative study investigates the vital mediating role of business capabilities between corporate social responsibility and green innovation. Data were analysed using partial least squares structural equation modelling with SmartPLS and bootstrapping to validate the path coefficients. It improves the stability of the results and elucidates interactions among variables. Research Model Framework Based on SmartPLS algorithm outputs (from figure 1)

Procedures and Data Collection

To collect primary data, a web-based survey containing a structured questionnaire (Google Forms) was conducted by distributing among company representatives identified through contact details obtained from official websites and social media profile pages. Multi-item measures based on a five-point Likert-type scale identified interconnections among variables that were determined prior. The study research includes independent, dependent, mediating and control variables. Measurement items were carefully refined for reliability of responses and to minimize bias, and full details are available in Appendix Table 1.

Population and samples

The unit of analysis of this research is a corporation in the recycling sector in Indonesia that applies a waste bank system and transforms trash into economic output with added value. Due to the lack of previous studies in recycling contexts, this sector was chosen. Furthermore, it is proactively promoting sustainability initiatives and becomes new alternative solutions for environmental problems with a huge potential to grow in Indonesia.

Method of Data Analysis

Descriptive statistics were used to profile the respondents and to characterise the recycling enterprises under inquiry in the present study. The data acquired were analysed using the structural equation modeling-partial least squares approach through SmartPLS to investigate the mediating effect of Company's Ability (Ringle et al., 2020) and output of smartplS software was begins to develop the model with few steps. The analyses included confirmatory factor analysis (CFA), correlation, multicollinearity, reliability, model predictive relevance (Q^2), common method bias tests and structural model testing (bootstrapped path coefficients).

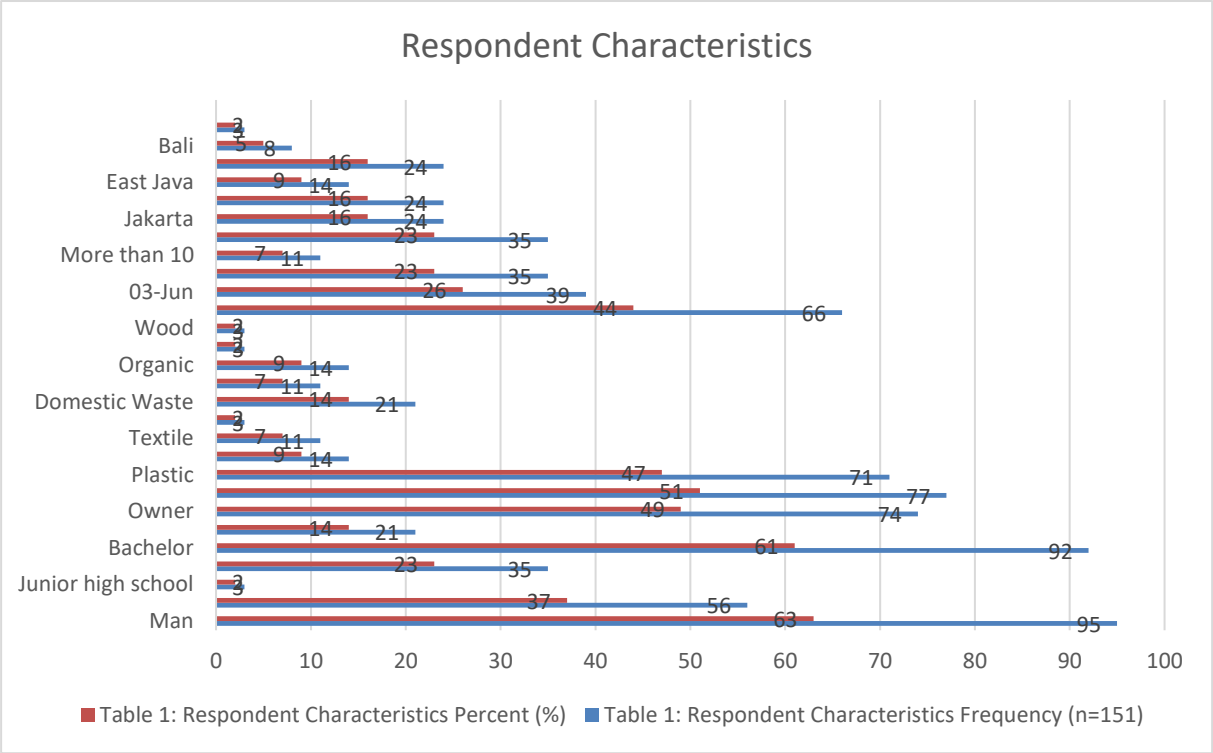
4. Results And Discussion

Research Respondent Data

Data were collected using 241 questionnaires issued to the recycling companies in Indonesia, and a total of 151 valid replies were obtained, giving the response rate of 62.7%. Table 1 shows the respondents' characteristics of gender, education level, and employment position, which are used to explore in more detail in the following paragraph. In addition, the characteristics of the firm such as type of recycled material, operational duration and breakdown status are further detailed. These descriptive analyses provide a complete overview of the characteristics of the study sample in terms of participants' demographics and organizations' profiles.

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

Table 1: Respondent Characteristics



The table 1 out of 151 genuine responses, most of the respondents were male, 95 (63%) as opposed to 56 (37%) female respondents. Regarding education, the sample was led by bachelor's degree holders (92 respondents, 61%), followed by master's degree holders 21 (14%), senior high school graduates 35 (23%), and junior high school graduates 3 (2%). In terms of the work status, 77 respondents (51%) were managers and 74 (49%) were owners. In terms of firm characteristics, the most common recycling material handled was plastic, reported by 71 respondents (47%), followed by household waste 21 (14%), paper and organic waste 14 (9%), textile and used cooking oil 11 each (7%), and glass, electronic waste and wood 3 each (2%). Regarding business experience, 66 respondents (44%) have been running a firm for less than three years, 39 (26%) for 3–6 years, 35 (23%) for 7–9 years, and 11 (7%) for more than 10 years. Based on geographical location, respondents from Yogyakarta were the most, as many as 35 respondents (23%), then respondents from Jakarta, Central Java, and West Java, each of which was 24 (16%), East Java was 14 (9%), Bali was 8 (5%), and Riau was 3 (2%). This trend indicates a heterogenous, analytically relevant sample for respondent-characteristics analysis.

Measurement Model And Confirmatory Factor Analysis (CFA)

In line with the two-step approach suggested by (Gerbing, 1988), this research performed statistical analysis in steps to guarantee a thorough evaluation of model quality. In the first stage, confirmatory factor analysis (CFA) assessed the measurement model using Smart PLS-SEM and determined indicator validity and reliability. The following stage explored structural relationships between latent constructs to extract meaningful causal insights. This approach, to be performed before model examination for structure, is in accordance with current PLS-SEM guidelines (Sarstedt et al., 2021). confirmatory factor analysis (CFA) results and the measurement properties are reported in Table 2.

Table 2: Measurement Model and Confirmatory Factor Analysis

Constructs and the sources of the measures	VIF Value	Standardized Loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Company's Ability (CA)						
CA1	**2.741**	0.833				
CA2	3.235	0.869				
CA3	**2.588**	0.844	0.934	0.937	0.948	0.753
CA4	3.289	0.860				
CA5	3.012	0.910				
CA6	3.566	0.890				
Corporate Social Responsibility						
CSRCO1	3.431	0.856				
CSRCO2	**2.503**	0.782				
CSRCS1	3.323	0.888				
CSRCS2	**3.205**	0.912	0.956	0.957	0.962	0.739
CSRCS3	3.520	0.870				
CSREN1	**2.382**	0.805				
CSREN2	**2.994**	0.845				
CSREN3	3.573	0.872				
CSREN4	2.614	0.896				
Green Innovation						
GI1	3.151	0.907				
GI2	**2.709**	0.884	0.912	0.913	0.938	0.790
GI3	**2.622**	0.878				
GI4	**2.755**	0.887				

Source: Authors' calculation using SmartPLS 3.1

The results of confirmatory factor analysis reveal that all the constructs have met the required validity and reliability thresholds. The Company's Ability (CA) construct has Cronbach's alpha of 0.934, rho_A of 0.937, composite reliability of 0.948, and AVE of 0.753. All CA1–CA6 indicators have high standardised loadings from 0.833 to 0.910, with VIF values ranging from 2.588 to 3.566. The CSR construct also shows satisfactory internal consistency as evidenced by a Cronbach's alpha of 0.956, rho_A of 0.957, composite reliability of 0.962, and AVE of 0.739. All the CSRCO1–CSREN4 indicators have loadings between 0.782 and 0.912 and good VIF values. The Cronbach's alpha for the Green Innovation (GI) construct is 0.912, rho_A is 0.913, composite reliability is 0.938, and AVE is 0.790. The loadings for the GI1–GI4 indicators are high (0.878–0.907) and the VIF values are between 2.622 and 3.151. In general, all AVE values are higher than 0.50 and all composite reliability values are higher than 0.70, showing the appropriate convergent validity and reliability . These results are consistent with the current PLS-SEM guidelines that high loadings, CR > 0.70 and AVE > 0.50 imply a sufficient measurement quality (Hair et al., 2026).

Correlation, Multicollinearity, Reliability

Means, standard deviations, and zero-order correlations are reported in Table 3. The correlation analysis suggests coefficients way below the 0.75 guidelines for multicollinearity conservative

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

absence. Inter-variable correlations varied between 0.132 and 0.616. Interjurisdictional Variance Inflation Factor (VIF) results further provide values below 5.00 confirming that no structural collinearity issues may arise in this analysis (Sarstedt et al., 2021). Construct discriminant validity was assessed using Fornell-Larcker criterion as well as HTMT ratios, which were presented in Tables 3 respectively, so that square roots of AVE values (0.71-0.86) are higher than inter-construct correlations, therefore fulfilling the requirements of the discriminant validity condition (Henseler et al., 2015).

Fornell-Larcker and HTMT Criterion Assessment

Diagonal AVE square roots exceeds all off-diagonal correlations meaning that Fornell-Larcker criterion holds and all HTMT ratios are below conservative 0.90 threshold. The external VIF of the factors are listed in Table 3. Such metrics that are aligned with updated PLS-SEM evaluation guidelines provide assurance of the measurement model quality before any structural analysis is performed (Sarstedt et al., 2021).

Table 3: Descriptive statistics: means, standard deviations, zero-order correlations and HTMT

Variable	Mean	Standard Deviation	CA	CSR	GI
Company's Ability	0.000	0.554	0.768		
Corporate Social Responsibility	0.000	0.516	0.744	0.760	
Green Innovation	0.000	0.421	0.742	0.765	0.789
Heterotrait-Monotrait Ratio (HTMT)					
Company's Ability	0.000	0.554			
Corporate Social Responsibility	0.000	0.516	0.783		
Green Innovation	0.000	0.421	0.801	0.834	

Source: Authors' calculation using SmartPLS 3.1

The table 4 mean values for Company's Ability, Corporate Social Responsibility, and Green Innovation are 0.000 for each, with standard deviations of 0.554, 0.516, and 0.421 respectively. The zero-order correlations imply that the variables are strongly positively correlated. CA–CSR is 0.768 and CA–GI is 0.742. CSR and GI are similarly highly associated at 0.789 The HTMT results also show discriminant validity as all the values are less than the threshold of 0.90, with CA–CSR and CSR–GI being 0.783 and 0.834, respectively. This implies that the three constructs are sufficiently distinct and suitable for further analysis, in line with current recommendations of PLS-SEM (Sarstedt et al., 2021).

Model Predictive Accuracy

Model's prediction accuracy was evaluated using R^2, Q^2 and f^2 measures. These measures measure the model's ability to explain the endogenous variation and predict out-of-sample data as given in the table below. This methodology follows the accepted PLS-SEM standards of assessing explanatory and predictive utility. (Sarstedt et al., 2021).

Table 4: R^2 and adjusted R^2; Q^2 and effect size.

Variable	R^2	Adjusted R^2	Q^2 predict	RMSE	MAE	Effect Size
"Company's Ability"	0.553	0.550	0.547	0.681	0.518	Medium
"Green Innovation"	0.933	0.932	0.931	0.266	0.211	Large

Results from Table 5: a table structural model in green entrepreneurship literature. For the Companys Ability (CA) variable: R square = 0.553 (adjusted R square = 0.550), Q^2_predict = 0.547, RMSE =

0.681, MAE = 0.518 and medium effect size have demonstrated moderate predictive relevance for the endogenous variable. On the other hand, it obtains exceptionally high R^2 (0.933; adjusted R^2 = 0.932), Q^2_predict = 0.931, RMSE = 0.266, MAE = 0.211 i.e. large effect size which means that it also exhibits high predictive relevance and high effect size (Hair et al., 2021).

Table 5: f^2 Values.

Variable	CA	GI
Company's Ability		0.219
Corporate Social Responsibility	0.238	0.248

Source: Authors' calculation using SmartPLS 3.1

The table 6 f^2 values of Green Innovation is 0.219, the influence of Corporate Social Responsibility on Company's Ability and Green Innovation are 0.238 and 0.248, respectively. All values are in the medium group as per the PLS-SEM criterion, as they are greater than 0.15 and less than 0.35. This suggests that the predictor variables contribute meaningfully to the endogenous variables. The impacts are nevertheless not large. The results indicate that CA, CSR, and GI are substantively relevant in the structural model and should be preserved for further investigation (Hair et al., 2021).

Common Method Bias Assessment

However, with self-reported survey data analytical integrity should be preserved by conducting thorough common method bias (CMB) tests (Podsakoff et al., 2012). Multi-method procedures were used: Harman's single-factor test explained 24.67% of variance (below the 50% threshold) indicating no significant CMB. As additional validation responding to validity critiques of Harman's (Hair Jr et al., 2020) test the latent variable approach produced inner VIF <3. 3, confirming lack of common method bias (Kock, 2015).

Structural Model Testing

The structural model was assessed using partial least squares structural equation modelling. The analysis consisted of route analysis by bootstrapping, confirmatory factor analysis and assessment of measurement parameters, summarised in the table below. Bootstrapping as a nonparametric approach was used to evaluate the statistical significance of path coefficients and other PLS-SEM parameters according to the current standard for variance-based SEM inference. This is consistent with the current reporting standards for PLS-SEM where the validated hypothesised relationships are considered before evaluating measurement invariance and model fit.

Table 6: Results of hypotheses testing [path coefficients bootstrapping]

Hypotheses	Relationships	Original Sample	Sample Mean	Standard Deviation	T Statistics)	P Values	Result
H1	[CSR] -> [CA]	0.744	0.740	0.045	16.436	0.000***	Sopport
H2	[CA] -> [GI]	0.053	0.052	0.029	1.824	0.069*	Sopport
H3	[CSR] -> [GI]	0.926	0.927	0.022	41.996	0.000***	Sopport
Mediating hypotheses							
H4	[CSR] -> [CA] -> [GI]	0.039	0.038	0.021	1.873	0.062*	Sopport

****sig<0,01 (1%), **sig<0,05 (5%), *sig<0,1(10%)*

The structural model of green entrepreneurship based on PLS-SEM, the bootstrapping results presented in Table 1 provide empirical evidence for all hypotheses. Finally, the Corporate Social Responsibility (CSR) to Companys Ability (CA) significant path is indicated by Hypothesis H1 suggesting a strong influence of CSR to firm capabilities (Zheng et al., 2025), with a path coefficient

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

of 0.744 (M = 0.740; STDEV = 0.045), T-statistic = 16.436, p = 0.000*** (Sarstedt et al., 2021). Although weak, H2 (M = 0.052; STDEV = 0.029) supports the relationship between CA and Green Innovation (GI) at the 0.053 level of significance (T= 1.824, p = 0.069*), consistent with evidence that internal capabilities slightly spur green innovation (Sarstedt et al., 2021).

The strongest is H3, CSR → GI 0.926 (M = 0.927; STDEV = 0.022), T = 41.996, p = 0.000*** as CSR as the first important predictor of sustainable innovation. This is corroborated by H4 (CSR → CA → GI) indicating partial mediation (0.039) (M = 0.038; STDEV = 0.021), T = 1.873, p 0.062*, where CA operates as a partial mediator as expected based on the resource-based view of AI in sustainability (Richter et al., 2022).

In essence, the model highlights the importance of CSR in improving firm level and innovation in green categories, and 1%, 5% and 10% significance levels. These results are in line with PLS-SEM developments that lately have highlighted that bootstrapping provides inference robustness in PLS-SEM (Sarstedt et al., 2021). Original sentence Future research may indicate moderators such as government regulations. The path diagram illustrating outer loadings, path coefficients, and bootstrapping p-values is presented in the following figure:

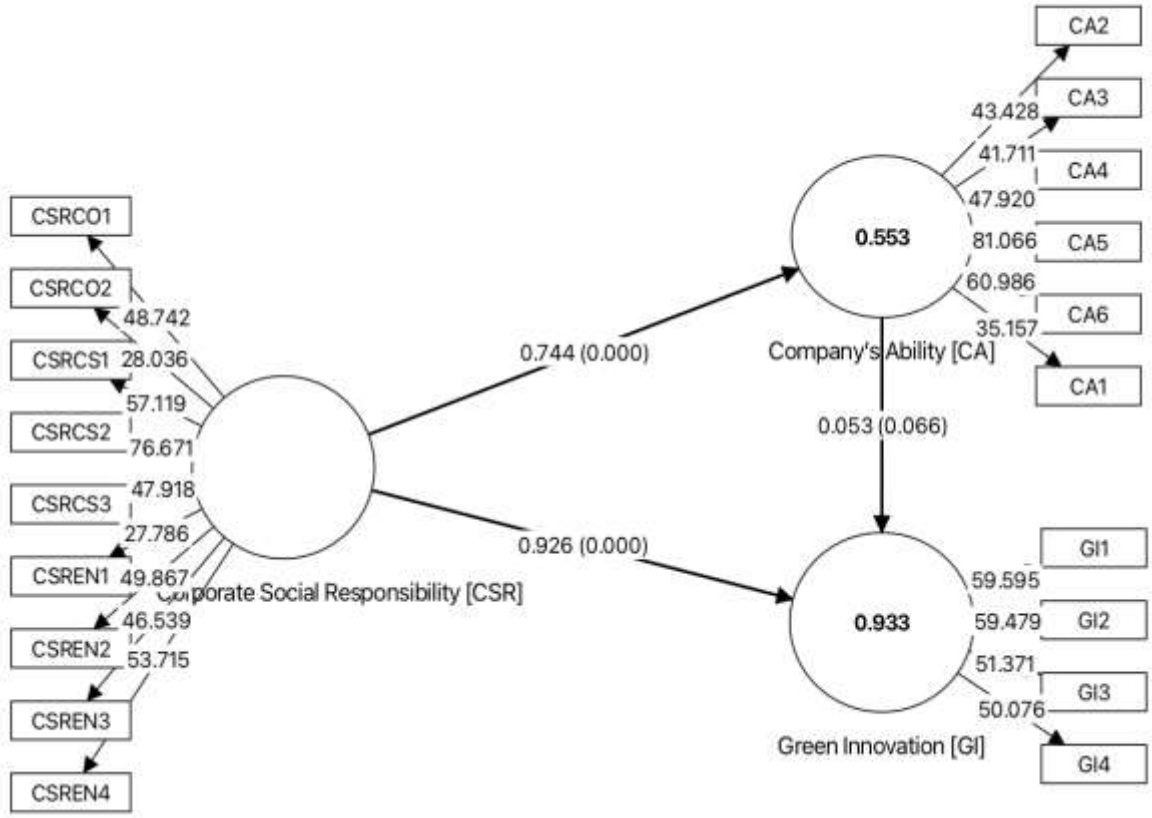


Figure 2: Path diagram Bootstrapping

Discussion

This study sheds light on the various challenges that hinder the recycling ecosystem for green innovation, especially based on the Indonesian context (I. Hossain et al., 2026). In addition, it studies the mediating effect of organizational capabilities during the process of CSR drives green innovation (Xiao et al., 2024). Green innovation is more directly under the influence of customer- or community- or green-related CSR initiatives. However, without synergistic integration of green innovation strategies, they will bring limited results on other CSR dimensions (Dewi et al., 2024).

CSR principles can guide the efficient and fair use of corporate resources towards achieving better CSR outcomes (Putra et al., 2023). CSR practices can play an important role not only in conserving the ecosystem but also strengthening the bounty of social relations with the surrounding community (Lestari & Suyanto, 2024). In addition, CSR adoption and promotion has been significantly positively correlated with a firms pursuit of excellence, leading to an increase of green innovation (Ma et al., 2022). However, this capability's mediating role has significant limitations (Simmou et al., 2023), which indicates that CSR's positive influence on green innovation is still in its infancy (Padilla-Lozano & Collazzo, 2021). Therefore, greater strategic alignment and investment are needed to maximise the long-term benefits of CSR adoption (Hael et al., 2025).

Organisational capabilities are important strategic resources that have a profound impact on all elements of green innovation and also have a strong mediating effect on the relationship between green innovation and corporate social responsibility (Ameen et al., 2023). This has facilitated firms to optimally complement their resources and core competencies, consequently creating sustainable value for competitive advantage (Ameen et al., 2023). However, organizations adopting CSR together with the environmentally friendly process innovation are more able to repeat their capabilities in the recycling industry (Xu et al., 2023). For recycling organisations, converting Corporate Social Responsibility into unique business strategies that are hard for competitors to copy is imperative (Sidharta et al., 2026). Green innovation, process efficiency, and product differentiation are among the approaches that enable this translation and are crucial to addressing market difficulties and enabling the fulfilment of organisational capability goals (Sarfraz et al., 2023). Thus, a firm's capability serves as an important capability that is crucial in promoting green innovation (Sidharta et al., 2026).

The research contends that corporate social responsibility measures, if performed in isolation, are insufficient to guarantee sustainability within the recycling industry (Sidharta et al., 2026). The report recommends an integrated framework of CSR, organisational competencies and green innovation for long term viability. This sustainability comes about from the interplay between CSR, green innovation and competitive success (Padilla-Lozano & Collazzo, 2021). In the Indonesian context, the recycling sector has limited domestic supply and poor recycling rates (Sae-Ueng et al., 2026). Although there are promising companies, the approach needed to cope with regional economic gaps is still unclear. Future research should thus study how regional stakeholder imbalances affect the adoption and longevity of CSR practices in mature businesses. Further study is also needed to identify the drivers of CSR and establish frameworks for sustaining competitiveness in an increasingly green-innovation-sensitive market.

5. Conclusion

The findings reveal that corporate social responsibility has a favourable and considerable influence on green innovation. In addition, corporate competencies play a mediating role in this relationship. It is an important resource endowment that can help enterprises to better engage in ecologically sound innovations. To remain competitive in a fast-changing market scene, recycling firms should implement integrated approaches with green innovation, operational efficiency, and product differentiation working in tandem. The paper calls for future studies on the impacts of digital technologies and the circular economy on sustainable performance. We believe that our findings call for more research on how firms adapt their business strategies to meet climate change as well as other strict environmental regulations in a way that maximizes the achievement of sustainable development goal and their overall competitiveness.

The significant learning in this mediation model provides a theoretical contribution to the literature by explaining the reinforcement mechanism between CSR and green innovation at the corporate level through company capabilities, which may be particularly relevant in the context of

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

the global crisis around climate. It builds on stakeholder theory by placing company capabilities as a major mediator between CSR and green innovation. This paper allows new ways of internal organizational capabilities in order to achieve powerful CSR strategies to foster sustainable green innovation.

In this research only green innovation was considered as mediating variable and the rest of the variables [economic, environmental, technological, etc] were not identified as mediating variables. Cross-sectional data: The design ignores temporal feedback and changes in the relationship between variables. Further research is encouraged to include other internal and external predictors of sustainable performance. An longitudinal approaches would allow for tracking the long-term dynamics of these variables. Expand sampling to different industry sectors for generalizability.

Author contribution statement

YOL, EAS, NFA, and R all worked together to write the manuscript, do the research, and make changes to the final version. They made the research hypotheses, built the theoretical framework, and oversaw the whole investigation. They also kept an eye on the study's progress and made sure that the methods were sound. After a thorough review, YOL, EAS, NFA, and R revised and approved the final manuscript for submission.

Conflict of Interest

None

Declaration of generative AI use and AI assistance

Authors independently selected methods, collected data, and performed PLS-SEM statistical analysis and interpreted the findings in designing, executing, and analyzing this research. We employed ChatGPT solely for cleaning up language, paraphrasing, and enhancing wording and coherence, while not allowing it to affect the scientific message. The authors bear full responsibility for the use of the data and methods and for the paper itself. Independent English language services edited the manuscript professionally to meet the requirements of international journal publication.

References

Adewole, O. (2022). “Issues emanating from business impact on climate, environmental sustainability and CSR (Corporate Social Responsibility): steps towards pragmatism in extant realities”: “Brand translation to equity from ‘CSR as a potential tool in climate change mitigation and enhancing financial performances in organizations.” *International Journal of Corporate Social Responsibility*, *7*(1), 6. https://doi.org/10.1186/s40991-022-00073-1

Ahmed, W., Ashraf, M. S., Khan, S. A., Kusi-Sarpong, S., Arhin, F. K., Kusi-Sarpong, H., & Najmi, A. (2020). Analyzing the impact of environmental collaboration among supply chain stakeholders on a firm’s sustainable performance. *Operations Management Research*, *13*, 4–21.

Almasyhari, A. K., Rachmadani, W. S., & Sari, Y. P. (2025). Strategic decision-making: Linking corporate choices, social responsibility, and environmental accounting in waste management. *Social Sciences & Humanities Open*, *11*, 101404.

Ameen, N., Papagiannidis, S., Hosany, A. R. S., & Gentina, E. (2023). It’s part of the “new normal”: Does a global pandemic change employees’ perception of teleworking? *Journal of Business Research*, *164*, 113956.

Anzola-Román, P., Garcia-Marco, T., & Zouaghi, F. (2024). The influence of CSR orientation on innovative performance: is the effect conditioned to the implementation of organizational practices? *Journal of Business Ethics*, *190*(1), 261–278.

Cao, C., Tong, X., Chen, Y., & Zhang, Y. (2022). How top management’s environmental awareness

affect corporate green competitive advantage: evidence from China. *Kybernetes*, *51*(3), 1250–1279.

Dewi, V. A. K., Hadiwibowo, I., & Azis, M. T. (2024). Green Innovation as a Mediator between CSR, Ownership Concentration, and Financial Performance. *International Research Journal of Business Studies*, *17*(3), 293–315.

Dwikat, S. Y., Arshad, D., & Mohd Shariff, M. N. (2023). Effect of Competent Human Capital, Strategic Flexibility and Turbulent Environment on Sustainable Performance of SMEs in Manufacturing Industries in Palestine. *Sustainability (Switzerland)*, *15*(6). https://doi.org/10.3390/su15064781

Elkington, J. (1997). The triple bottom line. *Environmental Management: Readings and Cases*, *2*, 49–66.

Elshaer, I. A., Azazz, A. M. S., & Fayyad, S. (2023). Green Management and Sustainable Performance of Small- and Medium-Sized Hospitality Businesses: Moderating the Role of an Employee's Pro-Environmental Behaviour. *International Journal of Environmental Research and Public Health*, *20*(3). https://doi.org/10.3390/ijerph20032244

Faraz, A. Z., Deng, Y., Arshad, S., & Rui, S. (2025). Digital transformation as a catalyst: linking green CSR to sustainable development through environmental strategy and innovation in Pakistani SMEs. *Kybernetes*.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). *Stakeholder theory: The state of the art*.

Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423.

Giddings, B., Hopwood, B., & O'brien, G. (2002). Environment, economy and society: fitting them together into sustainable development. *Sustainable Development*, *10*(4), 187–196.

Gutama, H., & Iresha, F. M. (2023). Evaluation of solid waste management effectiveness in Indonesia from 2019-2021: a geographic information system analysis. *IOP Conference Series: Earth and Environmental Science*, *1263*(1), 12067.

Hael, M., Belhaj, F. A., Hazaea, S. A., Eldaia, M., & Al-dalaien, B. O. (2025). A bibliometric and content analysis of the role of corporate social responsibility in enhancing competitive advantage. *Discover Sustainability*, *6*(1), 1118.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer.

Hair, J. F., Sharma, P. N., Chin, W. W., Sarstedt, M., & Ringle, C. M. (2026). A multimethod SEM framework for analyzing models with latent variables. *Journal of Global Marketing*, 1–16.

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101–110.

Hamdi, F. M., Ganbat, N., Altaee, A., Samal, A. K., Ibrar, I., Zhou, J. L., & Sharif, A. O. (2025). Hybrid and enhanced electrokinetic system for soil remediation from heavy metals and organic matter. *Journal of Environmental Sciences*, *147*, 424–450.

Han, B., Yang, Z., Zhou, J., & Wang, Y. (2025). How does social responsibility practice promote corporate green innovation? Based on the Mediating Effects Model of Double Chains. *Innovation and Green Development*, *4*(1), 100197. https://doi.org/https://doi.org/10.1016/j.igd.2024.100197

Han, L., Liu, T., Lu, H., & Zhang, W. (2025). Climate risk disclosure, green innovation and enterprise value. *Finance Research Letters*, *72*, 106553.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

Hossain, I., Ghosal, I., & Haque, A. K. M. M. (2026). *Green Policies for a Sustainable World*. Springer.

Hossain, M. A., Tat, H. H., & Rahman, A. A. (2025). The Impacts of Environmental Orientation, Social Media, Innovation Capabilities, and Marketing Management on Innovation Performance of Manufacturing SMEs in Bangladesh: A Mediated Moderation Model. *Journal of International Business and Management*, *8*(4), 1–30.

Jones, T. M., Harrison, J. S., & Felps, W. (2018). How applying instrumental stakeholder theory can provide sustainable competitive advantage. *Academy of Management Review*, *43*(3), 371–391.

Khan, S. A. R., Ahmad, Z., Sheikh, A. A., & Yu, Z. (2024). Green technology adoption paving the way toward sustainable performance in circular economy: a case of Pakistani small and medium enterprises. *International Journal of Innovation Science*, *16*(5), 801–822.

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of E-Collaboration (Ijec)*, *11*(4), 1–10.

Korhonen, J., Nuur, C., Feldmann, A., & Birkie, S. E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, *175*, 544–552.

Kumar, B., & Sharma, A. (2021). Managing the supply chain during disruptions: Developing a framework for decision-making. *Industrial Marketing Management*, *97*, 159–172.

Laily, N., Asyik, N. F., Wahyuni, D. U., Sari, J., & Rusdiyanto, R. (2025). The role of Green Business Strategy in mediating the relationship between environmental orientation and SMEs. *The Southern African Journal of Entrepreneurship and Small Business Management*, *17*(1), 13.

Lestari, N., & Suyanto, S. (2024). A systematic literature review about local wisdom and sustainability: Contribution and recommendation to science education. *Eurasia Journal of Mathematics, Science and Technology Education*, *20*(2), em2394.

Liu, Y., Pan, B., Zhu, X., Zhao, X., Sun, H., He, H., & Jiang, W. (2022). Patterns of microbial communities and their relationships with water quality in a large-scale water transfer system. *Journal of Environmental Management*, *319*, 115678.

Ma, S., Cui, X., Xiao, X., & Zhao, X. (2022). The impact of photo verification service on sales performance in the peer-to-peer economy: Moderating role of customer uncertainty. *Journal of Business Research*, *142*, 45–55.

Nollet, J., Filis, G., & Mitrokostas, E. (2016). Corporate social responsibility and financial performance: A non-linear and disaggregated approach. *Economic Modelling*, *52*, 400–407. https://doi.org/https://doi.org/10.1016/j.econmod.2015.09.019

Pablo, A. G., & Sarsale, M. (2026). MSMEs green practices: a bibliometric and systematic review. *Future Business Journal*, *12*(1), 166. https://doi.org/10.1186/s43093-026-00877-8

Padilla-Lozano, C. P., & Collazzo, P. (2021). Corporate social responsibility, green innovation and competitiveness – causality in manufacturing. *Competitiveness Review*, *32*(7), 21–39. https://doi.org/10.1108/CR-12-2020-0160

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology*, *63*(Volume 63, 2012), 539–569. https://doi.org/https://doi.org/10.1146/annurev-psych-120710-100452

Porter, M. E. (2008). *Competitive advantage: Creating and sustaining superior performance*. simon and schuster.

Putra, N. R., Yustisia, Y., Heryanto, R. B., Asmaliyah, A., Miswarti, M., Rizkiyah, D. N., Yunus, M. A. C., Irianto, I., Qomariyah, L., & Rohman, G. A. N. (2023). Advancements and challenges in green extraction techniques for Indonesian natural products: A review. *South African Journal of Chemical Engineering*, *46*(1), 88–98.

Rajak, S., Vimal, K. E. K., Arumugam, S., Parthiban, J., Sivaraman, S. K., Kandasamy, J., & Duque,

A. A. (2022). Multi-objective mixed-integer linear optimization model for sustainable closed-loop supply chain network: A case study on remanufacturing steering column. *Environment, Development and Sustainability*, *24*(5), 6481–6507.

Richter, N. F., Hauff, S., Ringle, C. M., & Gudergan, S. P. (2022). The use of partial least squares structural equation modeling and complementary methods in international management research. *Management International Review*, *62*(4), 449–470.

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2020). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, *31*(12), 1617–1643.

Rosati, F., Costa, R., Calabrese, A., & Pedersen, E. R. G. (2018). Employee attitudes towards corporate social responsibility: A study on gender, age and educational level differences. *Corporate Social Responsibility and Environmental Management*, *25*(6), 1306–1319.

Sabihaini, Kurniawan, A., Eko Prasetio, J., & Rusdiyanto. (2024). Environmental analysis and impact on green business strategy and performance in SMEs post the Covid-19 pandemic. *Cogent Economics & Finance*, *12*(1), 2330428. https://doi.org/10.1080/23322039.2024.2330428

Sae-Ueng, K., Nakason, C., & Chotikhun, A. (2026). Sustainable bamboo–plastic composites from upcycled chopsticks and post-consumer polypropylene: Effect of feedstock origin on interfacial adhesion and properties. *Advances in Bamboo Science*, 100246.

Sarfraz, M., Ozturk, I., Yoo, S., Raza, M. A., & Han, H. (2023). Toward a new understanding of environmental and financial performance through corporate social responsibility, green innovation, and sustainable development. *Humanities and Social Sciences Communications*, *10*(1). https://doi.org/10.1057/s41599-023-01799-4

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

Sidharta, E. A., Asyik, N. F., Rusdiyanto, R., Burhan, U., & Susilo, H. (2026). Green innovation, company's ability, and corporate social responsibility: Evidence from Indonesia's recycling industry. *Heritage and Sustainable Development*, *8*(1), 17.

Sidharta, E. A., Asyik, N. F., Rusdiyanto, R., Susilo, H., & Mustakim, M. (2025). The Role of Green Innovation in Strengthening CSR to Enhance Sustainable Performance in the Era of the Global Climate Crisis. *Complex Systems Informatics and Modeling Quarterly*, *2025*(44), 66–85. https://doi.org/10.7250/csimq.2025-44.05

Simmou, W., Govindan, K., Sameer, I., Hussainey, K., & Simmou, S. (2023). Doing good to be green and live clean! - Linking corporate social responsibility strategy, green innovation, and environmental performance: Evidence from Maldivian and Moroccan small and medium-sized enterprises. *Journal of Cleaner Production*, *384*. https://doi.org/10.1016/j.jclepro.2022.135265

Singh, S. K., Giudice, M. Del, Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, *150*. https://doi.org/10.1016/j.techfore.2019.119762

SUJARTO, V. N., & CHARIRI, A. (2025). *THE MEDIATION EFFECT OF FINANCIAL DISTRESS ON THE RELATIONSHIP BETWEEN ESG PRACTICES TO FINANCIAL STATEMENT FRAUD*. UNDIP: Fakultas Ekonomika dan Bisnis.

Suthar, N., Kumar, D., & Joshi, A. (2026). Strategic Innovation Management Using Emerging Technologies for Building Resilience in Competitive Scenarios. *Innovation Management for Disruptive Maturity in Competitive Scenarios*, 537–566.

Waluyo, D. (2024). *Ekonomi Sirkular Daur Ulang Sampah*. Portal Informasi Indonesia.

Weerakoon, C., & McMurray, A. J. (2024). Fostering social enterprise innovativeness: the interplay of learning, market orientation and stakeholder engagement within a capability framework.

e-ISSN: 2716-2605, p-ISSN 2721-0677
DOI: https:// https://doi.org/10.53515/lt.v8i1.242

Social Enterprise Journal, *20*(5), 888–920.

Wu, Y., & Tham, J. (2023). The impact of environmental regulation, Environment, Social and Government Performance, and technological innovation on enterprise resilience under a green recovery. *Heliyon*, *9*(10).

Xiao, H., Al Mamun, A., Reza, M. N. H., Lin, X., & Yang, Q. (2024). Modeling the significance of corporate social responsibility on green capabilities and sustainability performance. *Heliyon*, *10*(19).

Xu, L., Wu, X.-Q., Li, C.-Y., Liu, N.-P., An, H.-L., Ju, W.-T., Lu, W., Liu, B., Wang, X.-F., & Wang, Y. (2023). Sonocatalytic degradation of tetracycline by BiOBr/FeWO4 nanomaterials and enhancement of sonocatalytic effect. *Journal of Cleaner Production*, *394*, 136275.

Zheng, H., Dai, J., Li, B., & Shou, Y. (2025). The impact of anticipation of new technologies on operational and environmental performance: a strategy-structure-capabilities-performance perspective. *International Journal of Logistics Research and Applications*, *28*(8), 886–909.