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GREEN LEADERSHIP AND SUSTAINABILITY CHANGE PROGRAMS ON PRO-ENVIRONMENTAL BEHAVIOR: GREEN SELF-EFFICACY AS MEDIATOR

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Abstract

Employee green behavior is well documented in manufacturing and hospitality, yet remains largely unexamined in central banking, where sustainability mandates are institutional while daily practice stays discretionary. This study examines how Green Leadership Style (GLS) and Sustainability-Based Change Programs (SBCP) shape the Pro-Environmental Behavior (PEB) of Generation Z employees, and how far that influence operates through Green Self-Efficacy (GSE). Seven hypotheses derived from the Resource-Based View, Social Exchange Theory, and Social Cognitive Theory were tested using an explanatory cross-sectional design. Primary data were collected from 230 Generation Z employees at the Head Office of Bank Indonesia and analyzed with Partial Least Squares Structural Equation Modeling. All seven hypotheses were supported. Green self-efficacy emerged as the strongest direct predictor of pro-environmental behavior, ahead of change programs and leadership, and it complementarily partially mediated both organizational paths. The findings indicate that leadership role modeling and structured change programs translate into everyday green habits mainly when they build employees' confidence in their own capacity to act. The study contributes theoretically by positioning green self-efficacy as a mediating rather than moderating mechanism within an integrated three-theory framework, and by extending employee green behavior research to a central bank and a Generation Z workforce. For central banking institutions, the results imply that the Green Central Bank agenda should be governed as a capability-building programme.

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INTRODUCTION

Climate change has pushed organizations to cut emissions and use resources more sparingly, yet the aggregate numbers still move in the wrong direction. The International Energy Agency (2025) reports that energy-related carbon dioxide emissions rose by 0.8% to 37.8 gigatonnes in 2024 even as the global economy grew by more than 3%. Growth is decoupling from emissions, but absolute reductions have yet to materialise. Clean technologies such as solar, wind, nuclear, electric vehicles, and heat pumps are estimated to avoid roughly 2.6 gigatonnes of emissions annually, or about 7% of the global total (International Energy Agency, 2025). This evidence underlines that the environmental transition depends not only on technology but also on the behavior of the people who operate it (Steg & Vlek, 2009). The Sustainable Development Goals, particularly SDG 12 on responsible consumption and production and SDG 13 on

climate action, therefore place organizational practice and employee behavior at the center of the sustainability agenda (United Nations, 2015), a commitment that Indonesia has institutionalized through Presidential Regulation No. 111 of 2022 (Republik Indonesia, 2022).

Climate-related risks are also relevant to central banks because physical and transition risks can affect price stability and the stability of the financial system (Campiglio et al., 2018; Bolton et al., 2020). Dikau and Volz (2021) show that environmental considerations are increasingly embedded in central bank mandates and policies. In Indonesia, Bank Indonesia has declared its commitment to developing a green economy and green finance and to strengthening its vision as a green central bank at both the policy and institutional levels (Bank Indonesia, 2024). Institutional commitment, however, must be translated into internal practice. At Bank Indonesia, relevant practices include the Green Workplace initiative, the Quarterly Workplace Challenge, paperless work processes, energy and water efficiency, and waste reduction and segregation. The availability of programs and facilities lays the groundwork for change, but outcomes still depend on how leaders provide direction and how employees carry out their daily work habits (Kollmuss & Agyeman, 2002).

Employee green behavior (EGB) has become the core of environmentally sustainable organizations (Zacher et al., 2023). It encompasses both task-related actions and voluntary initiatives that contribute to environmental sustainability (Francoeur et al., 2021), and meta-analytic evidence confirms that leadership, organizational climate, and individual motivational states are among its strongest correlates (Katz et al., 2022). Two organizational factors have attracted particular attention. First, green or environmentally specific leadership motivates employees through vision, role modeling, intellectual stimulation, and individualized support (Peng et al., 2021; Lathabhavan & Kaur, 2023; Rietze et al., 2025). Second, structured organizational systems such as sustainability policies, green training, communication, and procedural integration provide the means and legitimacy for green action (Gao et al., 2025; Saleh et al., 2024).
The influence of organizational factors on PEB does not always operate directly; it frequently flows through individual psychological mechanisms (Yuriev et al., 2018). Green self-efficacy, defined as an employee's belief in his or her capacity to plan and execute actions that support organizational environmental goals, is one such mechanism grounded in Social Cognitive Theory (Bandura, 1997). Prior studies show that green self-efficacy mediates the effects of green leadership and organizational support on green performance and pro-environmental behavior (Mughal et al., 2022; Faraz et al., 2021; Saleem et al., 2024; Nwosu, 2025; Özgül & Demir, 2025). Nevertheless, evidence is not uniform: Puiu et al. (2026) found no direct effect of green self-efficacy on pro-environmental behavior, and Li et al. (2025) positioned it as a moderator rather than a mediator. These inconsistencies suggest that the role of green self-efficacy remains contingent on organizational and respondent context.

Two gaps motivate this study, one contextual and one theoretical. The contextual gap concerns the setting itself. Almost no work on employee green behavior has been carried out inside central banks, and the omission matters because a central bank is not simply another large service organization. Three features distinguish it. First, its environmental engagement is mandate-driven rather than market-driven: a manufacturer pursues eco-efficiency because materials and energy are cost centres and regulators impose compliance thresholds, whereas a central bank has no production footprint of consequence and derives its sustainability agenda from a public policy

mandate, so employees encounter green objectives as institutional values rather than as operational or competitive necessities. Second, work processes are administrative, rule-bound, and heavily standardized; in manufacturing, green behavior is embedded in the production task itself and can be engineered through process redesign, while in central banking almost every green act — printing less, switching off equipment, segregating waste, choosing shared transport — sits outside the formal job description and is therefore discretionary, which shifts the explanatory burden from technology and procedure toward leadership signalling and individual agency. Third, the accountability architecture differs: a commercial firm can tie green performance to profit, cost savings, or customer-facing reputation, whereas a public monetary authority is evaluated on price and financial system stability, so environmental conduct lacks an obvious performance anchor and depends on whether the organization deliberately builds one.

Taken together, these conditions mean that findings drawn from commercial firms, hotels, manufacturers, and small and medium-sized enterprises (Zaid & Yaqub, 2024; AlDana et al., 2026) cannot be assumed to transfer, and they make the psychological pathway between organizational signals and individual behavior theoretically more consequential in this setting than in the sectors that supply most existing evidence. The theoretical gap is narrower: the literature has rarely tested green leadership and sustainability-based change programs inside a single model with green self-efficacy as the mediator, having typically examined one organizational factor at a time or positioned self-efficacy as a predictor or moderator (Li et al., 2025; Puiu et al., 2026).

A further consideration concerns the workforce cohort and its analytical status in this study. Generation Z, born between 1997 and 2012 (Dimock, 2019), is often assumed to be environmentally conscious, but proximity to sustainability issues does not automatically produce green work habits (Baran & Sypniewska, 2024; Borah et al., 2024; Orgun et al., 2024). This study treats Generation Z as a research context rather than as a moderating variable, and the choice is theoretical rather than merely practical. Generational scholarship shows that cohort membership is a confounded proxy that conflates age, period, and cohort effects and cannot be cleanly identified in cross-sectional data; observed generational contrasts in work attitudes are typically small and shrink further once education, tenure, and job level are controlled (Rudolph et al., 2021). Treating a cohort label as a moderator would therefore attribute to generational identity variance that more plausibly reflects career stage and organizational condition. Social Cognitive Theory offers the more defensible account: what distinguishes employees early in their careers is not a generational value set but a thinner stock of mastery experience and fewer established practice references, which makes them more dependent on vicarious learning and social persuasion — precisely the efficacy sources that leadership and structured programs supply (Bandura, 1997). Holding the cohort constant therefore isolates the organizational and psychological mechanisms of interest instead of confounding them with cohort heterogeneity. Indonesian evidence further indicates that young employees' engagement and performance are highly responsive to work environment, motivation, and leadership support (Riyanto et al., 2021), which makes the Generation Z workforce of a central bank an informative setting in which these mechanisms should be observable.

Against this backdrop, this study tests GLS and SBCP as exogenous variables, GSE as a mediator, and PEB as the endogenous variable among Generation Z employees at the Head Office of Bank Indonesia. The model allows a simultaneous assessment of the

direct paths from organizational factors to behavior and the indirect paths through employees' confidence in their own capacity. Theoretically, the study integrates the Resource-Based View, Social Exchange Theory, and Social Cognitive Theory into one framework. Practically, the results provide Bank Indonesia and comparable public institutions with evidence on how leadership role modeling, program design, supporting facilities, learning, and confidence-building must be aligned so that green practices become embedded in everyday work.

Theoretical Framework and Hypotheses

Three perspectives inform the model, and they are best read as a sequence rather than as three parallel justifications, each answering the question the previous one leaves open. The Resource-Based View (RBV) answers what the organization brings. It treats environmental capabilities — proactive strategies, employee involvement, and shared vision — as strategic resources, so that green leadership and sustainability-based change programs are not isolated initiatives but organizational capabilities bundling human, procedural, and technological resources into green routines (Barney, 1991; Hart, 1995; Aragón-Correa & Sharma, 2003). The RBV thus establishes GLS and SBCP as the model's exogenous constructs, but it stops at the organizational boundary: it explains what resources exist, not why an individual employee would act on them. Social Exchange Theory (SET) answers that question of willingness. Employees reciprocate organizational and supervisory support with behavior serving organizational goals (Blau, 1964; Cropanzano & Mitchell, 2005), because perceived support generates felt obligation and discretionary effort (Kurtessis et al., 2017) — a mechanism confirmed in the environmental domain, where supervisory support and corporate environmental policy predict employee eco-initiatives (Raineri & Paillé, 2016). SET therefore grounds the direct paths from GLS and SBCP to PEB. Yet willingness is not capability, and in a discretionary, non-routinized behavioral domain an employee may be entirely willing to reciprocate and still not act. Social Cognitive Theory (SCT) closes this gap by supplying the agentic mechanism: self-efficacy, formed through mastery experiences, vicarious learning, and social persuasion, and malleable through organizational intervention (Bandura, 1997; Gist & Mitchell, 1992). SCT is what licenses green self-efficacy as a mediator rather than an additional predictor, since the very resources the RBV identifies and the exchange relationship SET describes are also the sources from which efficacy beliefs are built. The three theories therefore map onto the three structural layers of the model — organizational resources, exchange-based motivation, and individual agency — and the resulting framework is a single causal chain rather than an aggregation of perspectives.

Four constructs operationalize this framework. Green Leadership Style (GLS) is green transformational leadership that integrates an environmental vision into daily direction, communication, and practice, measured through role modeling, environmental vision, green motivation, and support, dimensions that correspond to idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration in transformational leadership theory (Bass & Riggio, 2006; Chen & Chang, 2013; Ding et al., 2023; Rietze et al., 2025). A Sustainability-Based Change Program (SBCP) is a deliberately designed change system aligning policies, procedures, facilities, and work practices with sustainability objectives, measured through program clarity, supporting infrastructure, socialization and communication, and integration into standard operating procedures (Benn et al., 2014; Tipu, 2022). Green Self-Efficacy (GSE)

is the employee's belief that he or she can plan, organise, and carry through actions serving the organisation's environmental goals and persist when obstacles appear, measured through capacity belief, technical capability, and green resilience (Chen et al., 2014; Mughal et al., 2022; Saleem et al., 2024). Pro-Environmental Behavior (PEB) comprises employee actions supporting organizational environmental sustainability, whether task-required or voluntary; aligned with Bank Indonesia's Green Workplace program, it is measured through energy use, water use, transportation choices, and waste management (Zacher et al., 2023, 2024). Such behavior does not emerge merely because facilities exist: behavioral intentions and perceived control (Ajzen, 1991), together with leadership, organizational systems, and self-efficacy, jointly determine whether employees act consistently.

Hypothesis Development

SET predicts that employees reciprocate leaders' support and role modeling with behavior that serves organizational goals (Blau, 1964; Cropanzano & Mitchell, 2005). In the environmental domain, leaders clarify priorities, model behavior, and reduce employees' hesitation when choosing greener ways of working (Peng et al., 2021). Studies by Lathabhavan and Kaur (2023), Zaid and Yaqub (2024), and Rietze et al. (2025) report positive relationships between green leadership and employee environmental behavior, and comparable effects have been documented for ethical, servant, and responsible forms of leadership (Aboramadan et al., 2021; Islam et al., 2021; Begum et al., 2022; Farrukh et al., 2022; Alowais & Suliman, 2025; Supriyatno et al., 2026), and observable leader behavior carries particular weight for young employees in formal organizations, who need visible legitimacy before altering an established routine. This reasoning yields:

H1: Green Leadership Style has a positive effect on Pro-Environmental Behavior.

SBCP translates sustainability goals into targets, facilities, communication, and procedures that reduce barriers to action and clarify expected behavior (Tipu, 2022). From the RBV, programs combine technological, procedural, and human resources into a green capability (Hart, 1995; Roscoe et al., 2019). Studies of training, culture, and organizational support show that structured interventions are associated with stronger environmental behavior (Ababneh, 2021; Aboramadan, 2022; Saleh et al., 2024; Gao et al., 2025; AlDana et al., 2026), although the effectiveness of specific instruments varies: Alkandi (2025) found internal environmental orientation to be a significant mechanism while green rewards were not, and Ahsan and Khawaja (2024) highlight innovation and resilience in translating sustainable leadership into environmental outcomes. When the organization provides tangible means and support, SET predicts a positive response from employees. Hence:

H2: Sustainability-Based Change Program has a positive effect on Pro-Environmental Behavior.

GLS can strengthen GSE through role modeling, direction, support, feedback, and opportunities to engage in environmental action, which correspond to the vicarious, persuasive, and mastery sources of efficacy in SCT (Bandura, 1997; Gist & Mitchell, 1992). Chen et al. (2014), Mughal et al. (2022), and Saleem et al. (2024) found that environmentally oriented leadership is related to green self-efficacy, and Rietze et al. (2025) show that green transformational leadership strengthens the psychological

empowerment that emboldens employees to act. On this basis:

H3: Green Leadership Style has a positive effect on Green Self-Efficacy.

A program with clear objectives, facility support, consistent communication, and procedural integration helps employees understand and master green actions. Training, opportunities to practice new behaviors, and access to resources provide mastery experiences that reinforce confidence (Pinzone et al., 2019; Cop et al., 2020; Aiswarya & Manivel, 2026), and recent evidence from public-sector organizations confirms that structured green training raises employees' green psychological resources rather than merely their awareness (Wu et al., 2021). Saleem et al. (2024) show that green training relates to green self-efficacy, and Özgül and Demir (2025) find that green perceived organizational support increases green self-efficacy. Hence:

H4: Sustainability-Based Change Program has a positive effect on Green Self-Efficacy.

Employees with high GSE are more confident in selecting green actions, sustaining effort, and overcoming obstacles, which helps them convert knowledge and intentions into consistent work behavior (Bandura, 2001). Mughal et al. (2022), Saleem et al. (2024), and Nwosu (2025) support the role of green self-efficacy in fostering pro-environmental behavior, whereas Puiu et al. (2026) did not find a direct effect, indicating that the relationship warrants testing in different organizational contexts. Hence:

H5: Green Self-Efficacy has a positive effect on Pro-Environmental Behavior.

Combining the arguments above, part of the influence of leadership is expected to operate through changes in employees' appraisal of their own capacity: GLS builds GSE (Mughal et al., 2022; Nwosu, 2025; Saleem et al., 2024), and GSE in turn enables green behavior because employees feel they possess the knowledge, technical skill, and persistence required. Similarly, SBCP raises GSE through training, facilities, procedures, and practice opportunities (Özgül & Demir, 2025), and GSE helps employees use program resources effectively, while programs may also facilitate behavior directly. Hence:

H6: Green Self-Efficacy positively mediates the effect of Green Leadership Style on Pro-Environmental Behavior.

H7: Green Self-Efficacy positively mediates the effect of Sustainability-Based Change Program on Pro-Environmental Behavior.

RESEARCH METHODOLOGY

The study used a quantitative explanatory design, with data gathered cross-sectionally through a single administration of the questionnaire. Each Generation Z employee at the Head Office of Bank Indonesia served as one unit of analysis. Because all variables were measured from the same respondents at one point in time, results are interpreted as predictive relationships rather than temporal causality (Podsakoff et al., 2003, 2012). The population comprised 536 Generation Z employees based on internal human resource data used as the sampling frame. Respondents were selected through purposive sampling using three criteria: (1) born between 1997 and 2012; (2) working at the Head Office of Bank Indonesia; and (3) tenure of at least one year. Purposive sampling is the methodologically appropriate strategy here rather than a

convenience compromise, for two reasons. First, the study is explanatory and theory-testing rather than descriptive: the inferential target is the structural relationship among constructs, not a population parameter, and theory testing requires a sample in which the theorized mechanism can actually operate — respondents who have been exposed to the leadership behaviors and change programs whose effects are being estimated. A probability sample drawn across the full workforce would dilute this exposure and introduce heterogeneity unrelated to the hypotheses, which attenuates rather than improves inferential validity. Second, the criteria define a theoretically bounded population rather than an arbitrary subset, and the achieved sample of 230 represents 42.9% of the 536-employee sampling frame, a coverage ratio that materially limits selection bias within that population.

The minimum tenure of one year is likewise a construct-validity requirement rather than an exclusion of convenience: green self-efficacy is formed through mastery experience, vicarious learning, and social persuasion accumulated within a specific organizational setting (Bandura, 1997), and the sustainability initiatives evaluated here operate on quarterly and annual cycles, so employees with less than a full cycle of exposure could not meaningfully report on leadership consistency, programme integration, or their own accumulated capability. Generalization is accordingly analytical rather than statistical: the findings speak to the theorized relationships among Generation Z employees working under comparable institutional conditions, and extension to Generation Z employees in regional offices or in other public institutions is an empirical question for replication rather than an assumption of the present design. The final sample consisted of 230 respondents. Using the inverse square root method with a minimum path coefficient of 0.197 at a 5% significance level and 80% power, the required minimum sample is 160 (Kock & Hadaya, 2018), which the sample exceeds.

All constructs were measured with 12 reflective indicators each (48 items in total) on a five-point Likert scale from strongly disagree (1) to strongly agree (5). GLS covered role modeling, environmental vision, green motivation, and support (Chen & Chang, 2013; Ding et al., 2023; Rietze et al., 2025). SBCP covered program clarity, supporting infrastructure, socialization and communication, and integration into standard operating procedures (Benn et al., 2014; Tipu, 2022). GSE covered capacity belief, technical capability, and green resilience (Chen et al., 2014; Mughal et al., 2022; Saleem et al., 2024). PEB covered energy use, water use, transportation, and waste management (Ones & Dilchert, 2012; Zacher et al., 2023). The five-point format was selected on psychometric rather than administrative grounds. Evidence on scale length indicates that reliability and validity rise steeply from two to five categories and then plateau, with little incremental gain beyond five to seven points, while longer scales increase respondent cognitive burden and the risk of non-differentiation in multi-item instruments; a five-point format also preserves a labelled midpoint and permits fully verbal anchoring of every category, which reduces interpretive variance across respondents relative to partially anchored seven- or ten-point formats. Ordinal scores were treated as quasi-interval data, a treatment that is standard in PLS-SEM and defensible because the algorithm estimates composites through ordinary least squares regressions that are robust to the modest departures from interval spacing typical of balanced, fully labelled Likert items, and because the method makes no distributional assumptions requiring metric data (Hair et al., 2022).

Instrument validation preceded distribution in three stages. First, all items were

adapted from previously validated instruments rather than newly written, and the adaptation was confined to contextualizing referents to Bank Indonesia's work setting so that the original construct definitions were preserved. Second, the adapted instrument underwent expert review for content validity by academic reviewers in human resource management and organizational behavior together with practitioners familiar with the institution's sustainability programs, who assessed each item for construct representativeness, clarity, and contextual appropriateness; items flagged as ambiguous or double-barrelled were reworded before pilot testing. Third, a pilot test was administered to a small group of respondents drawn from the target population but excluded from the final sample, and item performance was examined for reliability and for problems of comprehension before full distribution. Because the instrument was administered in Indonesian while the source items were in English, a translation and back-translation procedure was applied to preserve semantic equivalence.

The threat of common method bias was addressed procedurally as well as statistically, since post hoc statistical detection alone is a weak safeguard (Podsakoff et al., 2012). Procedurally, respondent anonymity and confidentiality were guaranteed in writing and no identifying information was collected, which reduces evaluation apprehension and socially desirable responding; respondents were told explicitly that there were no right or wrong answers and that responses would be reported only in aggregate. The questionnaire separated the predictor and criterion constructs psychologically by placing them in distinct labelled sections with different instructions and by ordering the criterion measures ahead of certain predictor blocks, so that respondents could not readily infer the hypothesized relationships and construct an implicit theory linking them. Scale anchors and item formats were varied across sections to interrupt response-set patterns, and participation was voluntary with no organizational incentive attached, removing a motive for consistent self-presentation. Statistically, common method bias was assessed using the full collinearity VIF approach, in which all constructs are regressed on a common random variable and VIF values above 3.3 indicate pathological collinearity attributable to method variance (Kock, 2015); values below this threshold across all constructs, combined with the procedural remedies above, indicate that common method bias is unlikely to account for the observed relationships, although it cannot be excluded entirely given the single-source cross-sectional design.

Data were analyzed using PLS-SEM in SmartPLS 4 (Ringle et al., 2022), which is appropriate for predictive models with latent constructs and mediation paths (Hair et al., 2019; Sarstedt et al., 2021). The measurement model was evaluated through outer loadings (≥ 0.708), average variance extracted (AVE > 0.50), Cronbach's alpha, rho_A, and composite reliability (> 0.70), and discriminant validity through cross-loadings, the Fornell–Larcker criterion, and the heterotrait–monotrait ratio (HTMT < 0.90) (Fornell & Larcker, 1981; Henseler et al., 2015; Hair et al., 2022). Common method bias was assessed using the full collinearity VIF approach with a 3.3 threshold (Kock, 2015). The structural model was evaluated through inner VIF (< 5), R^2 and adjusted R^2 (Hair et al., 2011), f^2 effect sizes (Cohen, 1988), out-of-sample predictive relevance with PLSpredict (Shmueli et al., 2019), and SRMR (< 0.08) as the principal fit measure (Hu & Bentler, 1999; Henseler et al., 2016). Hypotheses were tested with 5,000 bootstrap subsamples, one-tailed tests, and percentile confidence intervals at the 5% level ($t > 1.645$; $p < 0.05$; 95% CI excluding zero). Mediation was assessed following Preacher and Hayes (2008), Zhao et al. (2010), and Nitzl et al. (2016).

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RESULTS AND DISCUSSION

Respondent Profile and Descriptive Statistics

Table 1 summarizes the respondent profile. The gender composition was balanced (50.43% female; 49.57% male). All respondents were aged 21–29, consistent with the Generation Z focus. Most held a bachelor's or D4 degree (76.09%), were permanent (organic) employees (76.96%), and had less than five years of tenure (65.65%). Respondents were distributed across 21 departments, with the largest groups from the Payment System Policy Department and the Currency Management Department (19 each).

Table 1. Respondent Characteristics (n = 230)

Characteristic	Category	Frequency	Percentage
Gender	Female	116	50.43%
	Male	114	49.57%
Age	21–29 years (Generation Z)	230	100.00%
Education	Senior high school / vocational	23	10.00%
	Diploma (D3)	24	10.43%
	Bachelor / D4	175	76.09%
	Master	8	3.48%
Employment status	Permanent (organic)	177	76.96%
	Non-permanent (non-organic)	53	23.04%
Tenure at Bank Indonesia	< 5 years	151	65.65%
	5–10 years	79	34.35%

Source: processed primary data, 2026

The four constructs sat almost on top of one another in the “fairly good” band: GLS 3.037, SBCP 3.037, GSE 3.057, and PEB 3.035 (Figure 4). The spread is narrow, but its direction is telling — GSE sits highest and PEB lowest, so the attitudinal and practical groundwork is in place while the step into consistent daily behaviour has yet to be completed. At the indicator level, leader role modeling (GLS3) was the weakest GLS item; integration of green behavior into performance indicators (SBCP11) was the weakest SBCP item; practical environmental knowledge (GSE5) was the weakest GSE item; and reporting water leakage (PEB5) was the weakest PEB item, while paperless facilities and digital-skill confidence were relative strengths.

Measurement Model Evaluation

All 48 indicators exhibited outer loadings between 0.713 and 0.816, exceeding the 0.708 threshold (Hair et al., 2022). Table 2 shows that AVE ranged from 0.562 to 0.603 and that Cronbach's alpha, rho_A, and composite reliability all exceeded 0.90, demonstrating convergent validity and strong internal consistency.

Table 2. Convergent Validity and Construct Reliability

Construct	Cronbach's α	rho_A	Composite Reliability	AVE	Remark
GLS	0.929	0.930	0.939	0.562	Satisfied
SBCP	0.940	0.942	0.948	0.603	Satisfied
GSE	0.939	0.940	0.947	0.600	Satisfied
PEB	0.935	0.936	0.944	0.584	Satisfied

Source: SmartPLS 4 output, 2026

Discriminant validity was supported by three criteria. Every indicator loaded highest on its own construct; the square root of each construct's AVE exceeded its correlations with other constructs (Table 3); and all HTMT ratios were below 0.90, with the highest value (0.699) for the GSE–PEB pair (Henseler et al., 2015). Full collinearity VIF values were below the 3.3 threshold, indicating that common method bias is

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unlikely to distort the results (Kock, 2015).

Table 3. Discriminant Validity: Fornell–Larcker Criterion and HTMT

Construct	GSE	GLS	SBCP	PEB	HTMT (max)
GSE	0.774				0.699 (PEB)
GLS	0.476	0.750			0.525 (PEB)
SBCP	0.469	0.261	0.777		0.574 (PEB)
PEB	0.658	0.491	0.542	0.764	—

Source: SmartPLS 4 output, 2026. Diagonal values are square roots of AVE; off-diagonal values are construct correlations.

Structural Model Evaluation

Inner VIF values ranged from 1.073 to 1.549, comfortably below 5, so collinearity poses no threat to the path estimates. GLS and SBCP together accounted for 35.4% of the variance in GSE (adjusted R^2 = 0.349). Adding GSE to the equation lifted the explained variance in PEB to 53.9% (adjusted R^2 = 0.533), which counts as moderate on the thresholds of Hair et al. (2011). Effect sizes (f^2) were medium for GSE → PEB (0.246), GLS → GSE (0.208), and SBCP → GSE (0.198), and small for GLS → PEB (0.078) and SBCP → PEB (0.141) (Cohen, 1988). PLSpredict yielded Q^2predict values of 0.337 for GSE and 0.410 for PEB, indicating medium-to-large out-of-sample predictive relevance (Shmueli et al., 2019). The SRMR of 0.044 for both the saturated and estimated models is below 0.08, supporting acceptable model fit (Hu & Bentler, 1999; Henseler et al., 2016). Table 4 summarizes these criteria.

Table 4. Structural Model Quality Criteria

Criterion	GSE	PEB	Threshold / Interpretation
R^2	0.354	0.539	0.25 weak; 0.50 moderate; 0.75 substantial
Adjusted R^2	0.349	0.533	Minimal shrinkage
Q^2predict	0.337	0.410	> 0 predictive relevance; 0.35 large
Inner VIF (range)	1.073	1.285–1.549	< 5 no collinearity
SRMR (estimated model)	0.044		< 0.08 acceptable fit

Source: SmartPLS 4 output, 2026

Hypothesis Testing

Table 5 reports the bootstrapping results. All five direct paths and both indirect paths were positive and significant at $p < 0.001$, with 95% confidence intervals entirely above zero; H1 to H7 are therefore supported. GSE had the largest direct effect on PEB (β = 0.419), followed by SBCP (β = 0.289) and GLS (β = 0.216). GLS (β = 0.379) and SBCP (β = 0.370) were comparably strong predictors of GSE. Because the direct and indirect effects on each path are significant and of the same sign, GSE functions as a complementary partial mediator (Zhao et al., 2010; Nitzl et al., 2016). Figure 1 depicts the estimated model, Figure 2 plots the five direct coefficients together with their bootstrap confidence intervals, Figure 3 separates the direct from the mediated portion of each organisational effect, and Figure 4 reports the construct means against the descriptive picture presented earlier.

Table 5. Path Coefficients, Indirect Effects, and Hypothesis Decisions

Hyp.	Path	β	t-stat.	p-value	95% CI	f^2	Decision
H1	GLS → PEB	0.216	4.743	< 0.001	[0.123; 0.302]	0.078	Supported
H2	SBCP → PEB	0.289	5.277	< 0.001	[0.176; 0.391]	0.141	Supported
H3	GLS → GSE	0.379	7.185	< 0.001	[0.268; 0.476]	0.208	Supported
H4	SBCP → GSE	0.370	7.272	< 0.001	[0.267; 0.465]	0.198	Supported
H5	GSE → PEB	0.419	7.669	< 0.001	[0.312; 0.526]	0.246	Supported
H6	GLS → GSE → PEB	0.159	4.854	< 0.001	[0.102; 0.228]	—	Supported
H7	SBCP → GSE → PEB	0.155	5.205	< 0.001	[0.104; 0.221]	—	Supported

Source: SmartPLS 4 bootstrapping output (5,000 subsamples, one-tailed), 2026

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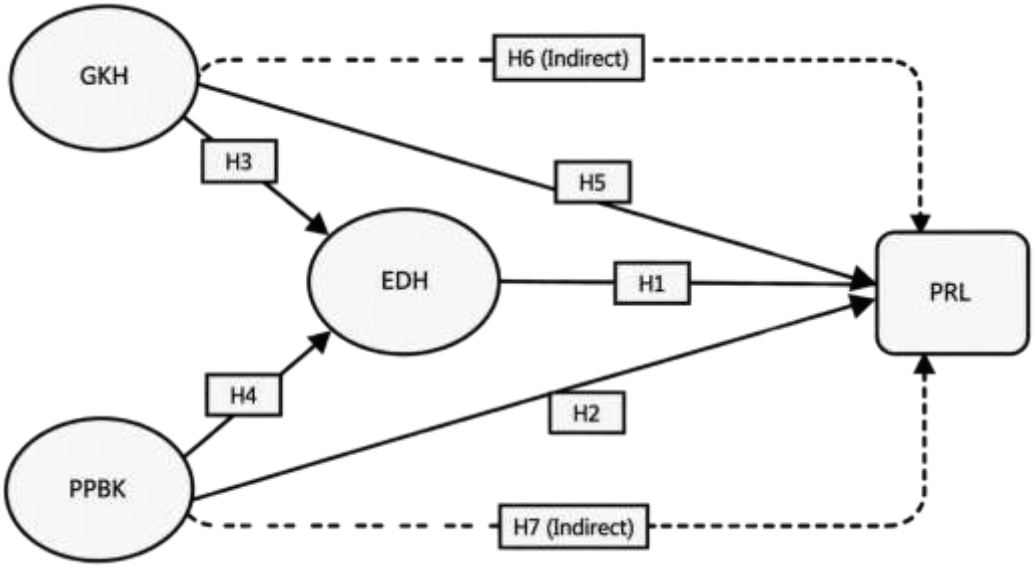


Figure 1. Estimated Structural Model with Standardized Path Coefficients
Source: SmartPLS 4 output, processed by the authors, 2026

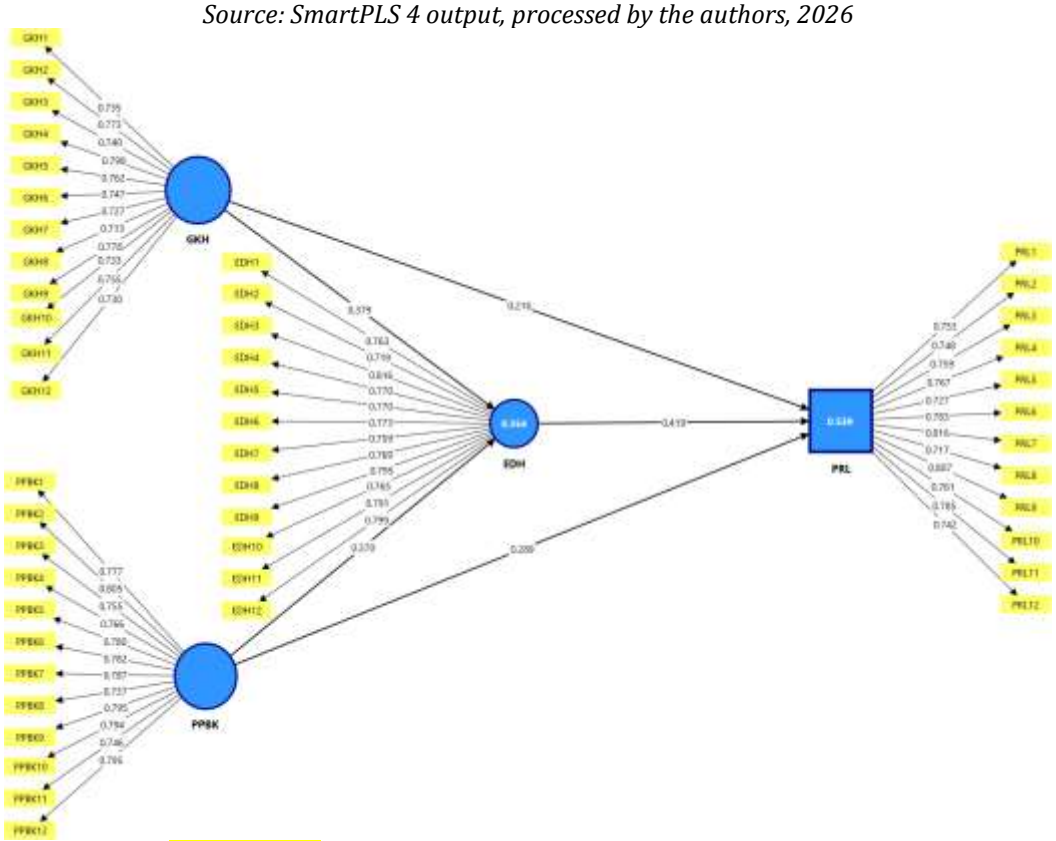


Figure 2. Standardized Path Coefficients with 95% Bootstrap Confidence Intervals
Source: SmartPLS 4 bootstrapping output (5,000 subsamples), processed by the authors, 2026

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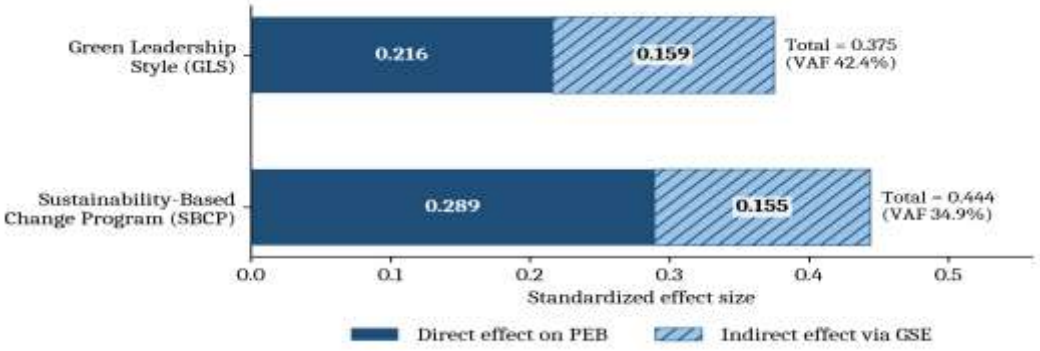


Figure 3. Decomposition of Total Effects on Pro-Environmental Behavior into Direct and GSE-Mediated Components
Source: SmartPLS 4 output, processed by the authors, 2026

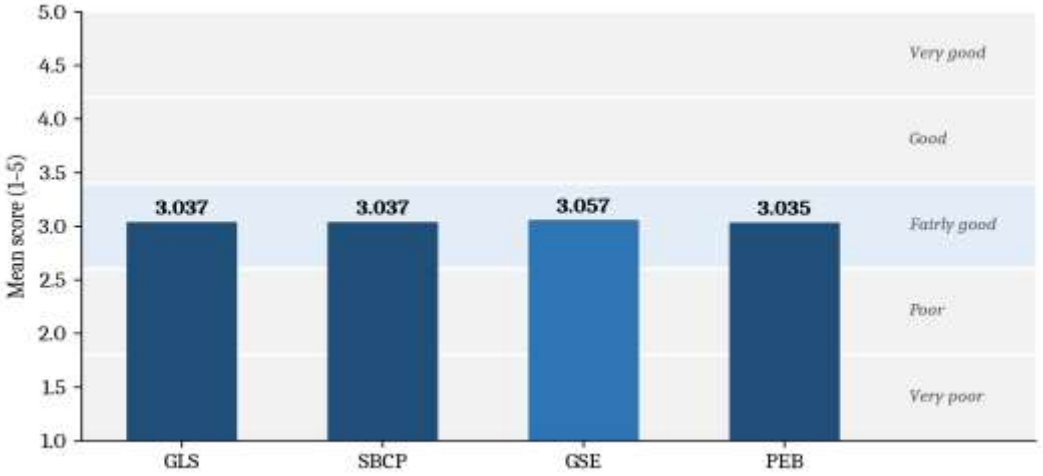


Figure 4. Mean Scores of the Four Constructs (Five-Point Likert Scale)
Source: processed primary data, 2026

Table 6. Decomposition of Total Effects on Pro-Environmental Behavior

Exogenous construct	Direct effect on PEB	Indirect effect via GSE	Total effect	Share mediated (VAF)
Green Leadership Style (GLS)	0.216	0.159	0.375	42.4%
Sustainability-Based Change Program (SBCP)	0.289	0.155	0.444	34.9%
Green Self-Efficacy (GSE)	0.419	—	0.419	—

Source: SmartPLS 4 output, processed by the authors, 2026. VAF = variance accounted for, computed as the indirect effect divided by the total effect.

Discussion

Green leadership and pro-environmental behavior (H1). Role modelling, environmental vision, motivation, and support from leaders each feed directly into how Generation Z employees behave. What leaders do signals which behaviours actually count; once sustainability shows up in unit decisions and in a supervisor's own daily conduct, employees have the cover they need to save energy, cut paper use, sort waste, and speak up about improvements (Rietze et al., 2025). The finding gains analytical weight from the observation that leader role modeling was the weakest GLS indicator, a pattern that should be read as a property of the institutional culture rather than as a shortcoming of individual managers. Public institutions govern through written rules, formal delegation, and documented process, and this legal-rational mode of authority

makes directives the natural instrument of managerial influence while leaving personal conduct comparatively unregulated. Sustainability can therefore be fully institutionalized at the level of policy and remain weakly instantiated at the level of observable everyday behavior — the classic decoupling of formal structure from enacted practice. The consequence is that the Green Central Bank agenda cannot rest on formal directives alone, because in a discretionary behavioral domain the directive establishes legitimacy but the leader's own conduct supplies the behavioral template. The respondent profile reinforces this interpretation: highly educated employees with short tenure lack established practice references and read superiors' behavior as information about appropriate conduct, consistent with the vicarious-learning logic of SCT (Bandura, 1997). The result supports the RBV view of leadership capability as an intangible resource that directs routines (Hart, 1995) and the SET logic of reciprocated support (Cropanzano & Mitchell, 2005), and aligns with Rietze et al. (2025) and Zaid and Yaqub (2024), extending them from general industry and SMEs to a central bank workforce.

Change programs and pro-environmental behavior (H2). Structured change programs convert sustainability goals into feasible action choices. Goal clarity, facilities, communication, procedural integration, and evaluation lower the barriers to green behavior (Yuriev et al., 2018), so initiatives such as the Green Workplace, the Quarterly Workplace Challenge, paperless facilities, energy efficiency, and waste management can influence behavior without first waiting for psychological change. The descriptive pattern is diagnostic: paperless facilities score relatively strongly while the integration of green behavior into performance indicators is the weakest aspect, indicating that the institution possesses infrastructural capital but that behavioral accountability mechanisms lag behind. This asymmetry is characteristic of public-sector organizational culture. Infrastructure can be procured through the budget cycle and is readily auditable, whereas embedding environmental conduct in performance appraisal requires altering an evaluation architecture that in a central bank is calibrated to its statutory mandate of price and financial system stability. Green behavior consequently occupies the status of a valued but unmeasured activity, and because formal appraisal is the principal signal of what the organization treats as consequential, the absence of such an anchor caps the behavioral return on infrastructural investment. Employees early in their careers, who depend on explicit statements of what to do, when, and who is responsible (Kotter, 1995; Armenakis & Bedeian, 1999), are particularly sensitive to this gap. The finding is consistent with the green HRM evidence that training, involvement, and performance systems foster green behavior (Ababneh, 2021; Aboramadan, 2022) and with Gaybullaev and Strode (2026) and Ahsan and Khawaja (2024) on strategic integration, innovation, and resilience. It also clarifies a divergence in that literature: Alkandi (2025) found green rewards non-significant while internal environmental orientation mattered, which converges with the present pattern in suggesting that what shapes behavior is not the incentive instrument itself but whether environmental objectives are embedded in the organization's routine evaluative attention.

Green leadership and green self-efficacy (H3). Green leaders not only direct what should be done but also shape employees' belief that they can do it. Role modeling offers imitable examples, vision clarifies purpose, intellectual stimulation helps employees discover new ways of working, and support reduces anxiety when experimenting with different practices (Bandura, 1997; Gist & Mitchell, 1992). The result corroborates Chen

et al. (2014), Rietze et al. (2025) on psychological empowerment, and Ding et al. (2023) on the four transformational components, and extends the evidence to Generation Z employees in a formal institutional environment. Job-based coaching, demonstration of problem solving, room to experiment, and constructive feedback are the practical levers, and they matter most for the majority of respondents with less than five years of tenure.

Change programs and green self-efficacy (H4). Structured programs raise green self-efficacy because they provide learning experiences, resources, procedures, and opportunities to practice. When employees understand program targets and have suitable facilities, uncertainty about how to act diminishes, and small successes in using digital systems, conserving resources, or completing unit challenges become mastery experiences (Bandura, 1997; Pinzone et al., 2019; Aiswarya & Manivel, 2026). The medium effect size implies that programs should be evaluated on whether they add knowledge and capability rather than on activity outputs alone; the low means for SBCP11 and GSE5 show room for improvement. The finding aligns with Özgül and Demir (2025) and Saleem et al. (2024), and complements Li et al. (2025), who modeled green self-efficacy as a moderator, by demonstrating a direct program-to-efficacy effect.
Green self-efficacy and pro-environmental behavior (H5). Green self-efficacy is the strongest direct driver of pro-environmental behavior in the model, and the pattern of indicator scores is analytically more informative than the magnitude of the coefficient itself.

Confidence in digital skills stands out as an early asset for extending paperless work, whereas the lowest scores attach to reporting water leakage — a contrast that separates two components of efficacy that are often conflated. Employees are confident in behaviors they can execute unilaterally within their own workspace, and markedly less confident in behaviors that require initiating an interaction across a hierarchical boundary. This is not a deficit of skill but of what might be termed procedural efficacy: the belief that a channel exists, that using it is legitimate, and that the report will be received without cost to the reporter. In a public institution characterized by high formalization and clear authority gradients, such beliefs are shaped by organizational culture more than by individual capability, which is why confidence must be paired with explicit, low-threshold action mechanisms rather than with further awareness building. Theoretically, this qualifies the SCT proposition in an institutional setting: mastery experience translates into behavior only where the organizational structure supplies a legitimate route for the behavior to take. The result supports Mughal et al. (2022), Saleem et al. (2024), Nwosu (2025), Baran and Sypniewska (2024), and Widyanty et al. (2025), but diverges from Puiu et al. (2026), who found no direct efficacy-behavior link.

The divergence is instructive rather than anomalous and admits three readings. Puiu et al. examined a setting in which green behavior was largely advocacy-oriented and lacked established procedures, so that efficacy had no infrastructural channel through which to express itself; the present formal institutional context supplies precisely such procedures and facilities, making confidence enactable. The two studies also operationalize the criterion differently — operational domains of energy, water, transport, and waste here, versus advocacy there — and efficacy beliefs are domain-specific by construction, so predictive strength should be expected to vary with how closely the behavioral measure matches the efficacy referent. Finally, the Generation Z cohort's fluency with the digital tools on which many of Bank Indonesia's green practices depend raises the baseline probability that confidence converts into action.

Read together, these readings suggest that the inconsistency in the literature reflects boundary conditions on the efficacy-behavior path rather than instability in the relationship itself.

Mediation by green self-efficacy (H6 and H7). Green self-efficacy bridges both organizational factors and behavior, and Figure 3 with Table 6 report the share of each effect that travels this route: roughly two-fifths of the leadership effect and about a third of the programme effect. The theoretical significance lies less in these proportions than in what complementary partial mediation implies about how organizational influence operates. Leadership retains a direct path through norms, direction, and example, consistent with SET: employees reciprocate visible supervisory support with discretionary green effort, and this exchange does not require any change in self-appraisal. But a substantial share of the influence runs through how employees assess their own capacity, which is an SCT mechanism and a distinct one — employees do not merely follow the leader, they convert leadership support into competence and the willingness to act on it. The two theories therefore describe complementary rather than competing routes, and the finding that both paths remain significant is evidence that neither alone is sufficient. For organizational theory this carries a broader implication. Models that treat psychological states as full mediators imply that organizational resources reach behavior only by changing how employees think about themselves, whereas models that omit mediation imply that resources act directly on conduct. The present configuration supports neither pure form and instead locates green self-efficacy as one mechanism among several in a multi-path system, which is the interpretation Zhao et al. (2010) associate with complementary partial mediation and which implies that an omitted-mediator specification would understate the total organizational effect while a full-mediation specification would misattribute the direct component.

The results are consistent with Rietze et al. (2025), Widyanty et al. (2025), Gaybullaev and Strode (2026), and Ahsan and Khawaja (2024), while diverging from the full-mediation possibility discussed by Saleem et al. (2024) — a divergence plausibly attributable to institutional setting, since in organizations where green behavior is embedded in formal procedure the direct organizational path survives, whereas in settings where it is purely voluntary the psychological route carries more of the load. Managerially, the implication is that leader development must combine consistent green role modeling with capacity building through coaching, experimentation, recognition, and feedback, and that programme evaluation must assess changes in knowledge, skill, and the ability to overcome obstacles rather than participation counts.

CONCLUSION

This study set out to establish how organizational factors shape the pro-environmental behavior of Generation Z employees in a central bank, and whether that influence operates through employees' appraisal of their own capacity. Green Leadership Style and Sustainability-Based Change Programs both raise pro-environmental behavior directly and both strengthen green self-efficacy, which is in turn the strongest single driver of behavior and a complementary partial mediator of both organizational paths. A green vision becomes a daily habit principally when leadership and programme design build employees' confidence in their capacity to act. Theoretically, the study integrates the Resource-Based View, Social Exchange Theory, and Social Cognitive Theory into a single causal chain running from organizational resources through exchange-based motivation to individual agency; it establishes green

self-efficacy as a mediating rather than merely moderating mechanism; and it extends employee green behavior research to a central bank and a Generation Z workforce.

Managerial implications. Three strategic implications follow. First, environmental conduct requires an accountability anchor: infrastructural investment yields limited behavioral return while green performance remains outside the formal evaluation architecture, so the decisive managerial question is whether sustainability is embedded in the systems by which the organization judges performance rather than how many facilities it provides. Second, leadership development should be treated as capability building rather than communication: because a substantial share of the leadership effect reaches behavior through employees' efficacy beliefs, leader effectiveness in this domain depends on consistent personal role modeling and on coaching, experimentation, and feedback that build subordinate competence, not on the transmission of environmental directives. Third, sustainability programmes should be evaluated on capability outcomes rather than activity outputs, since the mechanism through which programmes influence behavior is the mastery experience they generate; participation counts are therefore a poor proxy for programme effectiveness, and evaluation should record changes in employee knowledge, skill, and the capacity to overcome obstacles. Collectively these implications reframe the Green Central Bank agenda from a facilities-and-campaign programme into an organizational capability-building agenda, in which measurable targets establish clarity, clarity supports confidence, and confidence produces behavior.

Limitations and directions for future research. Four limitations qualify these conclusions and define an agenda for subsequent work. First, the cross-sectional, single-source self-report design restricts causal inference, and acceptable full collinearity VIF values cannot by themselves rule out method bias; longitudinal, multi-wave, or field-experimental designs with multi-source measures such as supervisor ratings, energy and water audits, printing data, and facility-report records would permit stronger inference. Second, the sample was confined to Generation Z employees at a single head office with uneven distribution across units, so replication across generational cohorts, regional offices, and other public organizations using stratified sampling is warranted to establish the boundary conditions of the model. Third, the model specified four constructs only; green psychological empowerment, green perceived organizational support, green organizational culture, work engagement, and green organizational identity are plausible additions, and predictive validity should be tested on holdout samples. Fourth, work-unit identity was collected through open-ended items, and standardized unit lists combined with interviews or focus groups would help explain the inter-unit variation observed here.

Statement on the Use of Artificial Intelligence

The authors declare that generative artificial intelligence tools were used in a limited and supervised capacity during the preparation of this manuscript, confined to language editing, grammatical correction, and improvement of readability in the English text. No artificial intelligence tool was used to generate research data, to design the research instrument, to perform or interpret the statistical analysis, or to produce the substantive scholarly arguments, findings, or conclusions presented here. All analytical work was conducted by the authors using SmartPLS 4 on primary data collected by the authors. The authors reviewed and verified all AI-assisted text and accept full responsibility for the integrity, accuracy, and originality of the entire content of this

article.

Conflicts of Interest

The authors declare no conflict of interest. The authors have no known competing financial interests, personal relationships, or institutional affiliations that could have appeared to influence the work reported in this paper. The research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The views expressed in this article are those of the authors and do not represent the official position of Bank Indonesia or of Universitas Mercu Buana.

Author Contributions

Conceptualization, Citra Putri Sumardani and Setyo Riyanto; data collection, Citra Putri Sumardani; data validation, Setyo Riyanto; formal analysis, Citra Putri Sumardani and Setyo Riyanto; writing—original draft preparation, Citra Putri Sumardani; writing—review and editing, Setyo Riyanto; visualization, Citra Putri Sumardani; supervision, Setyo Riyanto. All authors have read and approved the final version of the manuscript.

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