

Environmental Sustainability Management in Electoral Governance: Evidence from Bangka Belitung

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Abstract

Environmental sustainability in electoral governance remains underexplored in management and technology studies, despite the growing ecological footprint of electoral administration. This study analyzes the influence of green practices, SDG awareness, and financial efficiency as managerial mechanisms on environmental sustainability in election supervision. Survey data from 196 officials of Provincial and District/City Election Supervisory Boards in Bangka Belitung, Indonesia, were analyzed using PLS-SEM. The results indicate that all variables have a positive and significant effect, with SDG awareness as the strongest predictor, followed by green practices and financial efficiency. The model explains 48.6% of the variance, indicating moderate predictive power. This study extends TPB and NPM in the public sector by showing how managerial decisions, digital supervision systems, and institutional awareness jointly shape environmentally responsible election supervision. The findings highlight the role of electoral supervisory bodies as public managers who integrate democratic integrity with sustainable development objectives.

Keywords: electoral governance; green practices; financial efficiency; SDG awareness; environmental sustainability

1. Introduction

Environmental sustainability has become an increasingly urgent global concern, driven by worsening ecological degradation due to population growth, unsustainable consumption, and industrial expansion. The Global Waste Management Outlook 2024 estimates that the world generated roughly 2.1 billion tonnes of municipal solid waste in 2023 and could reach 3.8 billion tonnes by 2050 under a business-as-usual scenario, underscoring mounting pressure on natural systems (UNEP, 2024). In parallel, global CO₂ emissions reached 36.1 Gt in 2022, reaffirming the steep challenge of aligning institutions with climate goals and circular-economy principles (Liu et al., 2023).

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In Indonesia, environmental pressures remain highly salient. Official figures indicate net deforestation rose to 121,103.5 ha in 2022–2023, reversing the previous year's lower level (KLHK, 2024a). At the same time, the national Environmental Quality Index (IKLH) for 2023 stood at 72.54/100, reflecting only modest improvement in overall environmental performance (KLHK, 2024b). These indicators highlight the necessity of embedding sustainability not only in industrial and infrastructure policy but also in broader aspects of public governance. In this regard, democratic institutions—including those responsible for managing and supervising elections—cannot be detached from the wider sustainability agenda.

Despite its importance, electoral governance has received little attention in environmental studies. Violations during the 2024 general election, such as campaign materials placed illegally on public spaces, revealed gaps between regulations and practice (Azizah et al., 2025). International guidance points to solutions such as digital administration, paperless documentation, and low-carbon logistics (Carter & Pearson, 2020; International IDEA, 2024). In Indonesia, Bawaslu has a mandate under Law No. 7/2017 to supervise elections, making it a strategic actor to integrate sustainability through paperless reporting, digital monitoring, and waste reduction (Republic of Indonesia, 2017; Bawaslu RI, 2025).

Existing study tends to emphasize legality and transparency while overlooking ecological outcomes. Previous studies have not sufficiently examined how institutional practices can reduce the environmental footprint of election supervision. This study addresses that gap by focusing on three drivers: green practices, SDG awareness, and financial efficiency. It contributes novelty in three ways: (i) testing a conceptual model that combines behavioral theory (TPB), governance reform (NPM), and eco-efficiency; (ii) applying it to the unique context of Bangka Belitung, an island province with distinct waste-management challenges; and (iii) employing Partial Least Squares Structural Equation Modeling (PLS-SEM) to capture both predictive accuracy and theory development.

This study is expected to extend the discussion of sustainable electoral governance by showing how institutional practices and individual awareness shape environmentally responsible election supervision. The findings are also intended to inform policy strategies that link electoral integrity with long-term ecological accountability.

2. Literature Review

2.1. Electoral Governance in Indonesia

Indonesia's electoral governance is codified in Law No. 7/2017, which articulates the constitutional principles of direct, general, free, confidential, honest, and fair elections and delineates the mandates of the Election Commission (KPU), the Election Supervisory Board (Bawaslu), and the Ethics Council (DKPP) across the electoral cycle, including pre-election preparation, campaign, voting, counting, recapitulation, and dispute resolution (Republic of Indonesia, 2017). Within this architecture, Bawaslu carries a dual mandate of preventive supervision (early warning, recommendations, compliance monitoring) and repressive action (administrative adjudication and process-dispute resolution), supported by a multi-tier oversight structure from national and provincial levels down to district/city, sub-district, village, and polling-station supervisors, and by integrated criminal-law coordination through Sentra Gakkumdu (Republic of Indonesia, 2017). This distributed design establishes standardized reporting lines and rapid corrective orders, enabling continuous surveillance and institutional learning.

Recent institutional evaluation shows how this legal design allows Bawaslu to act not only as a compliance enforcer but also as a change agent that mainstreams cross-cutting governance priorities into routine oversight practice, most notably environmental sustainability through paperless reporting, digital complaint portals, e-documentation, and post-campaign waste-management expectations derived from the 2024 cycle (Bawaslu RI, 2025). Interpreted alongside international electoral-integrity guidance on digitization and information governance, these instruments strengthen traceability, auditability, and responsiveness while creating actionable entry points for greener planning, procurement, logistics, and campaign-compliance

supervision within the statutory mandate (OECD, 2019; UNDP, 2020). Conceptually, embedding sustainability in election oversight is consistent with the sustainability canon of meeting present needs without compromising future generations, which reframes oversight outputs in terms of both integrity and ecological performance (World Commission on Environment and Development, 1987).

2.2. *Green Practices in Electoral Supervisory*

Green practices in election supervision refer to the application of technology-enabled and resource-efficient managerial processes, including digitization (e-documentation, online complaint systems, and electronic evidence chains), material minimization (paper and plastic reduction, recyclable substitutes), and low-carbon logistics (efficient mobility, route optimization, and consolidated distribution). International guidance highlights digitization as a dual instrument for safeguarding electoral integrity while improving resource efficiency by reducing administrative frictions and material use (UNDP, 2020). Similarly, OECD frameworks emphasize greener electoral operations through waste reduction and logistics optimization without undermining procedural compliance (OECD, 2019).

Empirical and practitioner evidence demonstrates the feasibility of these practices. Experiences from the Asia-Pacific region document restrictions on single-use plastics and the adoption of biodegradable materials in electoral processes, providing operational templates for election bodies (International IDEA, 2024). In Indonesia, institutional evaluations reveal the implementation of paperless supervision, digital outreach, recyclable materials, and structured upcycling pathways for campaign waste, illustrating how green practices are embedded in routine supervisory activities rather than treated as ad hoc initiatives (Bawaslu RI, 2025).

Beyond the electoral context, the broader literature consistently finds that green innovation and environmentally oriented process redesigns enhance both environmental and organizational performance (Wang et al., 2021; Alves et al., 2020). A recent systematic review further identifies technology-enabled monitoring and cross-functional coordination as key enablers of effective environmental practices, which closely correspond to digital supervision systems and inter-agency collaboration in election oversight (Tennakoon et al., 2024). Collectively, these studies position green practices as managerial process innovations that reduce input intensity and waste while maintaining, or even improving, supervisory effectiveness. Accordingly, this study hypothesizes that:

H1: Green practices positively influence environmental sustainability in election supervision.

2.3. *Sustainable Development Goal (SDG) Awareness*

The 2030 Agenda frames SDG 13 (Climate Action) and SDG 16 (Peace, Justice and Strong Institutions) as mutually reinforcing, emphasizing that effective environmental outcomes depend on the capacity and legitimacy of public institutions (UN General Assembly, 2015). Translating these global commitments into operational practice requires institutional readiness, including adequate financing, data systems, and implementation capacity, so that SDG principles are embedded in organizational procedures, performance management, and reporting rather than remaining declarative (World Bank Group, 2018).

At the individual and organizational levels, SDG awareness functions as a behavioral driver that shapes environmentally responsible supervision. Drawing on the Theory of Planned Behavior, awareness influences attitudes, subjective norms, and perceived behavioral control, thereby converting sustainability knowledge into pro-environmental actions in daily supervisory tasks (Ajzen, 1991). In the Indonesian electoral context, institutional evaluations identify uneven environmental literacy, policy gaps, and the need for continuous organizational socialization as key factors determining whether SDG awareness translates into consistent supervisory behavior (Bawaslu RI, 2025).

International evidence further highlights the role of context and socialization in shaping SDG awareness. Global surveys show that the perceived importance of SDGs varies across social, economic, and environmental dimensions and across national contexts (Kleespies & Dierkes, 2022). Studies in low-

awareness settings demonstrate that targeted institutional socialization is essential, while evidence from higher-education institutions indicates that integrating SDGs into formal programs significantly enhances pro-environmental behavior (Omisore et al., 2017; Al Husban, 2025). Beyond educational settings, adopting SDG-based frameworks for programs and reporting provides a measurable structure for accountability and transparency, which can be analogously applied by public institutions to guide sustainability-oriented supervision (Fallah Shayan et al., 2022). Accordingly, this study hypothesizes that:

H2: SDG awareness positively influences environmental sustainability in election supervision.

2.4. *Financial Efficiency*

Within the New Public Management (NPM) framework, financial efficiency—characterized by cost discipline, output orientation, and value for money—is a core principle of public-sector reform (Hood, 1991). These principles are operationalized through public expenditure management practices such as credible budgeting, expenditure control, and performance-based allocation, which reduce waste in administrative activities including travel, printing, and logistics (Allen & Tommasi, 2001). Complementing this perspective, the reinvention of government emphasizes innovation and entrepreneurial public management to redesign processes for results, encouraging the use of digital reporting systems, lean procurement, and data-driven resource allocation (Osborne & Gaebler, 1992).

When integrated with environmentally oriented operations, financial efficiency supports eco-efficiency, defined as achieving equivalent or improved supervisory outcomes with lower material and energy inputs. In election supervision, this linkage implies that cost-saving measures—such as reducing paper-based reporting and optimizing supervisory mobility—can simultaneously strengthen fiscal stewardship and lower environmental impacts. Recent empirical studies reinforce this finance–sustainability nexus by showing that the incorporation of environmental considerations into efficiency metrics improves resource allocation and procurement decisions in both public and private organizations (Iazzolino et al., 2023; de Preux & Rizmie, 2018).

Further evidence indicates that environmental-sustainability commitment is positively associated with financial performance, suggesting that greener operational choices can generate fiscal co-benefits rather than trade-offs (Dzomonda & Fatoki, 2020). At a broader level, research on green finance and climate-related risk underscores the importance of integrating sustainability considerations into financial management and organizational planning (Migliorelli, 2023; Khan et al., 2022). Collectively, these insights position financial efficiency as a managerial lever through which public organizations, including electoral supervisory bodies, can align budget discipline with environmental sustainability objectives. Accordingly, this study hypothesizes that:

H3: Financial efficiency positively influences environmental sustainability in election supervision.

2.5. *Environmental Sustainability*

As an outcome construct, environmental sustainability in election supervision is evidenced by (i) eco-friendly resource use (lower paper, plastics, energy), (ii) waste reduction and management (recycling, upcycling, controlled disposal), and (iii) sustainable mobility/logistics (optimized routing, consolidated distribution, reverse logistics) (OECD, 2019; WCED, 1987; Dekker et al., 2012). The green-logistics literature formalizes cost–environment trade-offs and shows that operational tools such as route optimization, load consolidation, and reverse flows can deliver measurable reductions in emissions and waste without undermining effectiveness (Dekker et al., 2012). In electoral settings, these levers map to supervisor mobility, documentation and evidence chains, and post-campaign clean-up coordination, enabling the dependent variable to be specified with practical indicators that capture both process changes and environmental outcomes. Practitioner lessons (e.g., single-use plastic restrictions, biodegradable materials) supply feasible design choices (International IDEA, 2024), while local institutional experience (paperless supervision, digital outreach, waste upcycling pathways) grounds the construct in Indonesia’s electoral context (Bawaslu RI,

2025). Consequently, this study's hypotheses propose that green practices, SDG awareness, and financial efficiency jointly and positively predict environmental sustainability in election supervision, which are theoretically warranted and empirically testable within a PLS-SEM framework.

3. Method

This study employed a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS, selected for its suitability in prediction-oriented models and robustness to non-normal data. The population comprised employees of the Provincial and District/City Election Supervisory Boards in Bangka Belitung Province. Data were collected through a structured questionnaire using total sampling, resulting in 196 valid responses. All items were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Measurement items were adapted from established studies and contextualized to election supervision. Green Practices were measured through items related to paperless reporting, digital supervision, and waste reduction (UNDP, 2020; OECD, 2019). SDG Awareness captured respondents' understanding of and commitment to SDG principles, particularly SDG 13 and SDG 16 (Ajzen, 1991; Kleespies & Dierkes, 2022). Financial Efficiency was assessed using items reflecting cost discipline and efficient resource utilization in supervisory activities (Hood, 1991; Allen & Tommasi, 2001). Environmental Sustainability was operationalized through indicators of reduced resource use and environmentally responsible supervision (OECD, 2019; WCED, 1987).

Ethical considerations were observed. Participation was voluntary, informed consent was obtained, and anonymity and confidentiality of respondents were assured. All data were used solely for academic purposes.

4. Results And Discussion

4.1. Descriptive Analysis

A total of 210 questionnaires were distributed to employees of the Provincial Election Supervisory Board and the District/City Election Supervisory Board in Bangka Belitung Province. Out of these, 196 questionnaires were returned and deemed valid for further analysis, resulting in a response rate of 93.3%, which exceeds the minimum requirement for quantitative study and indicates strong participation.

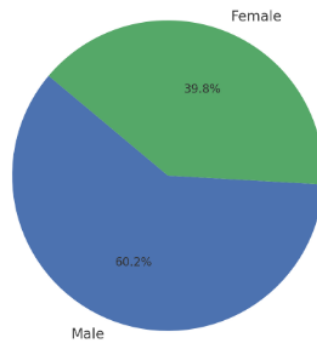


Figure 1 Gender Distribution of Respondents

As shown in Figure 1, the sample included 118 male respondents (60.2%) and 78 female respondents (39.8%), which mirrors the actual workforce composition of Bawaslu in Bangka Belitung. This distribution ensures that both male and female perspectives are well represented, strengthening the reliability of findings on green practices, financial efficiency, SDG awareness, and environmental sustainability.

4.2. Validity Test

Figure 2 illustrates the measurement and structural model estimated using PLS-SEM. The model consists of four latent constructs: Green Practices (GP), Financial Efficiency (FE), SDG Awareness (SA), and Environmental Sustainability (ES). Each construct is represented by nine observed indicators. Arrows pointing from the constructs to the indicators represent the measurement (outer) model, while the arrows between constructs show the structural relationships. The coefficients displayed on the paths to ES represent the estimated path coefficients, whereas the numbers next to each indicator represent their respective outer loadings.

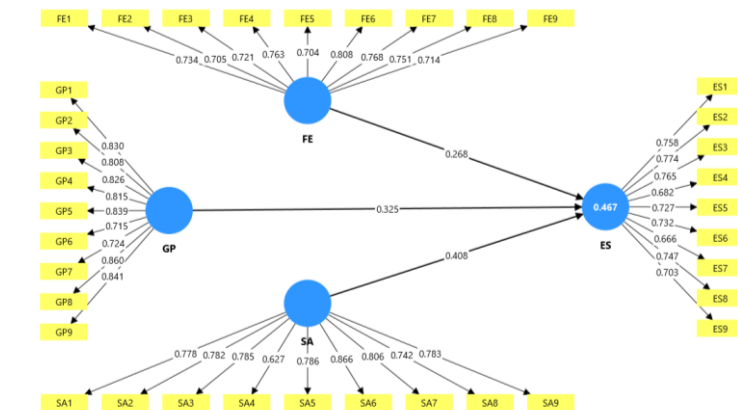


Figure 2. Structural Model

To assess the convergent validity of the measurement model, the outer loadings of each indicator were examined. A threshold value of 0.70 is generally recommended, indicating that the indicator shares more than 50% of its variance with the latent construct (Hair et al., 2021). Indicators with loadings between 0.40 and 0.70 may be considered for removal if their exclusion increases the Average Variance Extracted (AVE) and the overall construct reliability.

Table 1 Outer Loadings

	Outer loadings		Outer loadings
ES1 <- ES	0.758	GP1 <- GP	0.830
ES2 <- ES	0.774	GP2 <- GP	0.808
ES3 <- ES	0.765	GP3 <- GP	0.826
ES4 <- ES	0.682	GP4 <- GP	0.815
ES5 <- ES	0.727	GP5 <- GP	0.839
ES6 <- ES	0.732	GP6 <- GP	0.715
ES7 <- ES	0.666	GP7 <- GP	0.724
ES8 <- ES	0.747	GP8 <- GP	0.860
ES9 <- ES	0.703	GP9 <- GP	0.841
FE1 <- FE	0.734	SA1 <- SA	0.778
FE2 <- FE	0.705	SA2 <- SA	0.782
FE3 <- FE	0.721	SA3 <- SA	0.785
FE4 <- FE	0.763	SA4 <- SA	0.627

FE5 <- FE	0.704	SA5 <- SA	0.786
FE6 <- FE	0.808	SA6 <- SA	0.866
FE7 <- FE	0.768	SA7 <- SA	0.806
FE8 <- FE	0.751	SA8 <- SA	0.742
FE9 <- FE	0.714	SA9 <- SA	0.783

Reference: Data processed by the authors (2025).

Based on the results, most indicators demonstrated satisfactory loadings above 0.70, confirming their adequacy in measuring the respective constructs. However, three indicators fell below the recommended threshold: ES4 (0.682), ES6 (0.666), and SA4 (0.627). These indicators showed weaker correlations with their latent constructs, suggesting that they contributed less to explaining the variance of their respective constructs compared to other indicators.

In line with methodological guidelines, these three indicators were eliminated from further analysis to improve the convergent validity and overall measurement quality of the model. After their removal, the remaining indicators were retained, as they exhibited loadings above 0.70 and ensured that each construct met the reliability and validity criteria.

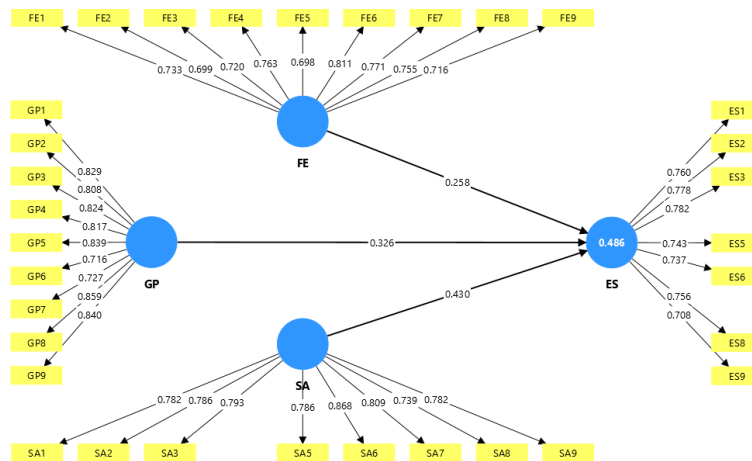


Figure 3 Structural Model after Elimination

After eliminating ES4, ES7, and SA4 due to low outer loadings (<0.70), the measurement model was re-estimated. The updated results indicate that most indicators achieved satisfactory outer loadings above 0.70. However, two indicators under the construct Financial Efficiency (FE2 = 0.699; FE5 = 0.698) fell slightly below the recommended threshold. Indicators with loadings between 0.40 and 0.70 may be retained if their removal does not substantially improve the Average Variance Extracted (AVE) and Composite Reliability (CR), particularly when theoretical justification supports their inclusion. In this study, both FE2 and FE5 remain close to the cut-off point and contribute to capturing the conceptual domain of financial efficiency; therefore, they were retained in the model. This decision ensures the construct maintains both its statistical adequacy and theoretical comprehensiveness.

Table 2 Construct Convergent Validity

Variable	Average variance extracted (AVE)	Threshold	Result / Decision
ES	0.566	0.50	Convergent Valid
FE	0.550	0.50	Convergent Valid
GP	0.653	0.50	Convergent Valid
SA	0.630	0.50	Convergent Valid

Reference: Data processed by the authors (2025).

The Average Variance Extracted (AVE) values for all constructs are above the recommended threshold of 0.50, which indicates that each latent variable is able to explain more than 50% of the variance of its indicators and thus achieves adequate convergent validity. As shown in Table 2, all Average Variance Extracted (AVE) values exceed the recommended threshold of 0.50, with ES = 0.566, FE = 0.550, GP = 0.653, and SA = 0.630. These results confirm that each construct explains more than 50% of the variance of its indicators, thereby meeting the criterion of convergent validity and demonstrating that the indicators consistently represent their respective latent variables

Table 3 HTMT Result

	ES	FE	GP	SA
ES				
FE	0.345			
GP	0.512	0.084		
SA	0.632	0.169	0.347	

Reference: Data processed by the authors (2025).

Discriminant validity was evaluated using the Heterotrait-Monotrait Ratio of Correlations (HTMT). According to Henseler et al. (2015), HTMT values below 0.90 indicate sufficient discriminant validity, while more conservative thresholds suggest a cut-off of 0.85. Table 3 presents the HTMT results for all constructs in the model. The values range from 0.084 to 0.632, with the highest relationship observed between ES and SA (0.632). Since all values are well below the threshold of 0.90, the results confirm that each construct is empirically distinct and measures conceptually different phenomena. This demonstrates that Green Practices (GP), Financial Efficiency (FE), SDG Awareness (SA), and Environmental Sustainability (ES) satisfy the criterion of discriminant validity and do not exhibit multicollinearity or redundancy.

4.3. Reliability Test

Reliability was assessed using three indicators: Cronbach's Alpha, Composite Reliability (rho_a), and Composite Reliability (rho_c). According to Hair et al. (2021), values above 0.70 are considered acceptable, values between 0.80–0.90 indicate good reliability, and values above 0.90 demonstrate excellent internal consistency.

As shown in Table 4, all constructs, Environmental Sustainability (ES), Financial Efficiency (FE), Green Practices (GP), and SDG Awareness (SA) exceeded the minimum threshold. Specifically, Cronbach's Alpha values ranged from 0.872 to 0.933, rho_a ranged from 0.874 to 0.937, and rho_c ranged from 0.901 to 0.944. These results confirm that all constructs demonstrate high internal consistency, meaning that the indicators within each construct are strongly correlated and measure the same underlying latent variable. Thus, the

findings provide strong evidence that the measurement model is reliable and suitable for further structural analysis.

Table 4 Reliability Test

	Cronbach's alpha	Composite reliability (rho a)	Composite reliability (rho c)
ES	0.872	0.874	0.901
FE	0.899	0.924	0.916
GP	0.933	0.937	0.944
SA	0.916	0.923	0.931

Reference: Data processed by the authors (2025).

4.4 Coefficient of Determination (R-Square Test)

The coefficient of determination (R^2) was examined to assess the explanatory power of the independent variables on the dependent variable in the structural model. As shown in Table 5, the R^2 value for Environmental Sustainability (ES) is 0.486, with an adjusted R^2 of 0.478. This indicates that the three exogenous variablesl Green Practices (GP), Financial Efficiency (FE), and SDG Awareness (SA) together explain approximately 48.6% of the variance in Environmental Sustainability. According to the guidelines by Hair et al. (2021), an R^2 value around 0.25 is considered weak, 0.50 is moderate, and 0.75 is substantial. Thus, the R^2 value obtained in this study falls within the moderate category, suggesting that the proposed model has a reasonable explanatory power. The remaining 51.4% of the variance in Environmental Sustainability is likely explained by other factors not included in the current model, which may be explored in future study.

Table 5. R-Square

	R-square	R-square adjusted
ES	0.486	0.478

Reference: Data processed by the authors (2025).

4.5. Bootstrapping

Bootstrapping with 5,000 subsamples was employed to test the statistical significance of the hypothesized relationships. Table 6 summarizes the path coefficients, standard errors, t-statistics, and p-values. A path is considered significant when $t > 1.96$ at $\alpha = 0.05$ or when $p \leq 0.05$.

Table 6. Bootstrapping Results (Path Coefficients)

	Original sample	T statistics	P values	Result
GP -> ES	0.326	6.720	0.000	Supported
SA -> ES	0.430	8.046	0.000	Supported
FE -> ES	0.258	5.380	0.000	Supported

Reference: Data processed by the authors (2025).

Hypothesis 1: The Influence of Green Practices on Environmental Sustainability

The effect of Green Practices on Environmental Sustainability was significant ($\beta = 0.326$, $T = 6.720$, $p < 0.001$), confirming that the adoption of environmentally friendly supervisory activities leads to tangible ecological benefits. Practices such as paperless reporting, recycling of campaign materials, and using digital platforms for monitoring reduce the environmental footprint of election supervision.

This result corroborates Wang et al. (2021), who established that green innovation practices (covering

product, process, and managerial innovation) positively affect organizational environmental performance. Similarly, Tennakoon et al. (2024) emphasized that green practices, particularly digitization and waste minimization, are vital for sustainable institutional performance. The findings also echo International IDEA (2024), which recommended concrete steps such as restricting single-use plastics and adopting biodegradable materials in elections to mitigate waste.

In the specific context of Indonesia, this evidence complements Bawaslu RI (2025), which identified lessons from the 2024 election cycle regarding the need for stronger adoption of green practices in campaign supervision. This confirms that election supervision can serve not only as a guardian of integrity but also as a catalyst for institutionalizing environmentally responsible governance. In Bangka Belitung, where elections produced significant volumes of campaign banners and printed posters that often ended up unmanaged in coastal areas, the adoption of paperless systems and recycling initiatives becomes particularly urgent given the province's limited waste-management infrastructure. As a supplementary comparison, International IDEA (2024) notes similar initiatives in countries such as South Korea and Australia, where electoral bodies have introduced digital supervision and green logistics to minimize environmental impact.

Hypothesis 2: The Influence of SDG Awareness on Environmental Sustainability

The strongest relationship was found between SDG Awareness and Environmental Sustainability ($\beta = 0.430$, $T = 8.046$, $p < 0.001$). This finding suggests that when election supervisors and institutions internalize the values of the Sustainable Development Goals, particularly SDG 13 (Climate Action) and SDG 16 (Peace, Justice, and Strong Institutions), they are more likely to adopt environmentally responsible behaviors in their supervision roles.

The result reinforces the Theory of Planned Behavior (TPB) (Ajzen, 1991), which highlights the role of attitudes, subjective norms, and perceived behavioral control in shaping behavior. It is also consistent with Kleespies and Dierkes (2022), who found that awareness of sustainability issues significantly affects pro-environmental choices among students, and with Al Husban (2025), who reported that integrating SDGs into curricula and organizational programs enhances sustainable behaviors. Moreover, Fallah Shayan et al. (2022) argued that framing programs under the SDGs provides measurable benchmarks and accountability, which this study empirically supports in the public sector context.

As an additional comparison, Omisore et al. (2017) reported that SDG awareness in Nigerian universities remained relatively low, with only 43% of respondents being aware and 4.2% demonstrating good knowledge. This contrast highlights that while awareness strongly predicts pro-environmental behavior in Bangka Belitung's election supervision, the effectiveness of SDG socialization efforts varies across contexts and requires continuous institutional engagement. In the local setting, uneven levels of environmental literacy among supervisors in Bangka Belitung have been noted, reinforcing the need for targeted training and institutional campaigns to embed SDG values into daily monitoring and reporting routines.

Hypothesis 3: The Influence of Financial Efficiency on Environmental Sustainability

The relationship between Financial Efficiency and Environmental Sustainability was found to be positive and significant ($\beta = 0.258$, $T = 5.380$, $p < 0.001$). This suggests that efficient budget utilization, cost-saving measures through digital systems, and optimized logistics positively influence the environmental sustainability of election supervision. The finding resonates with the New Public Management (NPM) perspective (Hood, 1991), which emphasizes cost-efficiency and accountability in public governance.

Empirically, this result aligns with Dzomonda and Fatoki (2020), who demonstrated that organizations with greater financial discipline are more likely to achieve sustainability targets, as well as with Iazzolino et al. (2023), who highlighted that financial efficiency, when integrated with ESG frameworks, enhances long-term performance. In the election supervision context, this implies that financial efficiency not only secures

value for money but also reduces environmental impact, for example by minimizing paper usage or cutting unnecessary travel costs during supervision. This study therefore strengthens the view that financial prudence in public bodies is an enabler of ecological accountability, expanding the discourse from corporate settings to election supervision.

As an international comparison, Khan et al. (2022) found that green finance contributes significantly to CO₂-emission reductions and improved environmental performance at the macro level. Similarly, Migliorelli (2023) noted that climate-related risks directly affect financial institutions, underscoring the importance of integrating sustainability into financial management. These findings indicate that the positive link between financial efficiency and environmental sustainability in Bangka Belitung's election supervision reflects broader global patterns where fiscal discipline and environmental responsibility reinforce one another. In particular, the geographic dispersion of islands in Bangka Belitung creates higher logistical costs for supervision, making budget efficiency not only a financial priority but also an environmental necessity by reducing travel emissions and resource use.

5. Conclusion

This study confirms that Green Practices, SDG Awareness, and Financial Efficiency have positive and significant effects on Environmental Sustainability in election supervision in Bangka Belitung Province, with SDG Awareness emerging as the strongest predictor. These findings indicate that environmentally responsible election supervision is shaped not only by operational innovations and cost discipline but also by the internalization of sustainability values at the individual and institutional levels.

From a theoretical perspective, the results extend the Theory of Planned Behavior (TPB) by demonstrating that sustainability awareness within a public-sector organization functions as a behavioral mechanism that translates attitudes and norms into pro-environmental supervisory practices. In parallel, the findings broaden the application of New Public Management (NPM) by showing that financial efficiency and managerial process innovations, particularly through digital supervision systems, contribute not only to fiscal performance but also to environmental sustainability outcomes. Together, these insights position sustainability in election supervision as the product of an interaction between behavioral intention (TPB) and managerial efficiency (NPM) in the public sector.

For future research, expanding the analysis beyond a single province and incorporating additional organizational variables such as culture or regulatory enforcement would provide a more comprehensive understanding of sustainability in electoral governance. Longitudinal designs may further capture how behavioral and managerial mechanisms evolve as electoral institutions adapt to increasing sustainability demands.

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