Asia Pacific Journal of Advanced Education and Technology
Volume 5, Issue 1, March 2026 / P- ISSN 2815 – 245X / E – ISSN 2815 – 2468 / www.apjaet.com

The Relationship between Green Operational Practices and Business Performance Metrics among SMEs in the Philippines: Basis for HR Sustainability Framework

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DOI: https://doi.org/10.54476/apjaet/33611

Abstract

This study examined the relationship between green operational practices and business performance metrics among small and medium enterprises (SMEs) in the Philippines as a basis for proposing an HR Sustainability Framework. Using a descriptive-correlational quantitative design, data were collected from 100 SME employees in operational, supervisory, and managerial roles. A structured questionnaire using a 4-point Likert scale measured four green operational practice dimensions (energy/resource efficiency, waste reduction, sustainable sourcing, and employee participation) and three business performance dimensions (environmental innovation, social innovation, and operational sustainability/efficiency). Data were analyzed through frequency/percentage, weighted mean, and standard deviation, and Pearson's r using SPSS. Results showed high implementation of green operational practices and high levels of perceived business performance. Correlation analysis confirmed significant positive relationships between all green practice dimensions and business performance, with the strongest association observed for waste reduction. Based on the findings, an HR Sustainability Framework is proposed to institutionalize sustainability through green recruitment, training, performance systems, and culture-building.

Keywords: green operational practices; SME performance; sustainability; green HRM; Philippines

Introduction

SMEs increasingly operate in an environment where sustainability expectations shape competitiveness and legitimacy. The rising emphasis on ESG metrics indicates that performance is no longer viewed purely through financial outcomes but also through environmental and social impact, creating stronger pressure for operational sustainability even among smaller firms (Ramadhan & Widiastuty, 2023; Taraku & Taraku, 2024).

The strategic importance of sustainability is particularly relevant for SMEs because they often face constraints in resources, technology, and specialized expertise. Despite these limitations, SMEs with stronger adaptive capacity and internal reconfiguration skills are better positioned to navigate disruptions and pursue long-term performance improvements (Dejardin et al., 2022).

Digital transformation and innovation culture also influence SME performance because they enable faster adaptation, productivity gains, and improved market responsiveness. Empirical literature highlights how digital capabilities and open innovation contribute to resilience and improved outcomes, especially when SMEs face volatile external conditions (Proksch et al., 2021; Menne et al., 2022). In practice, sustainability and digitalization increasingly intersect as firms adopt energy-saving systems, monitoring tools, and process improvements to reduce waste and inefficiencies.

Green operational practices provide SMEs a practical path toward sustainability by targeting day-to-day operational controls that reduce environmental impact while improving efficiency. Core practices include energy and resource efficiency, waste reduction and sustainable disposal, environmentally responsible sourcing and procurement, and employee participation in environmental programs—dimensions directly examined in this study. These practices are also consistent with green supply chain and responsible procurement literature that links environmental integration to improved operational credibility and stakeholder trust (Almereb & Karia, 2024; Cerchione, 2024).

Business performance in sustainability research is increasingly viewed as multidimensional, covering innovation behaviors and operational outcomes. In this study, performance is captured through environmental innovation behavior, social innovation behavior, and operational sustainability and efficiency. This perspective aligns with balanced and integrated performance frameworks that recognize efficiency, innovation, and stakeholder value as joint outcomes of sustainable management.

A key explanatory lens for linking green practices to performance is the Green Dynamic Capabilities (GDC) Theory. The GDC view emphasizes how firms "sense, seize, and transform" internal capabilities toward environmental objectives—thereby improving innovation and performance outcomes (Li et al., 2023). For SMEs, this implies that sustainability can be a strategic capability—not only a compliance obligation—when embedded into routines and decision systems.

Human resources are central to operationalizing sustainability because many green practices depend on employee behavior, skills, and reinforcement systems. The Human Resource Sustainability Framework (HRSF) reframes HR functions through an ethical and long-term lens, aligning workforce strategies with environmental and social goals. Sustainable HRM (SHRM) emphasizes recruitment, development, performance management, and reward systems that build both organizational resilience and employee well-being (Kramar, 2022; Nakra et al., 2024).

Given the operational nature of green practices and the people-driven mechanisms required for implementation, this study positions HR sustainability as a practical bridge between environmental initiatives and business outcomes. Specifically, it tests how green operational practices relate to business performance metrics and uses the evidence to propose an HR Sustainability Framework tailored to Philippine SMEs.

Objectives of the Study

This research aimed to:

1. Determine the perceived extent of green operational practices across energy/resource efficiency, waste reduction, sustainable sourcing, and employee participation.
2. Assess the perceived levels of business performance metrics for environmental innovation, social innovation, and operational sustainability/efficiency.
3. Test the significant relationship between green operational practices and business performance metrics.

Methodology

Research Design. The study used a descriptive-correlational quantitative research design. Descriptive analysis assessed levels of green practices and performance, while correlational analysis tested relationships between variables.

Respondents and Sampling. Respondents were SME employees in operational, supervisory, or managerial roles with at least one year of organizational experience and awareness of sustainability and operational policies. Sampling applied stratified random sampling by industry classification, with a final sample of 100 determined via G*Power (effect size = 0.10, $\alpha = 0.05$, power = 0.95, predictors = 4).

Research Instrument. A structured questionnaire with four sections was used, employing a 4-point Likert scale (1–Very Low to 4–Very High). Measures covered green operational practices (20 items across four dimensions) and perceived business performance (15 items across three dimensions).

Data Collection. Data collection involved management approval and ethical clearance, with survey distribution via digital and printed methods, and informed consent assuring confidentiality and voluntary participation.

Data Analysis. SPSS was used. Demographics were analyzed using frequencies and percentages; weighted means and SDs described levels of practice and performance; and Pearson's r tested relationships between variables.

Results

1. Extent of Green Operational Practices

Regarding the extent of green operational practices, energy and resource efficiency obtained an overall mean of 3.62 (SD = 0.28), interpreted as High, indicating that SMEs regularly apply resource-saving practices. The highest-rated indicator under this dimension was encouraging employees to conserve electricity and water (M = 3.81, SD = 0.39), while investment in technologies that reduce energy and resource use remained high but comparatively lowest (M = 3.45, SD = 0.50). For waste reduction and sustainable disposal, the overall mean was 3.80 (SD = 0.63) interpreted as High, showing consistent implementation of waste-related practices. The strongest item focused on minimizing single-use plastics

through internal policies (M = 4.05, SD = 2.96), while proper waste segregation was also rated high (M = 3.60, SD = 0.49). For environmentally responsible sourcing and procurement, the overall mean was 3.53 (SD = 0.32), interpreted as High, suggesting that sustainability is integrated into purchasing and supplier practices. The highest indicator was encouraging or requiring green certifications or eco-labels from vendors (M = 3.77, SD = 0.42), while considering environmental impact in procurement decisions remained high (M = 3.42, SD = 0.50). For employee participation in environmental programs, the overall mean was 3.52 (SD = 0.41), interpreted as High, reflecting active engagement of employees in sustainability initiatives. The highest-rated item was encouraging employee suggestions for improving environmental practices (M = 3.59, SD = 0.49), while embedding environmental values into culture and performance expectations was also rated high (M = 3.48, SD = 0.50).

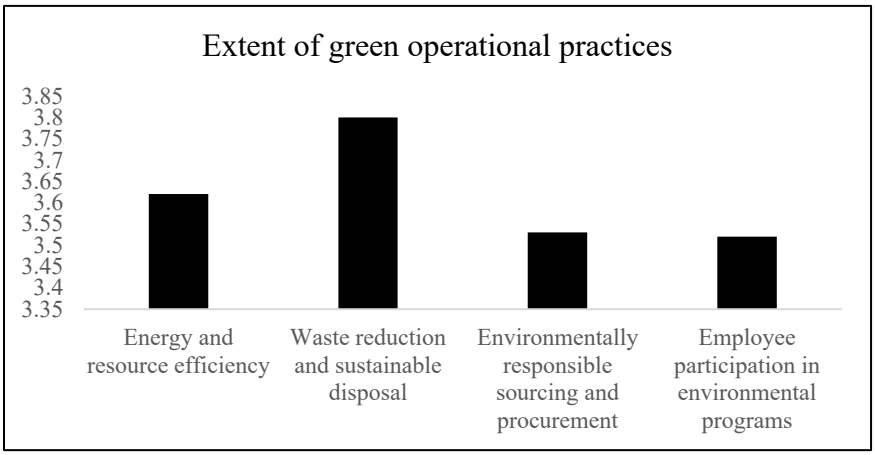

Figure 1 describes the extent of green operational practices.

2. Perceived Business Performance of SMEs

In terms of business performance metrics, environmental innovation behavior was rated High with a reported composite mean of 2.73 (SD = 0.27), indicating that SMEs demonstrate sustainability-oriented innovation in their operations. The highest-rated indicator under this dimension was adopting new technologies to reduce environmental footprint (M = 3.50, SD = 0.50), while guiding innovation using sustainability goals remained high (M = 3.31, SD = 0.46). For social innovation behavior, the composite mean was 3.42 (SD = 0.29), interpreted as High, indicating strong integration of social responsibility and stakeholder value in SME initiatives. The highest-rated item was embedding social responsibility in company operations and strategies (M = 3.57, SD = 0.50), while collaboration with NGOs or public agencies was rated high but lowest in the set (M = 3.27, SD = 0.45). For operational sustainability and efficiency, the overall mean was 3.63 (SD = 0.34), interpreted as High, indicating that sustainability practices contribute to improved productivity and efficiency. The strongest indicator was designing business processes to minimize waste and inefficiencies (M = 3.70, SD = 0.46), while sustainability as a guiding principle in operational planning was also rated high (M = 3.57, SD = 0.50).

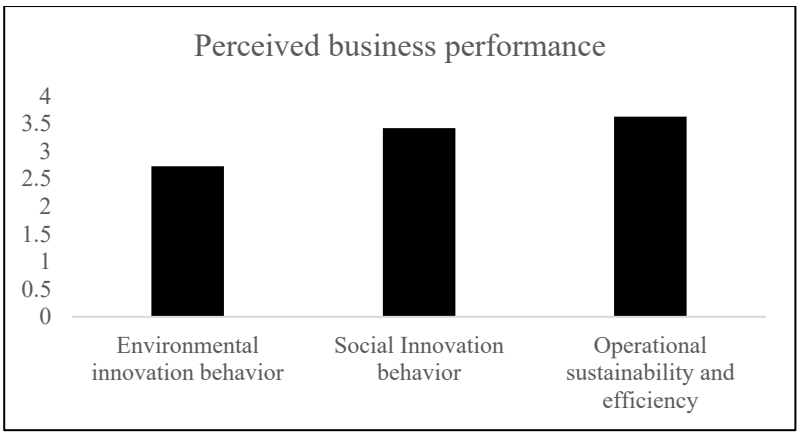

Figure 2 shows the perceived business performance of selected SMEs in the Philippines.

3. Relationship between green operational practices and business performance

Table 1
Relationship between Green Operational Practices and Business Performance Metrics

Variables	*r*-value	Sig. value	Decision on H_o	Interpretation
Energy and resource efficiency	0.54	0.01	Reject H_o	**Significant**
Waste Reduction and Sustainable Disposal	0.89	0.01	Reject H_o	**Significant**
Environmentally Responsible Sourcing and Procurement	0.52	0.01	Reject H_o	**Significant**
Employee Participation in Environmental Programs	0.46	0.01	Reject H_o	**Significant**

Correlation analysis showed that green operational practices were significantly and positively related to business performance metrics at p = 0.01 across all dimensions. Waste reduction and sustainable disposal showed the strongest relationship with business performance (r = 0.89), followed by energy and resource efficiency (r = 0.54) and environmentally responsible sourcing and procurement (r = 0.52). Employee participation in environmental programs also showed a significant positive relationship with business performance (r = 0.46). These results indicate that higher implementation of green operational practices is associated with higher business performance outcomes among SMEs in the Philippines.

Discussion

The demographic results show that respondents were largely mid- to late-career individuals, with many holding owner/manager roles—strengthening the credibility of sustainability and performance assessments because respondents are directly involved in operational and strategic decision-making. This aligns with the view that leadership roles shape sustainability integration and performance monitoring.

Findings indicate that Philippine SMEs implement green operational practices at a high level across multiple dimensions. Energy and resource efficiency practices were rated high overall (M = 3.62), reflecting routine conservation behaviors and monitoring systems. These patterns are consistent with literature

emphasizing workforce participation and capability-building as drivers of eco-efficiency (Piwowar-Sulej et al., 2023; Mohiuddin et al., 2022).

Waste reduction emerged as the strongest operational practice (M = 3.80), suggesting that SMEs may prioritize "visible" and actionable practices such as plastics minimization, segregation, and disposal systems. This aligns with the sustainability literature, which indicates that waste controls often yield immediate operational and cost benefits and can be implemented with fewer technological barriers than large capital investments (Habib et al., 2022; Cerchione, 2024).

Business performance metrics were also high, with operational sustainability/efficiency showing the highest performance score (M = 3.63). This reinforces the argument that sustainability-driven operations can translate into productivity gains and cost savings, consistent with multidimensional performance approaches that embed sustainability into operational planning (Holopainen et al., 2022; Shaumi et al., 2022).

Most importantly, correlation results confirm that green operational practices are significantly associated with business performance. Waste reduction showed the strongest relationship (r = 0.89), implying that SMEs that systematize waste policies and disposal routines tend to achieve stronger performance outcomes. The findings provide empirical support for GDC Theory, which argues that sustainability performance emerges when firms reconfigure internal processes toward environmental objectives (Li et al., 2023).

Practically, the results indicate that SMEs can treat green operational practices as performance levers—not only as compliance activities—especially in waste reduction and resource efficiency, where returns are more immediate. Conceptually, the findings strengthen the people-based mechanism implied by sustainable HRM: sustainability outcomes are amplified when HR systems translate green priorities into competencies, incentives, and culture (Kramar, 2022; Nakra et al., 2024). This justifies the proposed HR Sustainability Framework as an organizing model that connects employee-centered HR interventions to operational green practice adoption and measurable performance outcomes.

Conclusions

This study concludes that SMEs in the Philippines report high implementation of green operational practices and high levels of business performance across innovation and operational efficiency dimensions. All green practice dimensions showed significant positive relationships with business performance, with waste reduction demonstrating the strongest association. These findings support the Green Dynamic Capabilities perspective that sustainability-driven process reconfiguration strengthens innovation and performance. Based on the evidence, an HR Sustainability Framework is proposed to institutionalize sustainability through recruitment, capability-building, performance systems, and culture-based participation mechanisms.

Recommendations

SMEs should integrate sustainability criteria into hiring and onboarding to ensure employees are aligned with the organization's green goals. SMEs should provide regular training on energy efficiency, waste reduction, and sustainable sourcing to strengthen consistent implementation of green operational practices. SMEs should incorporate green key performance indicators into performance appraisal and offer recognition or incentives to encourage employee participation in sustainability initiatives. SMEs should prioritize waste reduction systems because these practices show the strongest relationship with improved business performance. SMEs should adopt the proposed HR Sustainability Framework and conduct periodic reviews of sustainability outcomes to support continuous improvement.

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