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ECO-BUSINESS MODEL INNOVATION AND INSTITUTIONAL SUPPORT FOR GREEN MSME PERFORMANCE IN RURAL INDONESIA

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Abstract

Rural micro, small, and medium enterprises (MSMEs) in developing countries face a dual challenge: they are highly vulnerable to environmental degradation while also holding strong potential to generate community-based sustainability solutions. This study examines how eco-business model innovation and institutional support jointly influence green MSME performance in rural Indonesia. Drawing on the Resource-Based View, Institutional Theory, and the eco-business model innovation framework, the study develops a capability-context interaction model to explain green performance outcomes among rural enterprises. A quantitative cross-sectional survey was conducted with 248 rural MSME owners across West Java, Central Java, and West Sumatra using multi-stage cluster sampling. The hypotheses were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with 5,000 bootstrap subsamples. The results show that eco-business model innovation has a significant positive effect on green MSME performance, institutional support also has a significant positive effect on green MSME performance, and institutional support positively moderates the relationship between eco-business model innovation and green MSME performance. The structural model explains 61.4% of the variance in green MSME performance. These findings highlight that green performance in rural MSMEs is shaped not only by internal innovation capabilities but also by the strength of the surrounding institutional environment. The study contributes to green entrepreneurship and rural development literature by demonstrating the interactive role of capability and context in supporting sustainable MSME performance in developing economies.

Keywords: Green MSMEs, Eco-Business Model Innovation, Institutional Support, Rural Entrepreneurship, PLS-SEM

INTRODUCTION

The global transition toward sustainable development has placed micro, small, and medium enterprises (MSMEs) at the center of policy and scholarly attention, particularly in rural economies where dependence on natural resources is high and institutional support remains uneven. In Indonesia, MSMEs play a crucial role in employment generation, income creation, and the functioning of local value chains, while also operating in environments characterized by resource constraints, limited market access, and vulnerability to environmental change. MSMEs are widely recognized as a major pillar of the Indonesian economy, contributing substantially to employment and national output (Sinha et al., 2024). This creates a fundamental paradox: rural MSMEs are both highly exposed to ecological pressures and uniquely positioned to generate grassroots sustainability solutions through locally embedded entrepreneurial practices.

Within this broader context, green entrepreneurship has emerged as an important field of inquiry that emphasizes market-based responses to environmental challenges (Schaper, 2016).

However, much of the existing literature has focused on urban firms, technology-intensive enterprises, or formally organized business sectors, leaving rural MSMEs comparatively underexplored. Prior studies have examined green innovation in manufacturing, sustainable supply chains, and environmentally oriented entrepreneurship, yet the mechanisms through which rural enterprises redesign their business logic to create environmental and economic value remain insufficiently understood (Chen et al., 2012; Zhu et al., 2013). This gap is particularly important in developing economies such as Indonesia, where institutional arrangements, digital readiness, and regional capacity vary substantially across provinces and districts.

To illustrate this research context, Figure 1 presents the sustainability paradox faced by rural MSMEs in Indonesia. It highlights that, despite their strategic economic role and environmental dependence, the adoption of green practices among rural MSMEs remains uneven and relatively limited. The figure also underscores the growing mismatch between rising environmental pressures and the slower pace of green transformation in rural enterprise sectors, thereby providing the empirical and conceptual background for examining the role of eco-business model innovation and institutional support in improving green MSME performance.

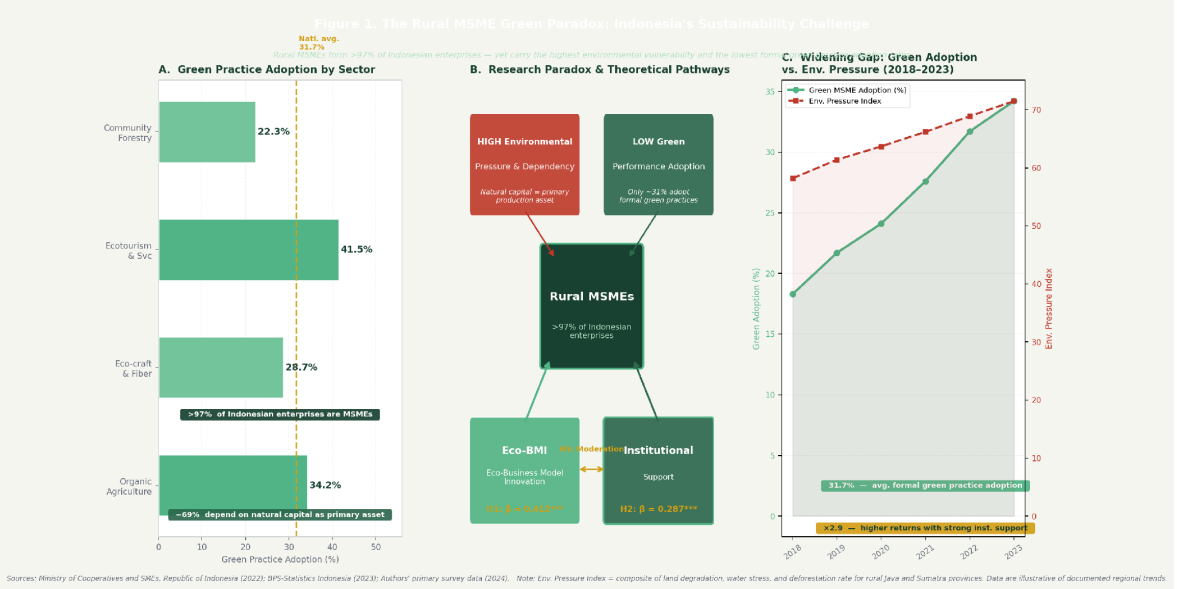


Figure 1. The Rural MSME Green Paradox: Indonesia's Sustainability Challenge

Figure 1 illustrates the sustainability paradox faced by rural MSMEs in Indonesia. On the one hand, these enterprises depend heavily on natural resources and local ecosystems for their business continuity. On the other hand, the adoption of green practices remains uneven across sectors and regions. This condition suggests that improving green MSME performance requires not only internal innovation through eco-business model innovation, but also supportive institutional conditions that enable such innovation to generate stronger environmental and economic outcomes.

A promising lens for addressing this gap is eco-business model innovation (eco-BMI), which refers to the reconfiguration of a firm's value creation, delivery, and capture mechanisms to embed environmental sustainability at the core of its business model (Bocken et al., 2014; Geissdoerfer et al., 2018). Unlike isolated green practices, eco-BMI reflects a more systemic transformation through resource efficiency, circular value chain integration, and community-based value creation. In rural settings, such innovation may enable MSMEs to improve resource productivity, strengthen resilience, differentiate products, and enhance long-term competitiveness. Nevertheless, the extent to which eco-BMI can translate into stronger green

MSME performance depends not only on internal firm capability, but also on the surrounding institutional environment.

Institutional theory provides an important complementary explanation for this relationship by highlighting the role of regulatory support, normative pressures, and enabling governance structures in shaping organizational behavior (DiMaggio & Powell, 1983; Scott, 2014). In rural Indonesia, MSMEs interact with a range of institutional actors, including local governments, cooperatives, industry associations, universities, and financial institutions. These actors can facilitate green transformation through policy incentives, financing access, technical assistance, and collaborative partnerships, but they can also constrain innovation when support is weak or fragmented. Accordingly, institutional support is not merely an external background condition; it is a direct driver of green MSME performance and a contextual factor that may strengthen the effectiveness of eco-business model innovation.

In the Indonesian rural context, these issues become more pressing because MSMEs often face intertwined constraints, including limited financing, capability gaps, weak infrastructure, and uneven digital readiness. At the same time, emerging evidence suggests that environmentally oriented business model innovation, digital-enabled efficiency, and collaborative support systems can strengthen resilience and sustainable value creation among MSMEs. These conditions indicate that green MSME performance should not be understood solely as an internal organizational outcome, but rather as the product of interaction between enterprise-level innovation and institutional support.

This study examines the direct effect of eco-business model innovation on green MSME performance, the direct effect of institutional support on green MSME performance, and the moderating role of institutional support in strengthening the relationship between eco-business model innovation and green MSME performance in rural Indonesia. The study focuses on rural green-oriented MSMEs operating in sectors such as agriculture, food processing, crafts, and agro-industry value chains, while recognizing the importance of regional diversity, infrastructure, and ecosystem readiness in shaping business outcomes.

The study offers three main contributions. First, it positions eco-business model innovation as a multidimensional driver of green MSME performance in the underexplored context of rural Indonesia. Second, it develops and empirically tests institutional support not only as a direct predictor of green performance but also as a moderator of the eco-BMI–performance relationship. Third, it extends capability-context interaction logic into the study of rural MSMEs in developing economies by showing that green performance is shaped jointly by internal innovation capability and external institutional conditions. In doing so, the article contributes to green entrepreneurship theory, institutional perspectives on MSME development, and policy discussions on how to build more effective support ecosystems for sustainable rural enterprise transformation.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Green MSMEs and Rural Sustainable Entrepreneurship

Green MSMEs are enterprises that deliberately integrate environmental sustainability into their core strategies, operations, and value propositions. In rural contexts, such sustainability orientations are often inseparable from livelihood imperatives, because natural capital such as clean water, fertile soil, and biodiversity serves not only as the foundation of production but also as the primary asset threatened by unsustainable practices. In this sense, rural entrepreneurship is shaped by the dual need to maintain economic viability while preserving ecological resources. Eco-entrepreneurs are understood as actors who recognize market opportunities and environmental imperatives as co-drivers of business creation (Schaper, 2016). Scholars have also distinguished between “weak” green MSMEs, which mainly adopt compliance-driven

environmental practices, and “strong” green MSMEs, which embed ecological logic more deeply into their business model architecture (Lans et al., 2014).

In Indonesia, rural MSMEs operating in sectors such as organic agriculture, ecotourism, handcraft production using natural materials, and community forestry have increasingly been recognized as emerging forms of green entrepreneurship (Haryanto et al., 2020). However, their sustainability performance is often constrained by limited access to green finance, technological capability, and market linkages. These structural limitations indicate that the development of rural green MSMEs cannot be explained solely by entrepreneurial intention or internal business orientation, but must also be understood in relation to the broader institutional and ecosystem conditions in which these enterprises operate.

Green MSMEs in rural settings function as critical levers of sustainable development by linking local value creation to broader environmental and social outcomes. Recent literature consistently highlights that green entrepreneurship in rural areas can improve resource efficiency, product quality, and market access through digital platforms and green supply chains, while also reinforcing local livelihoods and resilience in the face of environmental stressors (Almilia et al., 2025; Megawati et al., 2024; Mondal et al., 2024). This body of work also emphasizes that sustainable rural entrepreneurship often emerges from a confluence of local economic incentives, cultural values, and supportive institutional arrangements, such as fiscal policy, accessible finance, and multi-stakeholder partnerships involving universities, government, and private actors (Aviyanti & Widyastuti, 2024; Megawati et al., 2024). Furthermore, regional heterogeneity in institutional capacity suggests that place-based program design is essential to avoid uneven outcomes and to promote inclusive growth across districts and provinces (Aviyanti & Widyastuti, 2024; Heliani, 2023; Reniati & Faisal, 2023). Collectively, these studies suggest testable propositions regarding how local context and institutional enablement shape the adoption and effectiveness of green practices among rural MSMEs (Saptono et al., 2024; Setiadi et al., 2024).

Taken together, the literature suggests that rural green entrepreneurship should be viewed not merely as an environmentally responsible form of business activity, but as a context-dependent process in which sustainability-oriented innovation, local resource dependence, and institutional support interact to shape enterprise outcomes. This perspective provides an important foundation for examining how eco-business model innovation and institutional support jointly influence green MSME performance in rural Indonesia.

Eco-Business Model Innovation (Eco-BMI)

Eco-business model innovation (Eco-BMI) can be understood as a central mechanism through which rural MSMEs transform resource constraints into sustainable value creation. Rather than relying solely on isolated green practices, Eco-BMI involves redesigning the firm’s value proposition, operational processes, and market engagement in ways that embed environmental sustainability into the core of the business model. In rural MSME contexts, this process is particularly important because enterprises often operate under limited access to capital, technology, and formal support systems, requiring them to innovate through resource efficiency, local adaptability, and environmentally oriented value creation.

Recent literature indicates that digitalization and enabling institutional ecosystems can accelerate green business model experimentation among MSMEs, including green supply chain integration, sustainable product design, and data-driven decision making, all of which contribute to environmental and non-financial performance gains (Almilia et al., 2025; Megawati et al., 2024; (Mondal et al., 2024). These findings suggest that Eco-BMI is not only a matter of internal business redesign, but also a dynamic capability shaped by access to digital tools, market information, and collaborative support structures. In this respect, Eco-BMI becomes especially relevant for rural enterprises seeking to improve resilience, product differentiation, and sustainable competitiveness under constrained conditions.

The conceptual foundation of Eco-BMI remains closely linked to sustainable business model innovation literature. Bocken et al. (2014) emphasize that sustainable business models can be

designed around several key orientations, including maximizing material and energy efficiency, closing resource loops, and delivering functionality in more sustainable ways. Consistent with this view, Yang et al. (2017) show that sustainable business model innovation is closely related to the ability of firms to identify and capture previously unrealized forms of value. Together, these perspectives support the argument that Eco-BMI enables MSMEs to move beyond conventional business practices by embedding ecological considerations into how value is created, delivered, and captured.

In the Indonesian context, emerging studies suggest that digital campaigns for green practices, green supply chains, and quality control mechanisms can improve sustainability-oriented performance even among resource-constrained MSMEs (Almilia et al., 2025; Megawati et al., 2024). This implies that Eco-BMI may serve as a practical pathway through which rural MSMEs translate local resources, environmental awareness, and innovation efforts into stronger green performance. At the same time, the effectiveness of Eco-BMI appears to depend on contextual conditions such as institutional support, digital infrastructure, and regional capacity, which may strengthen or limit the performance outcomes of green business model redesign (Aviyanti & Widyastuti, 2024; Heliani, 2023; Saptono et al., 2024).

Taken together, the literature suggests that Eco-BMI has a direct role in improving MSME performance, while its effectiveness may be reinforced by supportive institutional and ecosystem conditions. This provides a strong basis for examining Eco-BMI as a key explanatory variable in the present study, particularly in relation to green MSME performance in rural Indonesia.

Institutional Support and Green Entrepreneurship

Institutional support plays a central role in shaping the development of green entrepreneurship, particularly among rural MSMEs operating under resource and capability constraints. From an institutional perspective, business behavior is influenced by external pressures and enabling conditions arising from regulations, social norms, and broader governance structures. In the context of green entrepreneurship, institutional support may take the form of government incentives, accessible green financing, streamlined licensing, technical assistance, and collaborative arrangements that encourage environmentally oriented business practices. These mechanisms help reduce uncertainty, lower adoption barriers, and create a more supportive environment for sustainability-oriented entrepreneurship.

A growing body of literature suggests that institutional support is positively associated with green innovation and sustainable business practices. In the Indonesian context, Haryanto et al. (2020) found that cooperative membership and access to government incubation programs were positively associated with sustainability practices among rural MSMEs, although the causal pathways were not formally tested. More recent studies further indicate that fiscal incentives, easier financing access, and governance arrangements that promote green innovation can strengthen the capacity of rural MSMEs to manage environmentally oriented business models and scale sustainable practices (Megawati et al., 2024; Saptono et al., 2024; Sinha et al., 2024). These findings suggest that green entrepreneurship is not driven solely by entrepreneurial initiative, but also by the quality of the institutional ecosystem in which MSMEs operate.

Institutional support is also important because the transition toward greener business models often requires external resources and knowledge that are not readily available within small firms. Recent literature highlights the importance of cross-sector collaboration, including partnerships among universities, government agencies, and private actors, in building the capabilities needed for rural MSMEs to implement eco-business model innovation effectively. University–industry collaboration, for example, is seen as important for developing decision-support tools, strengthening digital literacy, and facilitating the diffusion of green business practices across local enterprise ecosystems (Megawati et al., 2024; Setiadi et al., 2024). In this sense, institutional support functions not only as a regulatory driver, but also as a capacity-building mechanism that enables rural firms to adopt and sustain green entrepreneurship.

At the same time, the effectiveness of institutional support is highly context dependent. Regional variation in institutional capacity, infrastructure readiness, and organizational culture can either strengthen or weaken the effect of policy interventions, indicating that green entrepreneurship policies should be responsive to local realities rather than applied uniformly across regions (Aviyanti & Widyastuti, 2024; Heliani, 2023; Reniati & Faisal, 2023). Some studies caution that policy packages relying on isolated instruments, without complementary internal capacity development and digital infrastructure support, may fail to produce meaningful resilience or sustainability outcomes among MSMEs (Megawati et al., 2024; Saptono et al., 2024; Sinha et al., 2024). Therefore, institutional support should be understood as a multidimensional enabling factor whose effectiveness depends on alignment between policy design, local capability, and enterprise readiness.

Taken together, the literature suggests that institutional support has both a direct and an enabling role in green entrepreneurship. It can improve green MSME performance by providing resources, legitimacy, and access to collaboration, while also strengthening the effectiveness of eco-business model innovation in rural enterprise settings. This makes institutional support a crucial explanatory variable in understanding how green entrepreneurship develops and performs in rural Indonesia.

Theoretical Framework

This study integrates three complementary theoretical pillars: the Resource-Based View (RBV), Institutional Theory (IT), and the Eco-Business Model Innovation (Eco-BMI) literature, to construct a cohesive explanatory framework. Each theory addresses a distinct dimension of the green MSME performance puzzle, and their integration yields a richer account than any single theory could provide alone.

Resource-Based View (RBV)

The Resource-Based View (RBV) explains that sustained competitive advantage arises from firm-specific resources and capabilities that are valuable, rare, inimitable, and difficult to substitute. In more contemporary applications, RBV is not limited to static resource ownership, but also emphasizes how firms combine, reconfigure, and deploy internal capabilities to respond to changing environmental and market conditions. In the context of this study, eco-business model innovation (Eco-BMI) can be understood as a strategic capability through which rural MSMEs transform internal resources into sustainable value creation.

Applied to rural MSMEs, RBV suggests that environmentally oriented business performance does not depend solely on access to large-scale capital or advanced technology, but on how firms mobilize and recombine available resources into distinctive capabilities. Through Eco-BMI, rural enterprises redesign their value creation, delivery, and capture mechanisms around ecological principles, enabling them to convert local natural capital, community knowledge, organic inputs, and locally embedded market opportunities into sustainable business value. In this sense, Eco-BMI represents not merely a set of green practices, but a capability-based mechanism that allows firms to differentiate themselves while improving environmental performance.

This perspective becomes particularly relevant when Eco-BMI is supported by complementary internal capabilities such as digital literacy, data use, supplier collaboration, green product design, and waste reduction practices. Recent evidence suggests that digitalization and green supply chain management can enhance operational efficiency, innovation capability, and broader environmental, social, and economic performance among MSMEs (Almilia et al., 2025; (Megawati et al., 2024; Mondal et al., 2024). From an RBV perspective, these capabilities form a strategic resource bundle that is difficult for competitors to imitate, especially when it is embedded in local knowledge, organizational routines, and sustainability-oriented business practices.

RBV therefore provides a strong theoretical justification for the expectation that Eco-BMI has a direct positive effect on green MSME performance. Firms that are better able to build and deploy eco-innovation capabilities are more likely to achieve both competitive positioning and

sustainability outcomes, generating value not only in economic terms but also through improved ecological efficiency and resilience. At the same time, this perspective also supports the view that the performance effects of Eco-BMI may vary depending on whether firms possess the complementary capabilities needed to translate green business model redesign into measurable outcomes. In rural settings, these capabilities may be strengthened or constrained by the broader ecosystem, including digital readiness, market connectivity, and institutional support (Almilia et al., 2025; (Megawati et al., 2024; Saptono et al., 2024).

Institutional Theory (IT)

Institutional Theory explains that organizational behavior is shaped not only by technical and economic considerations, but also by the broader institutional environment in which firms are embedded. This perspective emphasizes that business decisions are influenced by formal rules, social norms, and shared beliefs that define what is considered legitimate and appropriate within a given context. In rural MSME settings, these institutional forces may take the form of government regulations, policy incentives, cooperative norms, community expectations, financing arrangements, and collaborative governance structures that either enable or constrain sustainability-oriented business practices.

In the context of rural Indonesia, institutional influences are especially relevant because MSMEs often operate in environments where access to markets, technology, finance, and business support depends heavily on local institutional arrangements. Supportive policies, simplified regulations, eco-certification incentives, accessible green financing, and cross-sector partnerships can reduce uncertainty, lower compliance burdens, and strengthen the capacity of MSMEs to adopt green entrepreneurship and eco-business model innovation. Recent literature further suggests that institutional support is not limited to formal policy intervention, but also includes relational and governance mechanisms such as university–industry collaboration, public–private partnerships, and local development programs that facilitate knowledge transfer and resource access (Aviyanti & Widyastuti, 2024; Megawati et al., 2024; Saptono et al., 2024).

Institutional Theory is directly relevant to this study in two important ways. First, it explains why institutional support is expected to have a direct positive effect on green MSME performance. When regulatory frameworks, financing mechanisms, and supportive networks align to encourage sustainable business practices, MSMEs are more likely to gain access to resources, legitimacy, and operational support that improve their environmental and business outcomes. In this sense, institutional support functions as an enabling condition that strengthens the performance of sustainability-oriented enterprises in rural contexts.

Second, Institutional Theory helps explain why the effect of eco-business model innovation may depend on the quality of the surrounding institutional environment. The performance returns from Eco-BMI are unlikely to be realized fully when firms operate in fragmented or weak institutional settings. By contrast, when policy incentives, market recognition, financing access, and collaborative support structures are present, the outcomes of eco-innovation are more likely to be translated into stronger green performance. Recent studies indicate that the influence of institutional arrangements on MSME sustainability is often contingent upon local leadership, organizational culture, and the coherence of governance arrangements, suggesting that the relationship between Eco-BMI and performance may be strengthened or weakened by contextual institutional conditions (Aviyanti & Widyastuti, 2024; Cuevas-Vargas, 2025; Megawati et al., 2024; Saptono et al., 2024).

Eco-Business Model Innovation (Eco-BMI) Framework

The Eco-Business Model Innovation (Eco-BMI) framework provides the operational bridge between firm-level green capabilities and their environmental as well as commercial performance outcomes. Unlike narrower constructs such as green product innovation or cleaner production practices, Eco-BMI focuses on the systemic architecture of how a firm creates, delivers, and captures value while embedding sustainability as a core business logic rather than a peripheral activity. In this sense, Eco-BMI translates the internal capability perspective of the Resource-Based

View into concrete business model configurations that can generate competitive and sustainability advantages.

This perspective is particularly relevant for rural MSMEs because sustainability-oriented business performance in these settings depends not only on isolated operational improvements, but on how firms redesign their value propositions, production processes, supply relationships, and market engagement in ways that reflect ecological and social priorities. Sustainable business model innovation literature emphasizes that such redesign may involve improving material and energy efficiency, closing resource loops, repurposing waste, and developing community-based or knowledge-intensive alternatives that create value while reducing environmental harm (Bocken et al., 2014; Geissdoerfer et al., 2018). For rural MSMEs in Indonesia, this framing is especially appropriate because ecological health and community welfare are not external concerns, but integral components of the value proposition that distinguishes green enterprises from conventional competitors.

In the present study, Eco-BMI serves as the primary independent variable and is operationalized through three subdimensions: resource efficiency reconfiguration, circular value chain integration, and community-embedded value delivery. These dimensions reflect the idea that green MSME performance is shaped not only by technical efficiency, but also by the ability of firms to align business innovation with local ecological resources, community relationships, and sustainability-oriented market opportunities. This operationalization is also consistent with recent studies suggesting that digitalization, green supply chain integration, and collaborative support systems can strengthen sustainability-oriented innovation and improve MSME performance in resource-constrained settings (Almilia et al., 2025; Megawati et al., 2024; Saptono et al., 2024).

More broadly, the Eco-BMI framework in this study integrates eco-business model innovation with institutional support and contextual factors to explain variation in green MSME outcomes across rural Indonesia. First, Eco-BMI is expected to directly enhance resource efficiency, innovation, and green differentiation. Second, institutional support is expected to strengthen the performance effects of Eco-BMI by providing enabling conditions such as incentives, financing access, and cross-sector collaboration. Third, contextual factors such as digital literacy, infrastructure readiness, and organizational capacity may influence the extent to which Eco-BMI and institutional support generate stronger sustainability outcomes. In this way, the framework offers an integrated basis for empirical testing and for designing place-based policy and practical interventions suited to the heterogeneity of rural MSMEs across sectors and regions (Aviyanti & Widyastuti, 2024; (Megawati et al., 2024; Setiadi et al., 2024).

Theoretical Integration and Conceptual Model

The integration of RBV, Institutional Theory, and the Eco-BMI framework yields a theoretical model in which green MSME performance is jointly determined by internal capability reconfiguration and external institutional embeddedness, with these two forces interacting multiplicatively rather than additively. The RBV explains the firm-level mechanism through which eco-BMI generates performance advantages; Institutional Theory explains the contextual conditions under which these advantages are realized and amplified; and the Eco-BMI framework operationalizes the specific content of the green capability being developed. This multi-theoretical integration reflects a broader movement in strategic management and entrepreneurship scholarship toward capability-context co-determination models, in which firm-level competencies are understood as inherently situational their performance consequences contingent on the institutional, market, and relational environments in which they are exercised (Peng et al., 2009). The conceptual model of this study is structured around three theoretically grounded paths: (1) Eco-BMI have an effect to Green MSME Performance (RBV logic; H1); (2) Institutional Support have an effect to Green MSME Performance (Institutional Theory logic; H2); and (3) Institutional Support moderating Eco-BMI to Green MSME Performance (integrated RBV × Institutional Theory logic; H3). This integrated framework addresses the research gaps identified in the literature

review and provides a theoretically robust foundation for the hypotheses formulated in the following section.

Hypothesis Formulation

Drawing on the theoretical framework described above, the following hypotheses are proposed:

H1: Eco-business model innovation has a significant positive effect on green MSME performance

Firms that redesign their value creation and delivery logic to embed environmental sustainability through circular material use, eco-service bundling, or community-based resource stewardship are expected to achieve superior green performance outcomes (Bocken et al., 2014; Jiang et al., 2018). In rural MSME settings, eco-BMI enables enterprises to differentiate their offerings in niche green markets while reducing resource costs, thereby generating both environmental and commercial performance gains.

H2: Institutional support has a significant positive effect on green MSME performance

When regulatory bodies provide environmental compliance incentives, cooperative networks promote sustainable practices, and financial institutions offer access to green financing, rural MSMEs are better positioned to invest in and sustain green operations (Ishaq et al., 2024; Wibowo, 2025). Institutional support reduces the transaction costs and uncertainty associated with green entrepreneurship, thereby directly improving green performance outcomes

H3: Institutional support positively moderates the relationship between eco-business model innovation and green MSME performance

The complementarity hypothesis posits that institutional support amplifies the performance returns of eco-BMI. In environments with strong institutional backing, the value of eco-innovation capabilities is magnified because MSMEs can more effectively translate innovative business models into market-recognized green performance. Conversely, in institutionally thin environments, even capable eco-innovators may struggle to capture value from their business model changes. This moderation effect has not been empirically examined in the rural MSME literature and represents a key theoretical contribution of this study.

RESEARCH METHODS

Research Design

This study employs a quantitative cross-sectional survey design. Quantitative methodology is appropriate given the need to test directional hypotheses about structural relationships among eco-BMI, institutional support, and green MSME performance across a sufficient number of observations to support multivariate statistical analysis. The research follows a positivist epistemological orientation, treating constructs as measurable phenomena whose relationships can be estimated through statistical inference.

Population and Sample

The target population comprises rural MSME owners and managers operating in agro-based, craft, ecotourism, or natural resource processing sectors in three Indonesian provinces: West Java, Central Java, and West Sumatra. These provinces were selected for their high rural MSME density, active green economy policy environments, and diversity of agroecological contexts. A multi-stage cluster sampling procedure was used: first, districts with established rural MSME clusters were identified through provincial cooperative office databases; second, villages within those districts were randomly selected; third, individual MSMEs within selected villages were systematically sampled.

A total of 248 completed questionnaires were obtained from 310 distributed (response rate: 80%). This sample size exceeds the minimum recommended by Hair et al. (2019) for PLS-SEM with up to six latent variables and moderate effect sizes (minimum n = 100; recommended n ≥ 200). Respondents were enterprises with 1–99 employees, operating for at least two years, and self-identifying as having implemented at least one environmental practice. The detailed

breakdown of the sample by province, sector, enterprise size, and respondent characteristics is presented in Table 1.

Table 1. Sample Profile: Population and Respondent Characteristics

Category	Sub-Category	Frequency (n)	Percentage (%)
Province	West Java	92	37.1
	Central Java	84	33.9
	West Sumatra	72	29.0
	Total	248	100.0
Business Sector	Organic Agriculture & Agro-processing	78	31.5
	Eco-craft & Natural Fiber Products	62	25.0
	Ecotourism & Community-based Services	54	21.8
	Community Forestry & NTFPs	54	21.8
	Total	248	100.0
Enterprise Size	Micro (1–4 employees)	112	45.2
	Small (5–19 employees)	97	39.1
	Medium (20–99 employees)	39	15.7
	Total	248	100.0
Years in Operation	2–5 years	74	29.8
	6–10 years	103	41.5
	> 10 years	71	28.6
	Total	248	100.0
Respondent Gender	Male	147	59.3
	Female	101	40.7
	Total	248	100.0
Education Level	Junior High School (SMP)	31	12.5
	Senior High School (SMA/SMK)	98	39.5
	Diploma (D3)	52	21.0
	Bachelor’s Degree (S1) or above	67	27.0
	Total	248	100.0
Questionnaires Distributed	—	310	—
Questionnaires Returned	—	261	84.2
Valid Questionnaires Used	—	248	80.0

Source: Primary data processed by the authors (2024)

As shown in Table 1, the sample is geographically distributed across three provinces with West Java contributing the largest share (37.1%), reflecting its higher rural MSME density. Organic agriculture and agro-processing represent the most common sector (31.5%), consistent with the growing prominence of certified organic farming clusters in rural Java and West Sumatra. Micro-enterprises constitute the majority (45.2%), underscoring the study's focus on the smallest economic actors in the rural green economy. The relatively balanced gender distribution (59.3% male; 40.7% female) and the meaningful share of female respondents reflect the important role of women in rural MSME entrepreneurship in Indonesia. Education levels are diverse, with nearly half of respondents holding at least a diploma qualification, indicating a sample capable of engaging meaningfully with sustainability concepts embedded in the survey instrument.

Measurement Instruments

All constructs were measured using reflective indicators on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Eco-business model innovation (Eco-BMI) was initially measured with 12 items covering resource efficiency reconfiguration, circular value chain integration, and community-embedded value delivery. After measurement model evaluation, two items with low outer loadings were removed, resulting in a final 10-item Eco-BMI scale.

Institutional support (IS) was measured with 9 items reflecting regulatory facilitation, associational normative pressure, and access to green finance. Green MSME performance (GMP) was measured with 8 items covering environmental, market, and social sustainability outcomes. All measurement items were adapted from prior studies.

Content validity was established through expert review by three academics in green entrepreneurship and MSME policy. A pilot test involving 30 rural MSME owners confirmed item clarity and acceptable internal consistency, with Cronbach's alpha values above 0.70 for all constructs.

Data Analysis Technique

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. This technique was selected because the study examines both direct and moderating relationships among latent constructs and is appropriate for prediction-oriented models with relatively complex relationships. Model evaluation followed a two-step approach, including assessment of the measurement model through indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, followed by assessment of the structural model using path coefficients, coefficient of determination (R^2), predictive relevance (Q^2), and bootstrapping with 5,000 subsamples for hypothesis testing.

Measurement Model Equations

The reflective measurement model specifies each observed indicator (x) as a linear function of its underlying latent construct (ξ) plus a measurement error term (ε). For each indicator x_{ij} associated with latent construct ξj, the measurement equation is:

$$X_{ij} = \lambda_{ij} \xi_j + \varepsilon_{ij} \quad (1)$$

Where λ_{ij} is the factor loading (outer loading) of indicator i on construct j, ξj is the latent variable score for construct j, and ε_{ij} is the measurement error, assumed to be uncorrelated with ξj and with errors of other indicators. Indicator reliability requires that outer loadings $\lambda_{ij} \geq 0.70$, ensuring each indicator explains at least 49% of its variance through the underlying construct.

Construct reliability was assessed using Composite Reliability (CR), calculated as:

$$CR_j = \frac{(\Sigma\lambda_{ij})^2}{[(\Sigma\lambda ij)^2} + \Sigma Var(\varepsilon_{ij}) \quad (2)$$

Where $\Sigma\lambda_{ij}$ is the sum of outer loadings for construct j and $Var(\varepsilon_{ij}) = 1 - \lambda_{ij}^2$ is the indicator error variance. The threshold CR ≥ 0.70 was applied. Average Variance Extracted (AVE) was computed to assess convergent validity:

$$AVE_j = \Sigma\lambda^2 / [\Sigma\lambda_{ij}^2 + \Sigma Var(\varepsilon_{ij})] \quad (3)$$

Convergent validity is confirmed when AVE ≥ 0.50, indicating that the construct explains more than half of the variance in its indicators. Discriminant validity was evaluated using the Heterotrait-Monotrait (HTMT) ratio criterion, where HTMT < 0.85 for all construct pairs.

Structural Model Equations

The structural model specifies the relationships among latent constructs. The main-effects structural equation for green MSME performance (η_1) as a function of Eco-BMI (ξ_1) and Institutional Support (ξ_2) is expressed as:

$$n_1 = \beta_1\xi_1 + \beta_2\xi_2 + \zeta_1 \quad (4)$$

Where β_1 and β_2 are the path coefficients representing the direct effects of Eco-BMI and Institutional Support on green MSME performance, respectively, and ζ_1 is the structural residual (inner model error). In terms of the study's variables, Equation 4 corresponds to the combined test of H1 and H2.

To test the moderating effect of Institutional Support (H3), an interaction term ($\xi_1 \times \xi_2$) was added to the structural equation using the product-indicator approach (Hair et al., 2019). The full moderation model is:

$$n_1 = \beta_1\xi_1 + \beta_2\xi_2 + \beta_3(\xi_1 \times \xi_2) + \zeta_1 \quad (5)$$

Where β_3 is the moderation coefficient for the interaction term ($\xi_1 \times \xi_2$). A statistically significant positive β_3 confirms H3, indicating that the effect of Eco-BMI on green MSME performance is amplified at higher levels of Institutional Support. All latent variables were mean centered prior to computing the interaction product to minimize multicollinearity between main effects and the interaction term (Aiken & West, 1991).

The explanatory power of the structural model was assessed using the coefficient of determination (R^2), which represents the proportion of variance in the endogenous construct explained by its predictors:

$$R^2 = 1 - [SS_{res} + SS_{tot}] \quad (6)$$

Where SS_{res} is the residual sum of squares and SS_{tot} is the total sum of squares of the endogenous latent variable. Cohen (1988) suggested R^2 ≥ 0.26 as substantial, ≥ 0.13 as moderate, and ≥ 0.02 as weak. Additionally, predictive relevance was evaluated using the Stone-Geisser Q^2 statistic via blindfolding:

$$Q^2 = 1 - [\Sigma SS_E / \Sigma SS_O \quad (7)$$

Where SSE is the sum of squared prediction errors (using the omission distance D) and SS_O is the sum of squared observations. A $Q^2 > 0$ indicates that the model has predictive relevance for the respective endogenous construct (Hair et al., 2019). Hypothesis significance was determined via bootstrapping with 5,000 subsamples, yielding t-statistics and 95% bias-corrected confidence intervals for all path coefficients.

RESULTS AND DISCUSSION

Measurement Model Assessment

Prior to testing the structural hypotheses, the measurement model was evaluated through a two-stage assessment of reliability and validity following the procedures recommended by Hair et al. (2019) for reflective PLS-SEM models. The evaluation encompassed indicator reliability (outer loadings), internal consistency reliability (Cronbach's alpha and composite reliability), convergent validity (AVE), and discriminant validity (HTMT criterion). The full results are presented in Table 2.

Table 2. Measurement Model Summary

Construct	Items	Cronbach's α	CR	AVE
Eco-BMI	10	0.892	0.914	0.573
Institutional Support (IS)	9	0.861	0.893	0.541
Green MSME Performance (GMP)	8	0.904	0.921	0.562
Interaction (Eco-BMI × IS)	—	—	—	—

Source: Processed by the author

The measurement model demonstrated satisfactory psychometric properties. All construct loadings exceeded the 0.70 threshold (range: 0.712–0.891), apart from two items subsequently removed from the Eco-BMI scale after iterative refinement. Composite reliability (CR) values ranged from 0.893 to 0.921, and Cronbach's alpha coefficients ranged from 0.861 to 0.904, confirming internal consistency. Average Variance Extracted (AVE) values for all constructs exceeded 0.50 (Eco-BMI: 0.573; IS: 0.541; GMP: 0.562), confirming convergent validity. Discriminant validity was established through the Heterotrait-Monotrait (HTMT) ratio criterion: all HTMT values fell below 0.85 (maximum HTMT = 0.772 between Eco-BMI and GMP), confirming that constructs are empirically distinct.

Structural Model and Hypothesis Testing

The structural model explained 61.4% of the variance in green MSME performance (R^2 = 0.614), indicating strong explanatory power. The model's predictive relevance was confirmed by Stone-Geisser's Q^2 value of 0.389 (> 0) for GMP. Results of hypothesis testing via bootstrapping are presented in Table 3.

Table 3. Structural Model Results (Bootstrapping, n = 5,000)

Hypothesis	Path	β	t-value	p-value	Result
H1	Eco-BMI → GMP	0.412	6.231	0.000	Supported
H2	IS → GMP	0.287	4.108	0.000	Supported
H3	Eco-BMI × IS → GMP	0.193	3.047	0.002	Supported

Source: Processed by the author

All three hypotheses were supported at the $p < 0.01$ significance level. The strongest path was from Eco-BMI to GMP ($\beta = 0.412$), indicating that rural MSMEs with more sophisticated eco-business model innovations demonstrate substantially better green performance outcomes. Institutional support also showed a significant direct effect ($\beta = 0.287$), and the interaction term

yielded a significant positive moderation effect (β = 0.193), confirming that institutional support amplifies the eco-BMI to GMP relationship.

The findings confirm that green MSME performance in rural Indonesia is shaped by the interaction between internal innovation capability and external institutional conditions. Eco-business model innovation emerges as the strongest predictor of green performance, while institutional support not only has a direct positive effect on performance but also strengthens the effectiveness of eco-business model innovation. These results suggest that green entrepreneurship in rural settings should be understood not merely as a firm-level capability issue, but as an outcome of the interaction between organizational innovation and institutional support.

The support for H1 extends prior evidence on sustainable business model innovation from urban and manufacturing settings into the rural MSME context. The result indicates that eco-business model innovation, reflected in resource efficiency reconfiguration, circular value chain integration, and community-embedded value delivery, can significantly improve green performance even among enterprises operating with limited resources and constrained market access. This finding reinforces the view that business model innovation is not restricted to large or technologically advanced firms. Rural MSMEs can also generate meaningful environmental and market benefits when sustainability is embedded in their value creation and delivery processes.

The support for H2 reinforces the relevance of institutional theory in explaining green entrepreneurship outcomes. Institutional support, reflected in regulatory facilitation, normative encouragement, and access to green finance, creates a more enabling environment for rural MSMEs to adopt and sustain green practices. In this context, supportive institutions help reduce uncertainty, improve access to relevant resources, and strengthen the legitimacy of sustainability-oriented business practices. This finding highlights that green MSME performance is influenced not only by what firms are capable of doing internally, but also by how far the surrounding institutional environment supports those efforts.

The support for H3 represents the most distinctive contribution of this study. The significant positive interaction effect indicates that the performance benefits of eco-business model innovation become stronger when institutional support is higher. In other words, rural MSMEs are more likely to translate eco-business model innovation into stronger green performance when they operate in a supportive institutional environment. This finding moves beyond a simple additive explanation and suggests an interactive capability-context model, in which internal innovation and external support jointly determine green entrepreneurship outcomes. Such a perspective is especially relevant in developing-country settings where institutional conditions often vary across regions and sectors.

Overall, the findings imply that strengthening green MSME performance in rural areas requires a dual strategy. At the firm level, MSMEs need to embed sustainability into their business models rather than relying on isolated green practices. At the institutional level, policymakers and support organizations need to create an enabling ecosystem through facilitative regulation, stronger associational support, and improved access to green financing. Therefore, the transition toward rural green entrepreneurship is likely to be more effective when internal innovation efforts are matched by consistent external institutional support.

CONCLUSION

Summary of Findings

This study investigated how eco-business model innovation and institutional support jointly determine green MSME performance in rural Indonesia. Using PLS-SEM on a sample of 248 rural MSME owners across three provinces, the study finds that: (1) eco-business model innovation is the strongest direct predictor of green MSME performance; (2) institutional support independently and significantly enhances green performance; and (3) institutional support

positively moderates the eco-BMI–green performance relationship, amplifying the returns on eco-innovation in contexts of stronger institutional facilitation.

Practical Implications

For rural MSME owners, the findings underscore the importance of actively redesigning business models around sustainability principles rather than adopting isolated green practices. Entrepreneurs should prioritize circular material flow integration and community-based value delivery as the eco-BMI dimensions most directly linked to performance gains. For policymakers, the moderation finding provides an actionable mandate: institutional support is not merely supplementary but multiplicative in its effect on eco-innovation returns. Provincial governments and development finance institutions should prioritize expanding green credit access, streamlining eco-certification processes, and strengthening cooperative networks that propagate sustainability norms in rural communities. National MSME development programs should embed eco-BMI coaching into existing business incubation services targeting rural areas.

Limitations and Future Research Directions

This study has several limitations that qualify its findings and suggest directions for future research. First, the cross-sectional design precludes causal inference about the dynamic evolution of eco-BMI and institutional support over time; longitudinal research would illuminate how these relationships evolve across enterprise life cycles. Second, although the multi-province sample enhances external validity within Indonesia, findings may not generalize to other Southeast Asian or developing country contexts with different institutional configurations; comparative multi-country studies are warranted. Third, the study relied on self-reported performance measures, which are susceptible to social desirability bias; future research should complement survey data with objective administrative records or third-party audit data. Finally, future studies should explore the mediating role of green innovation ambidexterity simultaneously exploiting existing eco-practices while exploring new ones in the eco-BMI to performance pathway, and should examine how digital technologies (e-commerce platforms, agricultural IoT) interact with institutional support to reshape the rural green MSME performance landscape.

BIBLIOGRAPHY

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* . Sage Publications.

Almilia, L., Mursita, L., Mustafida, N., Rachmadia, R., Irnawati, D., & Rohmayati, N. (2025). Digitalization of MSME in Green Campaign Activities, Supply Chain, and Quality Control. *International Journal of Asian Business and Information Management*, *16*(1), 1–25. https://doi.org/10.4018/IJABIM.389266

Aviyanti, C., & Widyastuti, T. (2024). Role of Leadership in Shaping Strategic Management Decisions of MSME Owners in Indonesia. *Dinasti International Journal of Management Science*, *5*(6), 1180–1192. https://doi.org/10.38035/dijms.v5i6.2958

Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, *65*, 42–56. https://doi.org/10.1016/j.jclepro.2013.11.039

Chen, Y., Chang, C., & Wu, F. (2012). Origins of green innovations: the differences between proactive and reactive green innovations. *Management Decision*, *50*(3), 368–398. https://doi.org/10.1108/00251741211216197

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* . Lawrence Erlbaum Associates.

Cuevas-Vargas, H. (2025). Linking Transformational Leadership to Sustainability Outcomes: The Mediating Roles of Digital Transformation and Innovation. *Corporate Social Responsibility and Environmental Management*, *32*(5), 6016–6030. https://doi.org/10.1002/csr.70020

DiMaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *American Sociological Review*, *48*(2), 147. https://doi.org/10.2307/2095101

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of Cleaner Production*, *198*, 401–416. https://doi.org/10.1016/j.jclepro.2018.06.240

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Haryanto, T, Sarasi, V., & Saefuloh, D. (2020). Green entrepreneurship: Building sustainability in Indonesian rural SMEs. *International Journal of Innovation, Creativity and Change*, *14*(3), 879–901

Heliani. (2023). MSME Financial Accounting In West Java: Sustainability and Impact Factors. *Jurnal Akuntansi*, *27*(3), 568–587. https://doi.org/10.24912/ja.v27i3.1739

Ishaq, M. I., Sarwar, H., Aftab, J., Franzoni, S., & Raza, A. (2024). Accomplishing sustainable performance through leaders' competencies, green entrepreneurial orientation, and innovation in an emerging economy: Moderating role of institutional support. *Business Strategy and the Environment*, *33*(2), 1515–1532. https://doi.org/10.1002/bse.3557

Jiang, W., Chai, H., Shao, J., & Feng, T. (2018). Green entrepreneurial orientation for enhancing firm performance: A dynamic capability perspective. *Journal of Cleaner Production*, *198*, 1311–1323. https://doi.org/10.1016/j.jclepro.2018.07.104

Lans, T., Blok, V., & Wesselink, R. (2014). Learning apart and together: towards an integrated competence framework for sustainable entrepreneurship in higher education. *Journal of Cleaner Production*, *62*, 37–47. https://doi.org/10.1016/j.jclepro.2013.03.036

Wibowo, M. N. (2025). Driving sustainability entrepreneurship in Indonesian batik MSMEs: The role of sustainability orientation and government support. *Problems and Perspectives in Management*, *23*(1), 544–556. https://doi.org/10.21511/ppm.23(1).2025.41

Megawati, S., Herdiansyah, H., Machmud, A., Antriyandarti, E., & Sudirman, S. (2024). Integrating circular economy, digital economy, and social protection policies to drive green business innovation: Insights from Indonesia's culinary SMEs. *Problems and Perspectives in Management*, *22*(4), 368–381. https://doi.org/10.21511/ppm.22(4).2024.28

Mondal, S., Singh, S., & Gupta, H. (2024). Exploring the impact of green entrepreneurial orientation on sustainable performance: insights from CSR, policy and innovation. *Management Decision*, *62*(12), 3946–3977. https://doi.org/10.1108/MD-10-2023-1816

Peng, M. W., Sun, S. L., Pinkham, B., & Chen, H. (2009). The Institution-Based View as a Third Leg for a Strategy Tripod. *Academy of Management Perspectives*, *23*(3), 63–81. https://doi.org/10.5465/amp.2009.43479264

Reniati, R., & Faisal, F. (2023). Green SME Business Model in Bangka Belitung: A Value Chain Analysis Approach. *Journal of International Conference Proceedings*, *6*(4), 82–97. https://doi.org/10.32535/jicp.v6i4.2574

Saptono, P. B., Khozen, I., Mahmud, G., Hodžić, S., Pratiwi, I., Purwanto, D., & Imantoro, L. W. (2024). Flourishing MSMEs: The Role of Innovation, Creative Compliance, and Tax Incentives. *Journal of Risk and Financial Management*, *17*(12), 532. https://doi.org/10.3390/jrfm17120532

Scott, W. R. (2014). *Institutions and organizations: Ideas, interests and identities (4th ed.).* . SAGE Publications.

Setiadi, N. J., Prasandy, T., & Alam, D. P. (2024). ENHANCING MSME EMPOWERMENT THROUGH TECHNOLOGY ADOPTION: A UNIVERSITY-INDUSTRY PARTNERSHIP. *Social Economics and Ecology International Journal (SEEIJ)*, *8*(1), 17–34. https://doi.org/10.21512/seeij.v8i1.11370

Sinha, J. K., Sinha, S., & Sinha, J. B. (2024). Micro, Small, and Medium-Sized Enterprises (MSMEs): The Significant Role and Challenges in Indonesia's Economy. *International Journal For Multidisciplinary Research*, *6*(3). https://doi.org/10.36948/ijfmr.2024.v06i03.20824

Yang, M., Evans, S., Vladimirova, D., & Rana, P. (2017). Value uncaptured perspective for sustainable business model innovation. *Journal of Cleaner Production*, *140*, 1794–1804. https://doi.org/10.1016/j.jclepro.2016.07.102

Zhu, Q., Sarkis, J., & Lai, K. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, *19*(2), 106–117. https://doi.org/10.1016/j.pursup.2012.12.001