Sustainability-based Agroindustry Business Model for Local Economic Strengthening

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Article Info

ABSTRACT

Article history:

Received February, 2025 Revised February, 2025 Accepted February, 2025

Keywords:

Sustainability, Agroindustry, Local Economy, Indonesia This study examines the role of sustainability-based agroindustry business models in strengthening the local economy in Indonesia. Using a quantitative approach, data were collected from 100 respondents via a Likert scale questionnaire and analyzed with Structural Equation Modeling - Partial Least Squares (SEM-PLS). The findings reveal that environmental sustainability, economic viability, and social equity significantly contribute to local economic strengthening. The model explains 65% of the variance in the local economy, underscoring the importance of a balanced approach to sustainability. This study highlights the practical and policy implications of adopting sustainable practices in agroindustry, emphasizing the need for stakeholder collaboration, government support, and community engagement to foster economic and environmental resilience.

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1. INTRODUCTION

The agroindustry sector in Indonesia plays a crucial role in economic development by leveraging the country's abundant natural resources and agrarian population, contributing significantly to GDP through value addition, employment generation, and regional income enhancement [1]. It also supports community welfare and food security through strategic food sector development [2]. However, rapid agroindustrial presents growth environmental and challenges, social including waste resource depletion, generation, and income inequality, necessitating sustainable business models for long-term viability [3]. Social issues such as occupational hazards further emphasize the need for improved safety standards and equitable growth [4]. Implementing techniques sustainable farming and agroecology can mitigate environmental impacts and enhance resilience against climate change [3], while government policies and legal frameworks play a vital role in ensuring synergy between industry players and policymakers for sustainable industrial practices [5]. Additionally, government support is crucial in aligning industry activities with national development goals, and community involvement in planning and development can optimize local potential and improve welfare, particularly in underdeveloped regions [2].

Sustainability in the agroindustry integrates economic, environmental, and social dimensions into business practices, crucial for Indonesia's economy and livelihoods. Sustainable business models align with the United Nations Sustainable Development Goals (SDGs), addressing zero hunger, sustainable cities, and responsible consumption by optimizing resource use, environmental impact, reducing and promoting social equity. Key strategies include employee engagement, supply chain optimization, and innovative technologies that enhance sustainability [6]. Precision agriculture, biotechnologies, and bio-based improve productivity products while minimizing environmental harm, supporting food security and ecological health [7], [8]. Organic farming and circular economy principles further boost resource efficiency and rural development [9]. However, challenges such as climate change, soil depletion, water scarcity, high costs, and market volatility hinder sustainability efforts Social barriers, including limited [7]. education and resource access, require policy interventions and community support [7], [8]. The greenwashing risk of demands accountability and transparency [6]. Solutions include policy incentives, agricultural subsidy reforms, and cooperative models to enhance social equity and resilience [7]. Educationsupport systems based and targeted regulations can further drive sustainability [10]. ESG practices in agribusiness attract and strengthen corporate investment governance by integrating environmental and social considerations into decision-making.

Despite the recognized importance of sustainability, the implementation of sustainable practices in the agroindustry sector faces various barriers, including limited access to capital, inadequate technology adoption, and insufficient policy support. Moreover, the absence of a structured framework for integrating sustainability into business operations often hampers efforts to meaningful economic create and

environmental impacts. Therefore, a comprehensive understanding of the factors influencing the adoption of sustainabilitybased business models is essential for addressing these challenges and enabling the agroindustry to contribute effectively to local economic development. This study aims to explore the development and implications of a sustainability-based agroindustry business model for strengthening the local economy in Indonesia.

2. LITERATURE REVIEW

2.1. Sustainability in the Agroindustry

Sustainability in the agroindustry integrates environmental stewardship, economic profitability, and social well-being, aligning with the triple bottom line framework. In Indonesia, where agroindustry relies on natural resources and supports rural livelihoods, sustainability is essential. However, challenges such as deforestation, soil degradation, and greenhouse gas emissions necessitate transformation for resilience against climate change and market fluctuations. This can be achieved through resource-efficient production methods like precision agriculture and agroforestry, optimizing input use and improving yields while minimizing environmental impacts [7], [11]. Techniques such as crop rotation and diversification enhance soil health, biodiversity, and productivity [8], [12]. Waste minimization strategies, including biogas production, reduce emissions and soil while degradation, renewable energy adoption lowers the sector's carbon footprint [10]. Equitable labor practices and cooperative strengthen social models equity and resilience, particularly for smallholder farmers [7]. Technological innovations, such as digital platforms, precision agriculture, and sustainable farming systems like aquaponics hydroponics, enhance production and efficiency while minimizing environmental impact [8], [11]. Policy reforms, including incentives and support for small-scale farmers, along with education initiatives and training programs, are crucial for overcoming

2.2. Business Models and Sustainability

Sustainability-based business models in the agroindustry focus on long-term value creation by integrating environmental, social, factors and economic into strategic management. These models emphasize value proposition adjustments, resource optimization, and stakeholder inclusivity, leading to improved operational efficiency, cost savings, and enhanced brand reputation. In practice, this involves integrating supply chains, adopting green technologies, and fostering collaborations among farmers, processors, and distributors, enabling access to niche markets that value ethically produced and environmentally friendly products. A shift in value propositions is essential to include environmental and social benefits, aligning with consumer demand for ecofriendly products [13], while the Green Business Model Canvas (BMC) helps businesses incorporate sustainability into their strategies [13]. Resource optimization through green technologies and digital platforms enhances efficiency and supply chain transparency, leading to better resource and management cost savings [14]. Stakeholder inclusivity plays a crucial role, as engaging employees and local communities supports the implementation of sustainable while practices, collaborations among industry actors enhance shared value creation [6], [15]. Additionally, sustainability-based models enable agroindustry enterprises to tap into niche markets that prioritize ethical and environmentally friendly products, improving brand reputation and market reach [14]. However, implementation barriers such as limited funding, lack of expertise, and policy inconsistencies remain significant obstacles, especially in developing countries like Indonesia.

2.3. Economic Implications of Agroindustry Sustainability

Sustainable agroindustry practices boost local economies by creating valueadded products, jobs, and market diversification. Organic farming,

agroforestry, and community-based processing enhance competitiveness, opening access to global markets and higher profits. In agroindustry significantly Indonesia, contributes to GDP, with sustainabilitydriven interventions like farmer training and technology adoption improving productivity and income. Organic farming and product diversification enhance quality and market reach, stabilizing income, as seen in Bali [16]. Small-scale enterprises adopting green practices generate over 50% of jobs in emerging economies, aligning with global sustainability goals [14]. Practices like crop rotation and integrated pest management reduce costs, improve soil health, and increase profitability [17]. Growing demand for organic products allows farmers to charge higher ensuring economic prices, sustainability (VARMA et al., 2024). Though less impactful, digital marketing helps expand market reach [16]. Challenges like scalability and policy gaps require coordinated policy shifts and consumer engagement. Circular economy principles efficiency enhance resource and sustainability, creating new economic opportunities [9]. Moreover, sustainable agroindustry practices reduce dependency on imported raw materials, promoting selfsufficiency and economic stability.

2.4. Environmental and Social Considerations

The social environmental and the dimensions of sustainability in agroindustry are crucial for maintaining ecological balance and community wellbeing. Environmental sustainability focuses on reducing the ecological footprint through resource conservation, pollution control, and biodiversity preservation, while social sustainability emphasizes equitable benefit distribution, improved working conditions, and community empowerment. Technologies such as precision agriculture, renewable energy, and circular economy approaches play a key role in achieving these goals. Sustainable agricultural practices like precision agriculture and conservation tillage enhance resource efficiency and reduce emissions [8], [18], while agroforestry and

organic farming support biodiversity by minimizing chemical inputs and providing diverse ecological niches [19]. The integration of renewable energy sources and circular economy principles further reduces reliance on fossil fuels and promotes resource efficiency. In Indonesia, the agroindustry significantly contributes to rural development by providing employment and preserving traditional knowledge systems, supporting social sustainability [8]. Additionally, promoting inclusivity and gender equity within agroindustry operations ensures fair distribution of benefits across different community groups, strengthening long-term social resilience [8].

2.5. Research Gap

Despite growing body the of on sustainability in the literature agroindustry, limited studies focus on its implementation in Indonesia, particularly regarding its impact on local economic development. Furthermore, there is a lack of empirical evidence on the factors influencing the adoption of sustainability-based business models and their interconnections. This study addresses these gaps by using SEM-PLS to investigate the critical success factors and implications sustainability-based of agroindustry practices in strengthening the local economy.

This literature review establishes a conceptual framework for understanding the role of sustainability in agroindustry and its potential to drive economic and social progress in Indonesia. The insights gained from this study will contribute to the discourse academic on sustainable provide development and practical recommendations for enhancing the agroindustry sector's sustainability performance.

3. METHODS

3.1. Research Design

A descriptive and explanatory research design was adopted to explore and analyze the relationships between key variables such as environmental sustainability, economic viability, and social equity. This design is suitable for understanding the factors influencing the adoption of sustainability-based business models and their implications for local economic development. The study uses Structural Equation Modeling - Partial Least Squares (SEM-PLS) to evaluate complex interrelationships between variables.

3.2. Population and Sample

The population of this study comprises stakeholders involved in the agroindustry sector in Indonesia, including business owners, managers, farmers, and purposive policymakers. А sampling technique was used to select 100 respondents who have significant experience or sustainability-based involvement in agroindustry practices. This sample size aligns with the recommendations for SEM-PLS analysis, which requires a minimum sample size of 10 times the largest number of formative indicators in the model.

3.3. Data Collection Instruments

were collected Data using а structured questionnaire on sustainability in the agroindustry, measured on a 5-point Likert scale (1 = strongly disagree to 5 =strongly agree). It covered four key variables: Environmental Sustainability (resource efficiency, waste reduction, renewable energy adoption, pollution control), Economic Viability (profitability, cost efficiency, market access, financial stability), Social Equity (fair labor practices, community engagement, gender inclusivity, equitable benefit distribution), and Local Economic Strengthening (employment generation, improvement, income economic diversification). The questionnaire was pretested for validity and reliability before fullscale data collection, conducted over one month through in-person visits, email, and surveys. Informed consent online was confidentiality obtained, ensuring and anonymity.

3.4. Data Analysis

The collected data were analyzed using Structural Equation Modeling - Partial Least Squares (SEM-PLS) with PLS-3 software, a robust tool suitable for small sample sizes, non-normal data distributions, and complex models with multiple latent variables. The analysis followed three key steps: Outer Model Evaluation, which assessed measurement reliability and validity through factor loadings, Cronbach's alpha, composite reliability, Average Variance Extracted (AVE), and the Fornell-Larcker criterion; Inner Model Evaluation, which examined path coefficients, coefficient of determination (R²), and predictive relevance (Q²), with hypothesis testing conducted via bootstrapping; and Model Fit Evaluation, which used indices such as Standardized Root Mean Square Residual (SRMR) to assess the overall goodness-of-fit of the model.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Descriptive statistics provide an overview of the variables analyzed in this study. Table 1 summarizes the mean scores and standard deviations of the key variables measured on a 5-point Likert scale.

Variable	Mean	Standard Deviation	Minimum	Maximum
Environmental Sustainability	4.10	0.45	3.00	5.00
Economic Viability	4.25	0.50	3.20	5.00
Social Equity	3.95	0.48	3.00	5.00
Local Economic Strengthening	4.30	0.40	3.50	5.00

Table 1. Descriptive Statistics of Variables

The descriptive statistics provide insights into respondents' perceptions of sustainability-based business models and their role in strengthening the local economy. Environmental Sustainability recorded a mean of 4.10 (SD = 0.45, range = 3.00-5.00), indicating strong agreement on the importance of waste reduction, resource efficiency, and renewable energy adoption, with moderate variability in responses. Economic Viability had a mean of 4.25 (SD = 0.50, range = 3.20-5.00), reflecting the critical role of financial stability and profitability in agroindustry businesses, though perspectives varied slightly due to differences in financial performance. Social Equity, with a mean of 3.95 (SD = 0.48, range = 3.00–5.00), highlights the significance of fair labor practices, equitable resource distribution, and community engagement, though responses showed moderate variability, possibly due to differences in regional implementation. Local Economic Strengthening scored the highest mean at 4.30 (SD = 0.40, range = 3.50-5.00), demonstrating strong agreement on the agroindustry's role in employment generation and community development, with low variability suggesting broad consensus among respondents.

4.2. Outer Model Evaluation

The measurement model was evaluated for reliability and validity.

Metric	Environmental Sustainability	Economic Viability	Social Equity	Local Economic Strengthening
Cronbach's Alpha	0.823	0.856	0.811	0.842
Composite Reliability	0.876	0.893	0.855	0.887
Average Variance Extracted	0.621	0.676	0.607	0.652

Table 2 Measurement

All reliability and validity metrics met the required thresholds (Cronbach's alpha > 0.7, composite reliability (CR) > 0.7, and Average Variance Extracted (AVE) > 0.5), ensuring strong measurement consistency. Cronbach's Alpha values ranged from 0.811 to 0.856, with Economic Viability showing the highest reliability (0.856) and Social Equity the lowest (0.811), though still acceptable. Composite Reliability (CR) values exceeded 0.7 for all constructs, with Economic Viability (0.893) having the highest CR and Social Equity (0.855) the lowest. AVE values also surpassed the 0.5 threshold, confirming adequate convergent validity, with Economic Viability (0.676) having the highest AVE and Social Equity (0.607) the lowest, suggesting minor refinements for better alignment.

4.3 Inner Model Evaluation

The structural model was assessed by examining path coefficients, R^2 values, and hypothesis testing.

Path Relationship	Path Coefficient (β)	t-value	p-value	Hypothesis Outcome
Environmental Sustainability → Local Economy	0.353	4.123	0.000	Supported
Economic Viability \rightarrow Local Economy	0.454	5.306	0.000	Supported
Social Equity \rightarrow Local Economy	0.287	2.982	0.000	Supported

Table 3. Hypothesis

Its R² of 0.65 informs us that the model explains 65% of the variation in local economic strengthening, with its predictive significance (Q²) of 0.50 bearing witness to its predictive ability. The findings of path analysis indicate that there exist significant relations between independent variables sustainability, (environmental economic equity) viability, and social and the (local dependent variable economic strengthening), with each of the hypotheses being substantiated by significant path coefficients, t-values, and p-values. Ecological sustainability has a moderate positive influence on the regional economy ($\beta = 0.353$, t = 4.123, p < 0.01), demonstrating that ecoefficiency and waste management not only impact the environment positively but also give rise to economic activities like ecotourism and sustainable agriculture. feasibility Economic has the highest correlation with local economic empowerment ($\beta = 0.454$, t = 5.306, p < 0.01), indicating the role of financially viable agroindustry companies in generating employment, increasing purchasing power, and stimulating economic activity. Social

equity also positively influences the local economy (β = 0.287, t = 2.982, p < 0.05), although its influence is less compared to the other dimensions. This necessitates the position of decent work, equitable distribution of resources, and community engagement toward social cohesion that indirectly enables economic development. **4.4. Discussion**

The strong and positive relationship of environmental sustainability with local economic empowerment highlights the role of green practices in achieving improved economic performance. Those firms that engaged in resource efficiency, minimized waste, and employed renewable energy reported greater operational efficiency and cost reduction. These findings align with studies by [20]–[22] that validate economic benefits from sustainable practices. Economic viability was the strongest predictor of local economic empowerment. Profitability, market access, and financial stability were the most dominant factors in enhancing local economic development. Those agroindustry companies that used sustainability-based models experienced improved revenue

growth and competitiveness. This supports [23], who confirmed that sustainable business models improve financial performance.

Social equity also performed а significant function, albeit not as robust as economic viability and environmental sustainability. Equitable distribution of benefits and community involvement facilitated the realization of acceptable social impacts, which involved the generation of jobs and gender inclusiveness. The findings support [24], [25], who reported social role in contributing equity's to the development of communities. The findings suggest that a balanced approach to sustainability-off-setting environmental, economic, and social dimensions-is the hallmark of maximizing local economic benefits. This has direct application in Indonesia, where agroindustry operations have substantial bearing on rural welfare and environmental health.

4.5. Policy and Practical Implications

The study highlights the importance of enabling policies and institutions to promote sustainability in the agroindustry. These include incentives for green technology use, capacity building for stakeholders, and multi-stakeholder platforms for best practice sharing. Additionally, firms must prioritize stakeholder engagement for aligning sustainability goals community with priorities.

5. CONCLUSION

This study demonstrates the urgency of sustainability-based business models in supporting the local economy through agroindustry practices. The findings validate the theoretical framework by illustrating that environmental sustainability, economic viability, and social equity positively contribute towards local economic While improvement. environmental sustainability translates to improved efficiency in operations, reduced costs, and minimal effect on the ecosystem, economic viability necessary market is for competitiveness and revenue enhancement, stressing the importance of financial prudence. Social equity ensures that growth is inclusive by facilitating good labor conditions, equitable resource allocation, and participation of citizens. The research concludes that a comprehensive approach to sustainability, incorporating environmental, economic, and social aspects, is vital in economies. building resilient local Policymakers stakeholders and in agroindustry need to join forces to adopt strategies that support sustainability, providing incentives and facilitating education on sustainable approaches. Through these, long-term economic, social, and environmental gains can be attained, and agroindustry can become a key driver of sustainable development in Indonesia.

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