

INTEGRATED AGRIBUSINESS STRATEGIES FOR ORNAMENTAL PIGEON FARMING: LINKING HOBBY-BASED LIVESTOCK SYSTEMS WITH SUSTAINABLE RURAL ECONOMIES

Sulfikar Affandy^{1*}, Darmawan², Suherman³

¹ Agribusiness Study Program, Faculty of Agriculture, Animal Husbandry and Fisheries, Universitas Muhammadiyah Parepare, Indonesia

² Accounting Study Program, Faculty of Economics and Business, Universitas Muhammadiyah Parepare, Indonesia

³ Agrotechnology Study Program, Faculty of Agriculture, Animal Husbandry, and Fisheries, Universitas Muhammadiyah Parepare, Indonesia

*correspondent e-mail: affandysulfikar@gmail.com

Article history:

Received: February 27, 2024

Accepted: January 15, 2024

Published: April 03, 2025

Keywords:

agribusiness integration, economic sustainability, hobby livestock, rural livelihoods, strategic planning.

ABSTRACT

Hobby-based livestock enterprises, such as ornamental pigeon farming, are increasingly recognized for their potential contribution to rural economic diversification. Yet their development is often fragmented and poorly integrated into agribusiness systems. This study examines ornamental pigeon farming from an integrated agribusiness perspective to support sustainable rural economic development. A case-based analytical approach was applied using primary data collected through structured interviews and observations, complemented by secondary sources. An integrated agribusiness framework was employed by combining Internal Factor Evaluation (IFE), External Factor Evaluation (EFE), and Internal-External (IE) matrix analyses to assess internal capacities, external conditions, and strategic positioning. The findings indicate that ornamental pigeon farming possesses moderate-to-strong internal capacity and operates within an opportunity-dominant external environment. The combined IFE and EFE results place the enterprise in a growth-oriented strategic position, highlighting the relevance of proactive integrative development strategies. The results suggest that economic viability in hobby-based livestock systems is determined by the interaction between internal capabilities and external opportunities rather than isolated factors. Integrated agribusiness strategies can strengthen the role of ornamental pigeon farming as a viable, sustainable component of rural economic systems.

Keywords:

integrasi agribisnis, keberlanjutan ekonomi, mata pencaharian pedesaan, perencanaan strategis, peternakan hobi.

ABSTRACT

Usaha peternakan berbasis hobi, seperti peternakan merpati hias, semakin diakui potensinya dalam diversifikasi ekonomi pedesaan. Namun, pengembangannya seringkali terfragmentasi dan kurang terintegrasi ke dalam sistem agribisnis. Studi ini meneliti peternakan merpati hias dari perspektif agribisnis terintegrasi untuk mendukung pembangunan ekonomi pedesaan yang berkelanjutan. Pendekatan analitis berbasis kasus diterapkan menggunakan data primer yang dikumpulkan melalui wawancara terstruktur dan observasi, dilengkapi dengan sumber sekunder. Kerangka kerja agribisnis terintegrasi digunakan dengan menggabungkan Evaluasi Faktor Internal (IFE), Evaluasi Faktor Eksternal (EFE), dan analisis matriks Internal-Eksternal (IE) untuk menilai kapasitas internal, kondisi eksternal, dan posisi strategis. Temuan menunjukkan bahwa peternakan merpati hias memiliki kapasitas internal yang moderat hingga kuat dan beroperasi dalam lingkungan eksternal yang didominasi peluang. Hasil gabungan IFE dan EFE menempatkan usaha tersebut pada posisi strategis yang berorientasi pada pertumbuhan, menyoroti relevansi strategi pengembangan integratif yang proaktif. Hasil penelitian

menunjukkan bahwa kelangsungan ekonomi dalam sistem peternakan berbasis hobi ditentukan oleh interaksi antara kemampuan internal dan peluang eksternal, bukan oleh faktor-faktor yang terisolasi. Strategi agribisnis terintegrasi dapat memperkuat peran peternakan merpati hias sebagai komponen yang layak dan berkelanjutan dalam sistem ekonomi pedesaan.

INTRODUCTION

Sustainable agricultural development is no longer limited to increasing food production but also encompasses the strengthening of non-food agribusiness systems that contribute to rural economic diversification and livelihood resilience (Borsellino et al., 2020; Mabhaudhi et al., 2022). In this context, the livestock subsector plays a strategic role not only as a source of animal protein but also as an alternative income generator through value-added and niche-oriented farming activities (Borrelli & Cibils, 2019; Hajar et al., 2024; Sloggett, 2019). An integrated agriculture approach emphasizes the interconnections among production processes, markets, institutions, and human resources in creating resilient and sustainable agribusiness systems (Horton et al., 2017; Olatinjo & Opatola, 2023; Shyam et al., 2023).

One emerging form of non-conventional livestock farming is hobby-based livestock production, including ornamental pigeon farming. Globally, ornamental and hobby-based livestock enterprises have gained increasing attention as part of rural creative economies due to their ability to generate relatively high economic value at a small scale (Fatchurrasad, 2022; Himayaturrohman, 2020; Rennu et al., 2018). Such enterprises are often driven by consumer preferences, cultural values, and social networks, which differentiate them from conventional livestock systems and create unique agribusiness dynamics (Josephson, 2020; Sutanto, 2022; Whiston, 2017).

In many developing regions, including Indonesia, ornamental pigeon farming is predominantly managed at the household level with limited integration across production, marketing, and institutional dimensions (Adawy et al., 2023; Mardiasuti et al., 2020; Sudarwani, 2016). Business management practices, market access, innovation adoption, and organizational support remain relatively underdeveloped, constraining the ability of these enterprises to grow sustainably (Aldilla et al., 2024; Fernando et al., 2019). As a result, the economic potential of ornamental pigeon farming is not fully realized (Maity et al., 2020), and business development strategies tend to remain fragmented and reactive to short-term challenges (Pitas, 2016; Wang et al., 2019).

Developing ornamental pigeon farming within an integrated agribusiness framework offers opportunities to enhance its contribution to sustainable rural economies. By considering internal business characteristics alongside external environmental conditions (Leonidou et al., 2017; Nasiri et al., 2022), integrated strategic approaches can support more structured decision-making and long-term business development (Alkhodary, 2023; Kniazieva et al., 2017). Such approaches allow hobby-based livestock enterprises to transition from informal activities into economically viable components of integrated agricultural systems (Santoso et al., 2021).

Although the ornamental livestock industry has promising economic potential, its development is often carried out in a piecemeal manner and is not yet integrated into a comprehensive agribusiness framework (Akbar et al., 2023; Fitriani et al., 2023; Wibowo, 2016).

Various important aspects, such as business management, market access, institutional support, and external environmental dynamics, have not been fully studied in an integrated manner in ornamental livestock development (Anisah et al., 2023; Sutanto, 2022). Consequently, the implemented development strategies tend to be short-term and not fully capable of supporting the sustainability of the business and its contribution to the rural economy.

Accordingly, this study aims to formulate integrated agribusiness development strategies for ornamental pigeon farming using a strategic analytical approach. Specifically, the study identifies key internal and external factors influencing business performance and proposes development strategies that support economic sustainability and rural livelihood enhancement. The findings are expected to contribute to a broader understanding of how hobby-based livestock systems can be positioned within integrated and sustainable agricultural development.

RESEARCH METHODS

Study Area and Research Design

This study employed a case-based analytical design to examine ornamental pigeon farming within an integrated agribusiness system. The research was conducted in a rural area where ornamental pigeon farming has developed as a hobby-based livestock enterprise with economic potential. The study was designed to capture both internal business characteristics and external environmental conditions influencing enterprise development within a broader rural economic context.

Data Collection

Primary data were collected through structured interviews and direct observations involving ornamental pigeon breeders, local traders, and relevant stakeholders. The interviews focused on production management, input availability, marketing practices, institutional support, and perceived business constraints. Secondary data were obtained from official statistics, local agricultural offices, and relevant reports to support contextual analysis of the agribusiness environment.

Integrated Agribusiness Assessment Framework

To move beyond a purely descriptive SWOT analysis, this study adopted an integrated agribusiness assessment framework that links internal and external factors with strategic development pathways. Internal factors were categorized into strengths and weaknesses related to production management, capital, human resources, and business organization. External factors included market dynamics, technological developments, policy environment, and socio-cultural influences relevant to ornamental livestock enterprises. Each factor was systematically identified and evaluated based on its relevance to enterprise performance and sustainability. This framework allowed the analysis to reflect the interconnected nature of agribusiness systems rather than isolated business components.

Strategic Factor Evaluation

Identified internal and external factors were quantified using the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices. Respondents assigned relative weights and ratings to each factor based on perceived importance and performance. Weighted scores were calculated to determine the overall internal and external positions of ornamental pigeon farming enterprises within the agribusiness system.

Strategy Formulation

Based on the IFE and EFE results, strategic alternatives were formulated using the Internal–External (IE) matrix and SWOT matrix integration. The strategies were categorized into development-oriented approaches that emphasize system integration, such as strengthening market linkages, improving business organization, enhancing value creation, and leveraging institutional support. This approach ensured that the proposed strategies were aligned with both internal capacities and external opportunities.

Analytical Validation

To enhance analytical rigor, the resulting strategies were reviewed through stakeholder discussions to assess feasibility and relevance. This validation process ensured that the proposed agribusiness strategies were grounded in practical conditions while remaining consistent with the integrated and sustainable agriculture framework.

RESULTS AND DISCUSSION

Internal Agribusiness Conditions of Ornamental Pigeon Farming

The internal assessment of ornamental pigeon farming reveals a combination of strengths and weaknesses that jointly shape its role within an integrated agribusiness system. As presented in Table 1, breeder experience and skills constitute the strongest internal factor, reflected by the highest weighted score (0.60). This indicates that accumulated knowledge and practical expertise play a central role in sustaining production performance and maintaining bird quality. Similarly, the high ornamental and market value of pigeons shows a strong contribution (weighted score 0.56), confirming that product differentiation is a key economic advantage in hobby-based livestock systems.

Other supportive internal factors include relatively low production costs and the presence of strong hobbyist networks, which together facilitate operational continuity and informal knowledge exchange. However, these strengths are offset by several structural weaknesses. Limited business organization represents the most critical constraint, as shown by its high weight and low rating, resulting in a considerable weighted score (0.36). Weak financial management and limited access to formal markets further reduce the ability of breeders to scale up and stabilize income streams.

Overall, the total IFE score of 2.79 (Table 1) indicates that internal strengths slightly outweigh weaknesses, suggesting that ornamental pigeon farming possesses sufficient internal capacity to support development, provided that organizational and managerial constraints are addressed within an integrated agribusiness framework.

Table 1. Internal Factor Evaluation (IFE) matrix of ornamental pigeon farming

Internal Factors	Weight	Rating	Weighted Score
Breeder experience and skills	0.15	4	0.60
High ornamental and market value	0.14	4	0.56
Low production costs	0.11	3	0.33
Strong hobbyist network	0.10	3	0.30
Limited business organization	0.18	2	0.36
Weak financial management	0.17	2	0.34
Limited access to formal markets	0.15	2	0.30
Total IFE Score	1.00		2.79

External Environment and Agribusiness Opportunities

The external environment of ornamental pigeon farming is characterized by opportunity-dominant conditions, as summarized in Table 2. Increasing demand for ornamental livestock emerges as the most influential external opportunity, with the highest weighted score (0.72), highlighting favorable market trends driven by hobbyist communities and aesthetic preferences. The expansion of digital marketing platforms also contributes substantially (weighted score 0.64), indicating growing potential for market access beyond local boundaries.

Additional opportunities arise from the increasing recognition of rural creative economies and the presence of community-based hobby networks, which together support value creation and social capital development. Nevertheless, the external environment also presents notable threats. Disease and health risks, price fluctuations, and limited institutional support collectively impose uncertainty on business sustainability, although their weighted scores remain lower than those of key opportunities. The total EFE score of 2.94 (Table 2) confirms that external opportunities currently outweigh threats, creating a conducive environment for strategic agribusiness development when supported by appropriate risk management and institutional integration.

Table 2. External Factor Evaluation (EFE) matrix of ornamental pigeon farming

External Factors	Weight	Rating	Weighted Score
Increasing demand for ornamental livestock	0.18	4	0.72
Growth of digital marketing platforms	0.16	4	0.64
Potential for rural creative economy	0.14	3	0.42
Community-based hobby networks	0.12	3	0.36
Disease and health risks	0.15	2	0.30
Price fluctuations	0.13	2	0.26
Limited institutional support	0.12	2	0.24
Total EFE Score	1.00		2.94

Integrated Positioning and Strategic Orientation

By combining the internal and external evaluation results, the positioning of ornamental pigeon farming within the Internal–External (IE) matrix can be clearly identified. As shown in Table 3, the IFE score of 2.79 and the EFE score of 2.94 place the enterprise in a growth-oriented strategic position. This position reflects a system with moderate-to-strong internal capacity operating within a favorable external environment.

Table 3. IE matrix position of ornamental pigeon farming

Dimension	Score	Strategic Implication
Internal condition (IFE)	2.79	Moderate–strong internal capacity
External environment (EFE)	2.94	Opportunity-dominant environment
IE Matrix Position	Growth orientation	Integrated development strategies

Such positioning implies that development strategies should focus on proactive and integrative actions rather than defensive or survival-oriented responses. In this context, strengthening organizational structures, enhancing market linkages, and improving access to institutional support are strategic priorities that can leverage existing strengths and opportunities simultaneously.

System-Level Implications of the Results

The results indicate that the development potential of ornamental pigeon farming emerges from the interaction between internal capabilities and external conditions operating within an integrated agribusiness system (Figure 1). Internal strengths such as breeder expertise, low production costs, and strong hobbyist networks (Table 1) constitute the foundational capacity that enables enterprises to respond effectively to external opportunities, including growing market demand, the expansion of digital marketing platforms, and supportive socio-economic environments (Table 2).

The convergence of these internal and external dimensions explains the growth-oriented strategic position identified through the IE matrix (Table 3). Rather than functioning independently, internal strengths and external opportunities reinforce each other through integrative mechanisms such as improved organization, market expansion, and strengthened institutional linkages. This systemic interaction demonstrates that hobby-based livestock enterprises can evolve into economically viable and sustainable rural agribusinesses when development strategies emphasize integration, coordination, and long-term system coherence.



Figure 1. System-level interactions shaping the development of ornamental pigeon agribusiness within integrated rural economies

Integrated Agribusiness Dynamics in Hobby-Based Livestock Systems

The findings of this study support the growing body of literature emphasizing that the performance of small-scale livestock enterprises is strongly influenced by the degree of integration across production (Chibanda et al., 2020), market (Cheteni & Mokhele, 2019; Rantšo, 2016), and institutional dimensions (Amam et al., 2024). The growth-oriented strategic position identified in this study aligns with previous research highlighting that niche livestock systems can generate substantial economic value when internal capabilities are effectively linked with favorable external conditions (Sitaula et al., 2020; Therond et al., 2017). In this regard, ornamental pigeon farming demonstrates characteristics similar to other hobby-based livestock enterprises that successfully transition into structured agribusiness activities.

The prominence of breeder expertise and strong social networks as key internal strengths is consistent with studies emphasizing the role of human capital and social capital in sustaining small-scale agribusiness systems (Fisher & McAdam, 2017; Halim et al., 2024; Pistorius et al., 2016). However, unlike conventional livestock systems that rely heavily on technological intensification, this study suggests that experiential knowledge and community-based networks play a more critical role in shaping economic outcomes in hobby-based livestock enterprises.

Market Opportunities, Institutional Constraints, and Strategic Alignment

The opportunity-dominant external environment identified in this study corroborates findings from rural development research showing that niche markets, supported by digital platforms, can enhance market access for small-scale producers (Ma et al., 2024; Tim et al., 2021; Xie et al., 2021). The growing demand for ornamental livestock and the expansion of online marketing channels create pathways for value creation that extend beyond local markets (Calado et al., 2017).

At the same time, the persistence of institutional and organizational constraints identified in this study reflects challenges commonly reported in smallholder agribusiness literature. Limited formal support and weak business organization have been shown to restrict the scaling-up of rural enterprises, even when market opportunities are available (Chatterjee & Datta, 2023; Kakembo & Kakembo, 2021; Miltzer et al., 2023). This finding suggests that market-driven opportunities alone are insufficient without complementary institutional and organizational development.

Implications for Sustainability and Rural Economic Development

From a sustainability perspective, the results reinforce the view that economic viability is a prerequisite for the long-term sustainability of integrated agricultural systems. Similar to observations by Lahti et al. (2018), Lacoste (2016), and Lüdeke-Freund (2020), this study highlights that sustainability outcomes are more likely to emerge from efficiency, coordination, and value creation rather than from the simple expansion of production activities.

Unlike studies that frame sustainability primarily in environmental terms, the present findings emphasize the importance of economic and social dimensions in hobby-based livestock systems. By integrating ornamental pigeon farming into a broader agribusiness framework, such enterprises can contribute to diversified income sources, reduced vulnerability, and enhanced resilience of rural livelihoods. This integrated approach supports the argument that sustainable agriculture must

encompass diverse production systems, including non-food and culturally embedded livestock enterprises.

CONCLUSION

This study demonstrates that ornamental pigeon farming can be positioned as a viable component of integrated agribusiness systems when development strategies emphasize alignment between internal capacities and external opportunities. By framing hobby-based livestock enterprises within a system-level agribusiness perspective, the study highlights their potential contribution to sustainable rural economies beyond conventional food-oriented production systems.

From a sustainability standpoint, the findings underscore that economic viability, organizational coherence, and market integration are central to the long-term development of hobby-based livestock enterprises. Strengthening these dimensions enables such systems to enhance income diversification, reduce vulnerability, and improve resilience of rural livelihoods, thereby reinforcing the socio-economic pillar of sustainable agriculture.

Policy efforts should therefore focus on facilitating structured agribusiness development through capacity building, improved market access, and institutional support tailored to niche livestock systems. Integrating hobby-based livestock enterprises into broader rural development and agricultural policy frameworks can expand the scope of sustainable agriculture while fostering inclusive and diversified rural economic growth.

REFERENCE

- Adawy, A. M. G., & Abdel-Wareth, A. A. A. (2023). Productive performance and Nutritional of domesticated pigeons. Present status and future concerns. *SVU-International Journal of Agricultural Sciences*, 5(2), 160-167. <https://doi.org/10.21608/svuijas.2023.226150.1305>
- Akbar, M., Rokana, E., Lokapirnasari, W. P., Safitri, E., & Winahyu, N. (2023). *Manajemen Usaha Ternak Kelinci*. Penerbit NEM.
- Aldilla, D., Nuddin, A., Yusriadi, & Suherman. (2024). Strategi Pemberdayaan Wanita Tani Penyangga Ketahanan Pangan Perkotaan Melalui Program Pekarangan Pangan Lestari. *Integrated and Sustainable Agriculture*, 1(1), 1–11. Retrieved from <https://journals.eduped.org/index.php/insagri/article/view/639>
- Alkhodary, D. (2023). Integrating sustainability into strategic management: A path towards long-term business success. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 8(4), 39. <https://dialnet.unirioja.es/servlet/articulo?codigo=8956100>
- Amam, A., Luthfi, M., Prihatin, K. W., & Wankar, T. J. (2024). Driving factors for sustainable livestock development in Indonesia: Study on beef cattle commodities. In *BIO Web of Conferences* (Vol. 88, p. 00031). EDP Sciences. <https://doi.org/10.1051/bioconf/20248800031>
- Anisah, A. L., Pradani, T., Yusuf, R., Dianawati, E., Saluby, W. S., Anggraeni, I., ... & Aziz, N. J. A. (2023). Pengantar bisnis. *EDUPEDIA Publisher*, 1-160. <https://press.eduped.org/index.php/pedia/article/download/7/7>
- Borrelli, P., & Cibils, A. (2019). Rural depopulation and grassland management in Patagonia. In *Grasslands* (pp. 461-487). CRC Press. <https://doi.org/10.1201/9780429187872-19>
- Borsellino, V., Schimmenti, E., & El Bilali, H. (2020). Agri-food markets towards sustainable patterns. *Sustainability*, 12(6), 2193. <https://doi.org/10.3390/su12062193>

- Calado, R., Olivotto, I., Oliver, M. P., & Holt, G. J. (Eds.). (2017). *Marine ornamental species aquaculture* (Vol. 712). Hoboken, NJ, USA: Wiley Blackwell. DOI:10.1002/9781119169147
- Chatterjee, S., & Datta, D. (2023). Entrepreneurial ability and development of micro enterprise. *Arthaniti: Journal of Economic Theory and Practice*, 22(1), 47-66. <https://doi.org/10.1177/0976747920946405>
- Cheteni, P., & Mokhele, X. (2019). Small-scale livestock farmers' participation in markets: Evidence from the land reform beneficiaries in the central Karoo, western Cape, South Africa. *South African Journal of Agricultural Extension*, 47(1), 118-136. <https://www.ajol.info/index.php/sajae/article/view/185264>
- Chibanda, C., Agethen, K., Deblitz, C., Zimmer, Y., Almadani, M. I., Garming, H., ... & Lasner, T. (2020). The typical farm approach and its application by the Agri Benchmark network. *Agriculture*, 10(12), 646. <https://doi.org/10.3390/agriculture10120646>
- Fatchurrasad, A. (2022). Sistem Informasi Manajemen Pencatatan Ternak Merpati Berbasis Website. *STORAGE: Jurnal Ilmiah Teknik dan Ilmu Komputer*, 1(4), 30-38. <https://doi.org/10.55123/storage.v1i4.1217>
- Fernando, Y., Jabbour, C. J. C., & Wah, W. X. (2019). Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: does service capability matter?. *Resources, conservation and recycling*, 141, 8-20. <https://doi.org/10.1016/j.resconrec.2018.09.031>
- Fisher, D. N., & McAdam, A. G. (2017). Social traits, social networks and evolutionary biology. *Journal of Evolutionary Biology*, 30(12), 2088-2103. <https://doi.org/10.1111/jeb.13195>
- Fitriani, A., Alim, S., & Herlina, L. (2019). Strategi pengembangan usaha pemeliharaan ayam pelung di Kabupaten Cianjur. *Jurnal Peternakan Indonesia (Indonesian Journal of Animal Science)*, 21(1), 34-50. <https://doi.org/10.25077/jpi.21.1.34-50.2019>
- Hajar, Nurhapsa, & Mustafah, A. E. S. W. (2024). Strategi Pengembangan Usaha Ayam Arab di Baranti, Sidenreng Rappang dengan Pendekatan Matriks I-E. *Integrated and Sustainable Agriculture*, 1(1), 19-26. Retrieved from <https://journals.eduped.org/index.php/insagri/article/view/1038>
- Halim, H., Suradi, A. R., & Ramli, F. (2024). Analisis Peran Modal Sosial dalam Pengembangan Agribisnis Sayuran Dataran Tinggi di Kabupaten Gowa. *Jurnal Riset Multidisiplin Agrisosco*, 2(1), 38-43. <https://doi.org/10.61316/jrma.v2i1.42>
- Himayaturrohman, E. (2020). Model Pelatihan Kewirausahaan Berbasis Minat. *Journal of Chemical Information and Modeling*, 15(2). [https://simlitbang.balitbangdiklat.net/assets front/pdf/1607751196Model Pelatihan Kewirausahaan.pdf](https://simlitbang.balitbangdiklat.net/assets/front/pdf/1607751196ModelPelatihanKewirausahaan.pdf)
- Horton, P., Banwart, S. A., Brockington, D., Brown, G. W., Bruce, R., Cameron, D., ... & Jackson, P. (2017). An agenda for integrated system-wide interdisciplinary agri-food research. *Food Security*, 9(2), 195-210. <https://doi.org/10.1007/s12571-017-0648-4>
- Josephson, P. R. (2020). *Chicken: A history from farmyard to factory*. John Wiley & Sons.
- Kakembo, F., & Kakembo, G. B. (2021, April). Developing the Circular Economy in Uganda: Prospects for Academia-Public-Private-Partnerships. In Bode, Umuerrri (Eds.): *Universities, Entrepreneurship and Enterprise Development in Africa—Conference Proceedings 2020* (pp. 74-90). https://doi.org/10.18418/978-3-96043-083-4_74
- Kniazieva, T., Kolbushkin, Y., & Smerichevskiy, S. (2017). Method of strategic planning and management decision-making considering the life cycle theory. *Baltic Journal of Economic Studies*, 3(5), 175-182. <https://dx.doi.org/10.30525/2256-0742/2017-3-5-175-182>
- Lacoste, S. (2016). Sustainable value co-creation in business networks. *Industrial Marketing Management*, 52, 151-162. <https://doi.org/10.1016/j.indmarman.2015.05.018>

- Lahti, T., Wincent, J., & Parida, V. (2018). A definition and theoretical review of the circular economy, value creation, and sustainable business models: where are we now and where should research move in the future?. *Sustainability*, 10(8), 2799. <https://doi.org/10.3390/su10082799>
- Leonidou, L. C., Christodoulides, P., Kyrgidou, L. P., & Palihawadana, D. (2017). Internal drivers and performance consequences of small firm green business strategy: The moderating role of external forces. *Journal of business ethics*, 140(3), 585-606. <https://doi.org/10.1007/s10551-015-2670-9>
- Lüdeke-Freund, F., Rauter, R., Pedersen, E. R. G., & Nielsen, C. (2020). Sustainable value creation through business models: The what, the who and the how. *Journal of Business Models*, 8(3), 62-90. <https://somaesthetics.aau.dk/index.php/JOBM/article/download/6510/5655>
- Ma, W., Sonobe, T., & Gong, B. (2024). Linking farmers to markets: Barriers, solutions, and policy options. *Economic Analysis and Policy*, 82, 1102-1112. <https://doi.org/10.1016/j.eap.2024.05.005>
- Mabhaudhi, T., Hlahla, S., Chimonyo, V. G. P., Henriksson, R., Chibarabada, T. P., Murugani, V. G., ... & Chivenge, P. (2022). Diversity and diversification: ecosystem services derived from underutilized crops and their co-benefits for sustainable agricultural landscapes and resilient food systems in Africa. *Frontiers in agronomy*, 4, 859223. <https://doi.org/10.3389/fagro.2022.859223>
- Maity, B., Das, T. K., Ganguly, B., & Pradhan, K. (2020). Pigeon rearing-an investment analysis for secondary income generation to farm women, landless, marginal and small farmers. *Asian Journal of Agricultural Extension, Economics & Sociology*, 38(6), 1-6. <https://doi.org/10.9734/ajaees/2020/v38i630354>
- Mardiastuti, A., Mulyani, Y. A., Rinaldi, D., Rumblat, W., Dewi, L. K., Kaban, A., & Sastranegara, H. (2020, February). Synurbic avian species in greater Jakarta area, Indonesia. In *IOP conference series: earth and environmental science* (Vol. 457, No. 1, p. 012001). IOP Publishing. DOI: 10.1088/1755-1315/457/1/012001
- Militzer, N., McLaws, M., Rozstalnyy, A., Li, Y., Dhingra, M., Auplish, A., ... & Heilmann, M. (2023). Characterising biosecurity initiatives globally to support the development of a progressive management pathway for terrestrial animals: a scoping review. *Animals*, 13(16), 2672. <https://doi.org/10.3390/ani13162672>
- Nasiri, M., Saunila, M., Rantala, T., & Ukko, J. (2022). Sustainable innovation among small businesses: The role of digital orientation, the external environment, and company characteristics. *Sustainable Development*, 30(4), 703-712. <https://doi.org/10.1002/sd.2267>
- Olabinjo, O., & Opatola, S. (2023). Agriculture: A pathway to create a sustainable economy. *Turkish Journal of Agricultural Engineering Research*, 4(2), 317-326. https://www.researchgate.net/publication/376946701_Agriculture_A_Pathway_to_Create_a_Sustainable_Economy
- Pistorius, R., Bruil, J., & Vernooy, R. (2016). Access and benefit sharing of genetic resources. Making it work for family farmers. <https://hdl.handle.net/10568/73348>
- Pitas, J. H. R. (2016). *Birds of a feather? Exploring pigeons in Baltimore, Maryland*. University of Maryland, Baltimore County.
- Rantšo, T. A. (2016). Factors affecting performance/success of small-scale rural non-farm enterprises in Lesotho. *Journal of Enterprising Communities: People and Places in the Global Economy*, 10(3), 226-248. <https://doi.org/10.1108/JEC-10-2014-0020>
- Rennu, M., Tomasberg, L., & Leete, A. (2018). From 'heritage adepts' to historical reconstructionists: Observations on contemporary Estonian male heritage-based artisanry. *Journal of Ethnology and Folkloristics*, 12(1), 21-48. DOI: 10.2478/jef-2018-0003

- Santoso, R. T. P. B., Junaedi, I. W. R., Priyanto, S. H., & Santoso, D. S. S. (2021). Creating a startup at a University by using Shane's theory and the entrepreneurial learning model: a narrative method. *Journal of Innovation and Entrepreneurship*, 10(1), 21. <https://doi.org/10.1186/s13731-021-00162-8>
- Shyam, C. S., Shekhawat, K., Rathore, S. S., Babu, S., Singh, R. K., Upadhyay, P. K., ... & Singh, V. K. (2023). Development of integrated farming system model—A step towards achieving biodiverse, resilient and productive green economy in agriculture for small holdings in India. *Agronomy*, 13(4), 955. <https://doi.org/10.3390/agronomy13040955>
- Sitaula, B. K., Žurovec, O., Luitel, B. C., Parker, A., & Lal, R. (2020). Need for personal transformations in a changing climate: reflections on environmental change and climate-smart agriculture in Africa. In *Climate impacts on agricultural and natural resource sustainability in Africa* (pp. 347-370). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-37537-9_21
- Sloggett, J. N. (2019). The Potential Contribution of Mobile Processing Services to Food. *Annals of Public and Cooperative Economics*, 457, 474.
- Sudarwani, M. M. (2016). A Study On The Visual Character Of Mantran Wetan In Magelang, Indonesia. *International Journal of Technology Enhancements and Emerging Engineering Research*, 4(1), 5-9.
- Sutanto, A. (2022). *Strategi Mengembangkan Agribisnis Dengan Canvas Model* (Vol. 1). UMM Press.
- Therond, O., Duru, M., Roger-Estrade, J., & Richard, G. (2017). A new analytical framework of farming system and agriculture model diversities. A review. *Agronomy for sustainable development*, 37(3), 21. <https://doi.org/10.1007/s13593-017-0429-7>
- Tim, Y., Cui, L., & Sheng, Z. (2021). Digital resilience: How rural communities leapfrogged into sustainable development. *Information Systems Journal*, 31(2), 323-345. <https://doi.org/10.1111/isj.12312>
- Wang, S., Lin, B., & Yun, Y. (2019). The Current Situation of Special Economic Animal Breeding and the Planning and Construction of Investment Service System under the Revitalization of Rural Industry. *Revista Científica de la Facultad de Ciencias Veterinarias*, 29(5), 1364-1373. <https://link.gale.com/apps/doc/A624690462/IFME?u=anon~3b5c9f31&sid=googleScholar&xid=34b4308a>
- Whiston, K. (2017). *Pigeon geographies: aesthetics, organisation, and athleticism in British pigeon fancying, c. 1850-1939* (Doctoral dissertation, University of Nottingham). <https://eprints.nottingham.ac.uk/46605/>
- Wibowo, B. (2016). Dinamika kinerja agribisnis ayam lokal di Indonesia. *Wartazoa*, 26(4), 191-202. <http://dx.doi.org/10.14334/wartazoa.v26i4.1398>
- Xie, L., Luo, B., & Zhong, W. (2021). How are smallholder farmers involved in digital agriculture in developing countries: a case study from China. *Land*, 10(3), 245. <https://doi.org/10.3390/land10030245>