Empowering Rural Revitalization: Integrated Development of Rural Industries Driven by E-commerce and Empirical Analysis

Tong Zhu[1,2]*, Mohd Zaidi Abd Rozan[3]

[1]Universiti Teknologi Malaysia, Faculty of Management, Malaysia, [2]Anhui International Studies University, International Business School, China, [3]Department of Information Systems, Faculty of Management, Universiti Teknologi Malaysia, Malaysia. *Email: zhutong@graduate.utm.my

ABSTRACT

With the rapid development of the digital economy, e-commerce has become a key driver in promoting rural industrial integration and economic growth. This study constructs a theoretical framework to analyze the coupling and coordination relationships among e-commerce, specialty agriculture, and rural tourism, aiming to explore their synergistic effects on rural revitalization. Based on a comprehensive evaluation index system, this research applies the entropy weight method and the coupling coordination degree model to assess the integration dynamics of these three industries. Using panel data from 2013 to 2023, the study reveals the evolving interconnections between e-commerce and rural industries. Results show that integration has significantly improved, with e-commerce playing a central role in optimizing rural structures. Specifically, the coupling degree between e-commerce and rural tourism is found to be higher than that between e-commerce and specialty agriculture, highlighting the role of digital platforms in expanding rural tourism markets. This research establishes a systematic approach for evaluating rural industry integration under e-commerce and provides empirical insights into rural industrial transformation. The findings offer theoretical and practical implications for policymakers and stakeholders to foster sustainable, coordinated rural development through digital innovation.

Keywords: Rural Revitalization, Rural Industries, Industrial Integration, E-Commerce
JEL Classifications: Q13, O18, L81

1. INTRODUCTION

In recent years, driven by the global wave of the digital economy, e-commerce is profoundly reshaping the rural industrial landscape at an unprecedented speed, becoming an important engine for promoting rural revitalization. Rural e-commerce, emerging from the profound integration of information technology with the rural economy, is becoming a new engine for rural revitalization. Currently, rural e-commerce has demonstrated a strong driving effect. In 2023, the online retail sales in rural areas of China amounted to 1.7 trillion yuan, reflecting a year-on-year growth of 12.2%, demonstrating the significant effectiveness of e-commerce in the sales of agricultural products and the transformation and upgrading

of agriculture. As rural infrastructure continues to advance, an increasing number of farmers are utilizing e-commerce platforms to market their agricultural products. At the same time, rural leisure tourism has rapidly emerged as a new industry, becoming a typical representative of the deep integration of agriculture and the service industry, attracting a large number of urban residents to visit and consume in rural areas. E-commerce for agricultural products and rural tourism have become important sources of income growth for farmers, providing new opportunities for the upgrading and transformation of rural industries. However, the integrated development of e-commerce with related rural industries such as specialty agriculture and rural tourism is still in the exploratory stage, with prominent issues such as insufficient collaboration in the industrial chain,

an incomplete integration mechanism, and uneven regional development.

The implementation of the rural revitalization strategy has further highlighted the urgency of integrated development of rural industries. It is an important strategic decision made by the Chinese government regarding the "three rural issues" (agriculture, rural areas, and farmers). The core goal of the rural revitalization strategy is to accelerate the adjustment of the rural industrial structure, enhance the level of agricultural modernization, and promote the integrated development of urban and rural areas. In 2021, the Chinese government issued the "Opinions on Comprehensively Promoting Rural Revitalization and Accelerating the Modernization of Agriculture and Rural Areas," which encourages the development of leisure agriculture and high-quality rural tourism routes, deepens the promotion of e-commerce in rural areas, and accelerates the modernization of agriculture and rural areas. However, in the face of the dual challenges of the rapid evolution of the digital economy and the upgrading and transformation of rural industries, how to leverage e-commerce to promote the coordinated development of rural industries and to establish an efficient and sustainable model of industrial integration has become a pressing issue that policymakers and academia need to address.

The essence of rural industrial integration lies in the optimized allocation and collaborative innovation of cross-industry resource elements. The integration of business formats in the context of rural revitalization refers to industries or internal sub-industries closely related to agriculture, rural areas, and farmers. Through new technologies, new platforms, and new models, it involves the cross-border and cross-configuration or reorganization of related resources that are in a separated state, achieving the organic integration of the primary, secondary, and tertiary industries in rural areas, and continuously extending the industrial chain (Zhang and Zhang, 2024). The aim is to reduce agricultural production costs, achieve modernization of rural industries, and continuously increase the benefits for farmers (Su et al., 2016). The swift advancement of internet information technology, e-commerce has become an important mechanism for promoting agricultural and rural development. By integrating e-commerce with external rural industries, it drives the upgrading of rural industrial structures; through the internal integration of specialty agriculture and rural tourism, it injects new vitality into the rural economy and adds new development ideas. However, existing research lacks a systematic exploration of how e-commerce promotes the coordinated development model of rural industrial integration, especially regarding the interaction mechanisms between different industries and their dynamic evolution processes, which remain limited.

This study aims to explore the coupling and coordinated development model of e-commerce and rural-related industries, providing theoretical and methodological suggestions for rural industrial development driven by e-commerce. It reveals the potential driving force of e-commerce on rural industrial development and promotes the sustainable development of rural revitalization.

2. LITERATURE REVIEW

2.1. E-commerce and Rural Industry Development
Rural e-commerce has increasingly emerged as a significant catalyst for reducing the disparity between urban and rural areas, as well as fostering economic development in rural regions (Li and Gan, 2025). E-commerce has driven the restructuring of the rural economy, triggering a new wave of rural revitalization (Zhang et al., 2022). Current research generally believes that e-commerce can optimize the rural economic structure, improve the resource allocation efficiency of rural markets, and play an important role in promoting the integration of resources in agricultural industry clusters and enhancing innovation capabilities (Lv et al., 2025). E-commerce has enhanced the branding of agricultural products, improved the structural organization of the agricultural industry, facilitated industry integration, which is beneficial for boosting rural industries and achieving rural revitalization (Xu and Zheng, 2021). Concurrently, e-commerce can have positive impact on farmers' income levels, especially by selling specialty agricultural products through e-commerce platforms, which can bring higher profits to farmers (Zheng et al., 2024). The development of rural e-commerce and rural tourism in China has provided new directions for the reform of rural economic construction, emphasizing the construction of rural characteristic industries and accelerating the integration of rural industries (You et al., 2025). Through the construction of rural characteristic industries, using e-commerce as a medium to expand markets and increase profits has become an important measure to enhance the sales of agricultural products and rural tourism, thereby promoting rural economic development (Wei and Claire, 2022; Li and He, 2024). However, although existing research has extensively explored the role of e-commerce in promoting the development of rural industries, most studies primarily focus on the positive effects of e-commerce on rural economic growth, farmers' income, and industrial integration, with less in-depth investigation into the collaborative mechanisms between different rural industries and their dynamic evolution processes.

2.2. Integrated Development of Rural Industries
Following the robust implementation of the rural revitalization strategy in China, there has been a swift advancement in agricultural practices and associated rural industries. This progress has consequently spurred a growing body of research focused on the integration and development of these industries, encompassing both theoretical frameworks and empirical investigations. The essence of rural industrial integration is the internalization of the division of labor among rural industries, with the main sign of its completion being the formation of new business formats and new business models (Su et al., 2016). This integration requires the strategic convergence of industrial revitalization, tourism enhancement, and agricultural product revitalization as part of the rural revitalization strategy (Chen and Long, 2024). The integration of rural industries is contingent upon advancements in technological innovation and the development of new industrial models, which serve to enhance the rural industrial framework, broaden the agricultural industrial chain, and elevate the income levels of farmers (Yan and Cao, 2024). In the coordinated development process of leisure agriculture and rural tourism, it

should be based on agricultural resources to promote the mutual integration of agricultural industries and achieve coordinated development (Sang, 2024). Leisure agriculture not only increases the added value of agricultural products but also attracts a large number of tourists through the tourism industry, further promoting the development of the rural economy (Wen, 2025). In specific empirical research, Tao et al. (2022) evaluated the integration and development of agriculture and logistics industries in Anhui Province by constructing a coupling coordination development evaluation system and using a coupling coordination degree model. Xundong et al. (2022) conducted empirical analysis by establishing an evaluation index system for the development of leisure agriculture and rural tourism industries, taking the Yangtze River Delta region of China as an example, and pointed out that the integration of leisure agriculture and rural tourism industries has become an important direction for leading rural construction and promoting rural revitalization.

In summary, current research on the impact of e-commerce on rural industrial development and the integration of rural industries is relatively abundant. The study of rural industries mainly focuses on two representative directions: Agricultural products and rural tourism. Most research revolves around the coupling of agriculture with rural tourism or rural tourism with e-commerce, while there is little reported research on the overall coupling relationship among the three. It is important to recognize that e-commerce, rural tourism, and agricultural products serve as significant mechanisms for the revitalization of the rural economy. Furthermore, there exists a notable degree of correlation among their developmental strategies. However, there is a paucity of analysis regarding the influential role of e-commerce in this context. Additionally, empirical research on industrial integration generally conducts analysis by establishing evaluation indicators and using coupling coordination models.

3. RESEARCH DESIGN

E-commerce, as an important carrier of the digital economy, promotes agricultural production and circulation upgrades while assisting in the marketing and promotion of rural tourism, thereby enhancing market competitiveness. Feature agriculture, as the foundation of the rural economy, provides product and content support for e-commerce and rural tourism, enhancing the value chain of the industry through standardization, branding, and digitization. Rural cultural tourism develops the experience economy by utilizing rural ecological and cultural resources, and expands its market reach through e-commerce platforms, increasing customer flow and consumption stickiness, thus forming industrial linkage. The interaction relationship diagram is illustrated in Figure 1.

3.1. Research Methodology Theory
The concept of coupling between e-commerce and rural-related industries, studied in this article, originated from the field of physics and refers to the degree of interaction among various systems or elements. Coupling can be categorized into two dimensions: development and coordination. Development is the dynamic evolutionary process for a system or its constituent elements, progressing from lower to higher levels, from simplicity to complexity,

Figure 1: The integrated development model of e-commerce and rural related industries under the background of rural revitalization
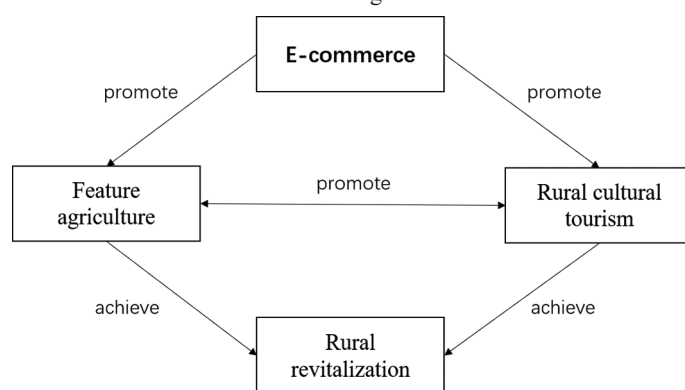
and from disorder to order. Coordination refers to the establishment of interdependent and mutually reinforcing relationships between various constituent elements within and outside the system (Xu et al., 2020). This article conducts an empirical study to assess the coupling coordination degree and dynamic changes of rural feature agriculture, rural cultural tourism, and e-commerce in the rural ecological environment using comprehensive evaluation indicators and a coupling coordination model. Furthermore, it explores the path of fostering a positive coupling and coordinated development of e-commerce and rural-related industries.

3.2. Select Indicators
To ensure that the constructed evaluation index system is reasonable and effective, the selected indicators need to reflect the development characteristics and current status of e-commerce, featured agriculture, and rural cultural tourism industries as much as possible, based on the principles of practicality, representativeness, and accessibility. Based on relevant literature, an evaluation index system for e-commerce, feature agriculture, and rural cultural tourism industries is constructed from three dimensions: industrial scale, output level, and industrial growth. For comprehensive information, please consult Table 1.

3.3. Construction of a Model for Coupling Coordination Degree
1. Data standardization

   The extremum method is used to standardize the original data due to the varying dimensions of different indicators and their economic significance. The calculation formula is:

$$X_{ij} = \frac{x_{ij} - \min\left(x_{ij}\right)}{\max\left(x_{ij}\right) - \min\left(x_{ij}\right)} \tag{1}$$

2. Calculate the indicator weights

   This research utilizes the entropy weight method to allocate weights to each indicator, calculating and determining the information entropy of the jTH indicator.

$$H_j = k \sum_{i=1}^{m} P_{ij} \ln P_{ij} \tag{2}$$

In the formula, $P_{ij} = X_{ij} / \sum_{i=1}^{m} X_{ij}$, $k = -1 / \ln m$. Assuming

Table 1: The evaluation index system of the developmental status of e-commerce, feature agriculture and rural cultural tourism

Industry type	Dimension	Evaluation indicator	Weight%
E-commerce industry	Development scale	Express business volume	17.32
		Online retail sales	15.00
		Number of enterprises	9.79
	Output level	Enterprise e-commerce sales	12.88
		Enterprise e-commerce purchase volume	12.10
	Industrial growth	Sales growth	28.79
		Purchase growth	4.13
Feature agriculture	Development scale	Effective irrigation area	9.61
		Total sown area of crops	22.07
		Number of products with geographical indications	15.99
	Output level	Gross output value of agriculture	12.90
		Online sales of agricultural products	17.34
	Industrial growth	Added value of agriculture	17.16
		Growth rate of major agricultural products	4.93
Rural cultural tourism	Development scale	Leisure agriculture and rural tourism comprehensive business income	11.77
		Number of visitors received by rural tourism	14.92
		Number of A-level tourist attractions	6.39
	Output level	Total tourism revenue	10.54
		Leisure agriculture and rural tourism operating income	10.20
	Industrial growth	The number of tourists received by rural tourism increased	42.02
		Comprehensive operating income growth	4.16

that the entropy weight of the jTH evaluation index is denoted as , the entropy weight can be defined as:

$$W_j = \left(1 - H_j\right) / \sum_{j=1}^{n} \left(1 - H_j\right) \qquad (3)$$

The calculation results are displayed in Table 1:

3. Industrial development level evaluation function
After using the entropy weight method to calculate the weights, the linear weighting method is employed for integration, establishing the comprehensive evaluation function for the developmental status of e-commerce, feature agriculture, and rural cultural tourism industries, respectively.
E-commerce industry evaluation index:

$$U_e = \sum_{i=1}^{m} W_j X_{ij} \qquad (4)$$

Feature agricultural industry evaluation index:

$$U_a = \sum_{i=1}^{m} W_j X_{ij} \qquad (5)$$

Rural cultural tourism industry evaluation index:

$$U_t = \sum_{i=1}^{m} W_j X_{ij} \qquad (6)$$

In the formula, m is the indicator quantity of each industry evaluation; W_j is the weight of each indicator of each industry; X_{ij} is the standardized value of the data. Establish a comprehensive development evaluation index can demonstrate the overall level of integrated development:

$$T = aU_e + bU_a + cU_t \qquad (7)$$

The variables a, b, and c represent the contribution rates of the e-commerce industry, feature agriculture and rural cultural tourism industry, respectively, to the coordination degree. Due to the mutual promotion and integration of the three industries, the coefficients are all set at 0.33.

4. Construction of coupling and coordination model
To enhance the understanding of the integration and coordination among e-commerce, feature agriculture, and rural cultural tourism, this article uses a coupling coordination model to quantitatively analyze the degree of coordination in the integrated development of the three industries. Because this study involves three systems, the coupling model formula as follows:

$$C = 3 \times \left[\frac{U_1 \Delta U_2 \Delta U_3}{\left(U_1 + U_2 + U_3\right)^3} \right]^{\frac{1}{3}} \qquad (8)$$

C denotes the degree of coupling among the three industries, with a value range of [0, 1]. A value of C approaching 1 signifies a greater degree of industrial correlation, reflecting enhanced integration and coordinated development. Conversely, a value of C nearing 0 indicates a diminished level of coupling between the industries. The degree of coupling can reflect the level of interdependence between industries to some extent, but it cannot fully capture the interaction and coordination among industries as a whole (Meng et al., 2021). Therefore, the coordinated development process of the three industries is reflected in the utilization of a coordination model. The calculation formula as follows:

$$D = \sqrt{(C \times T)} \qquad (9)$$

D represents the degree of coupling coordination, with values ranging from 0 to 1. A value of D approaching 1 suggests a greater level of coordinated development among industries; T represents the comprehensive development evaluation index.

4. EMPIRICAL ANALYSIS

4.1. Regional Introduction

Anhui, acknowledged as a major agricultural province in China, ranks among the four principal regions for grain production and plays a crucial role in the overall framework of agricultural development within the country. In recent years, the agricultural industrialization in Anhui Province has experienced significant growth, driven by the implementation of rural revitalization initiatives and the integration development strategies of

the Yangtze River Delta. According to data from the Anhui Provincial Department of Agriculture and Rural Affairs, the total output value of the agricultural product processing industry in Anhui Province reached 1.6 trillion yuan in 2024, a year-on-year increase of 12.9%. The Anhui provincial government is committed to comprehensively advancing the implementation of key rural revitalization tasks, with ensuring the supply of important agricultural products such as grain as a top priority. It actively improves rural governance and strengthens policy support measures for revitalization. A scientific examination of the synergistic growth of e-commerce and rural industries in Anhui Province will contribute to the advancement of high-quality development within the regional rural economy.

4.2. Data Sources

The research data is primarily sourced from official statistics and publications, including national and provincial statistical agencies and annual reports on economic and social development. Through screening and processing relevant data on e-commerce, agricultural development, and tourism in Anhui Province from 2013 to 2023, we obtained the necessary data. Due to the lack of clear data indicators for feature agriculture, it has been replaced by statistical data related to agricultural development.

4.3. Result Analysis

1. Analysis of the calculation results for indicator weights.
    From the weight of evaluation indicators for the development level of e-commerce, feature agriculture, and rural cultural tourism in Anhui Province (Table 1) show that six indicators of e-commerce sales growth, express business volume, total sown area of crops, online sales of agricultural products, the number of tourists received by rural tourism increased, and number of visitors received by rural tourism carry significant weight and make substantial contributions to the development of these three industries. In addition, it can also be observed that the scale of development and industrial growth are important indicators for the advancement of e-commerce, feature agriculture, and rural cultural tourism in Anhui Province, significantly influencing the advancement of these industries.

2. Evaluation and analysis of e-commerce, feature agriculture, and rural cultural tourism development in Anhui Province.
    After calculating the weights of each indicator, the evaluation index for e-commerce, feature agriculture, and rural cultural tourism industries in Anhui Province from 2013 to 2023 were calculated using formulas (4) to (7). Furthermore, a comprehensive development evaluation index was derived. These data illustrate the development level trends of these three industries over the past eleven (Figure 2). As illustrated in Figure 2, the period from 2013 to 2023 demonstrates a general upward trajectory in the development levels of e-commerce, feature agriculture and rural cultural tourism in Anhui Province generally show an upward trend. This reflects the positive development trend of e-commerce, feature agriculture, and rural cultural tourism in Anhui Province over the past decade, which has provided strong support for Anhui's agricultural economy. In 2013, Anhui Province actively facilitated the application and sustainable

growth of e-commerce within enterprises through the execution of the e-commerce demonstration drive project, the enhancement of e-commerce demonstration parks, and the development of e-commerce demonstration enterprises. In 2014, spurred by the province's leading enterprises, the e-commerce sales volume of businesses experienced a significant increase. In the second half of 2016, Anhui Province initiated the "e-commerce Anhui" project, aiming to facilitate the convergence and advancement of conventional business models in both online and offline settings, and in domestic and international trade. Furthermore, the surge in online demand during the COVID-19 pandemic from 2020 to 2022 has also contributed to the sustainable growth of the e-commerce industry.

For feature agriculture, the comprehensive development level of feature agriculture in Anhui Province showed an upward trend from 2013 to 2015. Anhui Province has proactively advanced the construction of "agriculture, rural areas, farmers," and has vigorously developed feature agriculture such as fruits and Chinese herbal medicines, while maintaining stable development of important agricultural products such as grain. This has led to a steady improvement in overall agricultural development. However, from 2016 to 2017, changes in crop planting area and agricultural structure, along with a summer flood disaster in 2016, led to a decrease in crop production and a downward trend in agricultural development. Subsequently, agricultural development exhibited steady growth and continued to improve. Even during the COVID-19 pandemic, the implementation of relevant measures, such as "stabilizing production and ensuring the supply of agricultural products," ensured the stable progress of agricultural production. Furthermore, by promoting the online trading of agricultural products, it has also ensured the steady growth of agricultural sales (Guo et al., 2022). Overall, the feature agriculture in Anhui Province has strong development potential.

Anhui is a significant agricultural province and a major tourist destination, with 70% of its tourism resources situated in rural areas. Since 2013, Anhui Province has comprehensively launched the construction of beautiful villages. This initiative seeks to maintain the distinctive features of rural areas, enhance the quality of life, and continuously improve infrastructure and public service development in these regions, thereby establishing

Figure 2: Development trends of e-commerce, feature agriculture and rural cultural tourism in Anhui province from 2013 to 2023
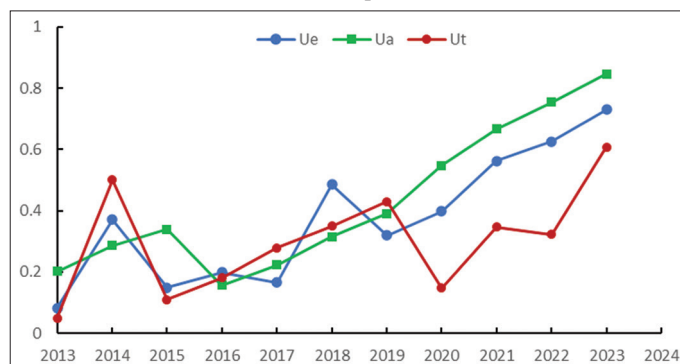
a solid foundation for the advancement of rural tourism. In 2013, Anhui Province initiated the "Don't be a stranger in your hometown - Anhui people visiting Anhui' campaign, which significantly boosted the influx of tourists and the revenue from rural tourism in 2014. From 2015 to 2019, the rural tourism industry in Anhui Province has experienced steady growth, driven by the increasing popularity of weekend leisure tourism, rural vacation tourism, family self-driving tourism, seasonal picking tourism, and red tourism. In 2020, the COVID-19 pandemic resulted in a substantial decline in both tourist arrivals and tourism revenue, leading to a serious impact on the tourism economy. Consequently, rural tourism in Anhui Province has experienced a significant decline. The pandemic ended in 2023, and the tourism economy has returned to normal.

3. Analysis of the coupling and coordination degree of e-commerce, feature agriculture, and rural cultural tourism development in Anhui Province.

During the research period, the integration of e-commerce, feature agriculture, and rural cultural tourism industries in Anhui Province exhibited an overall upward trend, as depicted in Figure 3. The D values for the three major industrial systems vary between 0.14 and 0.99, yielding an average of 0.59. This indicates that the three major industrial systems have experienced mutual resistance and have transitioned from a state of imbalance to a stage of coordinated development as a whole. During the research period, the integration of e-commerce and the rural cultural tourism industry has maintained a high level of development among them. Therefore, from an industrial coupling perspective, it is evident that that the combination of e-commerce + rural cultural tourism > e-commerce + feature agriculture > feature agriculture + rural cultural tourism. E-commerce is instrumental in facilitating the coordination and integration of the development of industries related to rural revitalization. In recent years, Anhui Province has actively pursued rural revitalization and development through the integration of "Internet plus + agriculture, rural areas, and farmers" and "e-commerce + agricultural tourism." By the end of 2023, Anhui Province had 31 e-commerce demonstration parks and 83 e-commerce public service centers.

As depicted in Figure 2, the degree of coupling among the three industries in Anhui Province declined significantly in 2016, and the coordination degree of coupling exhibited a downward trend from 2015 to 2016. However, it gradually improved to a better state of coordination in 2017. This was mainly due to the shift of e-commerce and rural tourism from explosive growth to a more rational state, as well as various factors such as the decrease in agricultural production in 2016. Despite the impact of the COVID-19 pandemic in 2020 on the degree of coordination, there was a positive progression in the overall coupling coordination.

5. DISCUSSION

This research is based on the theory of coupling coordination and systematically develops an evaluation index system for measuring rural industrial development, adhering to the principles of practicality, representativeness, and accessibility. The index system is based on three dimensions: Development scale, output level, and industrial growth. It employs representative indicators to effectively capture the overall development status of e-commerce, specialized agriculture, and rural cultural tourism. This offers a thorough and impartial benchmark for the analysis of the integrated advancement of e-commerce, specialized agriculture, and rural cultural tourism. This study conducts a systematic analysis and quantitative assessment of the integrated and coordinated development of e-commerce, specialized agriculture, and rural cultural tourism in Anhui Province by utilizing the entropy weight method in conjunction with the coupling coordination degree model. The findings demonstrate a rising trend in both the overall development and the synergy between these three key industries, indicating an increasingly effective convergence and harmonious growth. In particular, e-commerce plays a key role in promoting the coordinated development of feature agriculture and rural cultural tourism. Specifically, the study finds that the coupling degree between e-commerce and rural cultural tourism is the highest, indicating that e-commerce has a significant effect on promoting the development of the rural tourism industry. This may be because e-commerce platforms expand the promotion and market reach of rural tourism, attracting more urban residents to visit rural areas. At the same time, the coupling degree between

Figure 3: Coupling and coordination curve of e-commerce, feature agriculture, and rural cultural tourism development in Anhui Province from 2013 to 2023
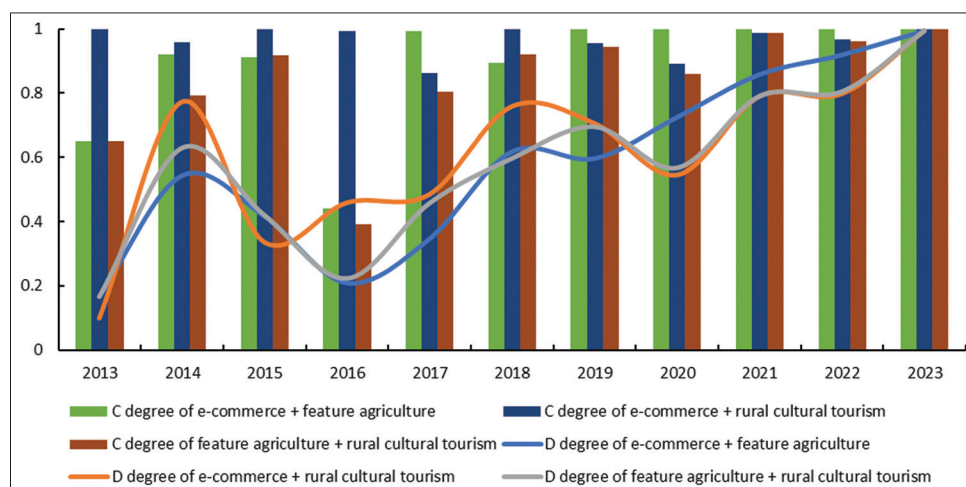
e-commerce and feature agriculture is also relatively high, indicating that e-commerce significantly contributes to the improvement of branding and sales of agricultural products.

Drawing from the preceding analysis, this article advances several policy recommendations aimed at strengthening the integration between e-commerce and agriculture, thereby accelerating rural revitalization and promoting the robust growth of the rural economy:

1. Strengthening the policy guarantees, support the stable improvement of rural industries.

   Feature agriculture and rural cultural tourism are susceptible to natural disasters and other unforeseen factors, leading to imbalanced development. E-commerce can also have a positive impact through sensible regulation (Tang and Zhu, 2020). Government departments should collaborate and integrate administrative resources to provide policy and financial support, such as increasing subsidies for agricultural cooperatives (Zheng et al., 2024), in order to guide and promote the stable and orderly development of industries, ensuring the healthy and sustainable growth of rural industries. In particular, the rural cultural tourism industry, particularly impacted by the COVID-19 pandemic, needs to implement unique promotional activities for cultural tourism to enhance and stimulate residents' consumption willingness, thereby fostering the recovery of the industry. In addition, efforts should be made to strengthen grassroots management and cultivate talent in rural e-commerce to create a favorable business environment for the development of e-commerce (Chen and Long, 2024).

2. Highlighting regional characteristics and foster the synergistic advancement of agricultural practices and tourism.

   Maximize the potential of local cultural tourism assets while highlighting agricultural resources. They should actively promote the construction of leisure tourism, eco-tourism, feature agriculture, cultural creativity, and other types of distinctive villages and towns, aiming to achieve a deep integration of ecology, production, and life (Guang, 2018; Shakya and Vagnarelli, 2024). Meanwhile, fully leverage the cultural functions of regional agriculture, utilize local customs to develop unique products, and enhance the cultural value and regional brand value of agricultural products (Lin and Wang, 2023). Emphasize the agricultural sightseeing experience function of agriculture, create the overall landscape atmosphere of rural tourism, and form an ecological tourism system with regional characteristics. Ultimately, achieve the complementary integration of agriculture and tourism.

3. Strengthen industrial collaboration and establish a development model of integration and symbiosis.

   Guided by the vision of "innovation, collaboration, green, openness, and sharing" (Kong and Xia, 2019), accelerate the construction of an integrated development model of e-commerce + feature agriculture + rural cultural tourism industry, increase support for related basic industries in rural areas, adopt differentiated strategies to cultivate agricultural products and tourism resources with distinct regional characteristics, and devising specific economic support policies for the relatively underdeveloped rural regions. Through the popularization of Internet new media technology,

we can simultaneously promote the transformation of the traditional rural industry marketing model and better facilitate the development and revitalization of rural industries.

6. CONCLUSION

With the advancement of the rural revitalization strategy, e-commerce has become an important driving force for the integrated development of rural industries. The integration of e-commerce with feature agriculture and rural cultural tourism has become a successful case of integrated agricultural development in China. The analytical framework proposed in this study reveals how e-commerce promotes the deep integration of rural industries, providing a new theoretical perspective for rural revitalization. The innovations of this study are as follows: (1) A theoretical analysis framework for the integration of e-commerce, feature agriculture, and rural cultural tourism has been constructed, along with measurement indicators, providing a comprehensive and objective basis for promoting the integrated development of e-commerce and rural industries. (2) A method combining the entropy weight method and the coupling coordination degree model has been used to examine the integration of multiple industries in the context of rural revitalization, offering new analytical tools. This method not only quantifies the dynamic development trends of industry integration but also provides strong support for scientific decision-making. (3) The research results reveal the key role of e-commerce in promoting the upgrading of feature agriculture, advancing rural tourism development, and enhancing the integration of the three major industries, providing targeted suggestions for the coordinated development of regional rural industries.

This study is based on empirical analysis in Anhui Province and measures the integrated development of e-commerce, feature agriculture, and rural cultural tourism to support the construction of the research framework. The conclusions of the study are as follows: (1) E-commerce plays a core driving role in promoting the integration of rural industries. From 2013 to 2023, the development of e-commerce, feature agriculture, and rural cultural tourism in Anhui Province has shown a significant upward trend, with all three industries advancing from a low starting point to a high starting point. E-commerce has increased the added value of feature agriculture through market expansion, supply chain optimization, and brand building, while also promoting the market-oriented development of rural tourism. (2) Feature agriculture and rural tourism have achieved complementary development driven by e-commerce. Feature agriculture provides core resources for rural tourism, while rural tourism expands the consumer market for feature agricultural products, creating a positive interaction. Research results indicate that in the integration of the two major industries, the coupling degree of e-commerce + rural cultural tourism is higher than that of e-commerce + feature agriculture, suggesting that rural tourism has strong growth potential under the empowerment of e-commerce. (3) The integration of the three major industries has a stronger promoting effect on rural revitalization. During the research period, the integration and development of e-commerce with feature agriculture and rural cultural tourism in Anhui Province went through stages of integrated development and coordinated development. From 2017 to 2023, the three major

industries showed a clear trend of coordinated growth in integration. This indicates that with the popularization of digital technology and the promotion of government policies, the integration of rural industries is advancing to a higher level, providing momentum for the sustainable development of the rural economy. (4) The integration of rural industries still faces the influence of policy and environmental factors, and there is a need to further optimize the development path. The development of the e-commerce industry is easily affected by government activities or policy measures, while agriculture and rural tourism industries are more susceptible to the impacts of natural disasters and market fluctuations.

In the future, it is necessary to strengthen policy support and optimize the industrial collaboration mechanism to enhance the resilience and sustainability of rural industries. However, the integrated development of rural industries is a complex dynamic process, and the role of e-commerce in this process still requires further in-depth research. The limitations of this study include: First, the indicator system of this research is primarily based on macro-level data; future studies could incorporate more micro-level data into the evaluation indicator system to improve the accuracy of the research results. Second, this paper mainly focuses on the promoting role of e-commerce in feature agriculture and rural cultural tourism, without delving into the integration paths of other rural industries (such as rural manufacturing and rural services) with e-commerce. Future research should expand to include other rural industries and comprehensively analyze the role and impact of e-commerce in different rural industries. Third, the empirical analysis of this study is based on Anhui Province, with a limited time span. Future research could be validated over a larger geographical area and a longer time span to enhance the generalizability of the research conclusions.

7. FUNDING

REFERENCES

Chen, M., Long, Y.A. (2024), Empowering rural revitalization: unleashing the potential of e-commerce for sustainable industrial integration. Journal of the Knowledge Economy, 15(4), 8813-18831.

Guang, Y. (2018), A study on the development of industrial cluster professional town in Anhui province based on rural revitalization. East China Economic Management, 32(9), 35-42.

Guo, J., Jin, S., Zhao, J., Wang, H., Zhao, F. (2022), Has COVID-19 accelerated the E-commerce of agricultural products? Evidence from sales data of E-stores in China. Food Policy, 112, 102377.

Kong, X.L., Xia, J.M. (2019), The value logic relationship and cooperative path selection between rural revitalization strategy and rural tri-product integration. Journal of Northwest University (Philosophy and Social Sciences Edition), 49(2), 10-18.

Li, F., Gan, Y. (2025), Research on the sustainable development capability of Chinese rural E-Commerce based on multidimensional perspective. Scientific Reports, 15(1), 11547.

Li, W., He, W. (2024), Revenue-increasing effect of rural e-commerce: A perspective of farmers' market integration and employment growth. Economic Analysis and Policy, 81, 482-493.

Lin, Y., Wang, X. (2023), Does establishing regional brands of agricultural products improve the reputation of e-commerce? Evidence from China. Electronic Commerce Research, 25, 2621-2639.

Lv, J., Guo, X., Jiang, H. (2025), Rural E-commerce and income inequality: Evidence from China. Sustainability, 17(10), 4720.

Meng, Y., Feng, Y., Zhao, Y. (2021), Coupling and coordinating development of agriculture-tourism industry in underdeveloped regions based on rural revitalization strategy: Take Guangxi for example. Guilin University of Technology, 41, 426-433.

Sang, Q. (2024), Research on the "Agricultural and Tourism Dual Chain" Model of Leisure Agriculture from the Perspective of Circular Economy. Tehnički Vjesnik, 31(3), 885-893.

Shakya, M., Vagnarelli, G. (2024), Creating value from intangible cultural heritage-The role of innovation for sustainable tourism and regional rural development. European Journal of Cultural Management and Policy, 14, 12057.

Su, Y.Q., You, Y.T., Wang, Z.G. (2016), Convergence development of primary, secondary and tertiary industries: Theoretical discussion, situation analysis and suggestions. China Soft Science, 8, 17-28.

Tang, W., Zhu, J. (2020), Informality and rural industry: Rethinking the impacts of E-Commerce on rural development in China. Journal of Rural Studies, 75, 20-29.

Tao, S., Luan, J., Geng, H., Shu, J. (2022), The integrated development of agriculture and logistics industry in Anhui province from the perspective of industrial integration. Journal of Yunnan Agricultural University (Social Science), 16(3), 103-111.

Wei, G., Claire, K. (2022), The promise of the Internet for rural economic development in China: A study of agricultural e-commerce. Peking University Law Journal, 10(2), 151-172.

Wen, F. (2025), Research on the collaborative development of rural tourism and leisure agricultural products. Journal of Southwest University Natural Science Edition, 47(4), 123-133.

Xu, L.Y., Zheng, Y.X., (2021), Analysis on the path of rural E-commerce promotion rural revitalization. Journal of Graduate School of Chinese Academy of Social Sciences, 2, 109-120.

Xu, W., Li, L., Zhou, J., Liu, C. (2020), The dynamic evolution and its driving mechanism of coordination of rural rejuvenation and new urbanization. Journal of Natural Resources, 35, 2044-2062.

Xundong, S., Guanxin, Y., Jing, X., Sijia, Z. (2022), Study on the coupling and coordinated development of leisure agriculture and rural tourism industry under the background of rural revitalization: Take the Yangtze River Delta region as an example. Journal of Chinese Agricultural Mechanization, 43(7), 230.

Yan, M., Cao, X. (2024), Digital economy development, rural land certification, and rural industrial integration. Sustainability, 16(11), 4640.

You, Q., Zihao, Y., Yu, X.S. (2025), High-quality development and rural revitalization: The role of rural e-commerce. Frontiers in Sustainable Food Systems, 9, 1599629.

Zhang, J., Zhang, W. (2024), Harnessing digital technologies for rural industrial integration: A pathway to sustainable growth. Systems, 12(12), 564.

Zhang, Y., Long, H., Ma, L., Tu, S., Li, Y., Ge, D. (2022), Analysis of rural economic restructuring driven by e-commerce based on the space of flows: The case of Xiaying village in central China. Journal of Rural Studies, 93, 196-209.

Zheng, S., Yu, L., Fu, H. (2024), Has rural e-commerce increased potato farmers' income? Evidence from the potato home of China. Potato Research, 67(1), 15-35.

Zheng, Y., Mei, L., Chen, W. (2024), Does government policy matter in the digital transformation of farmers' cooperatives?-A tripartite evolutionary game analysis. Frontiers in Sustainable Food Systems, 8, 1398319.