



Analysis of the Factors for the Synergistic Promotion of Rural E-commerce Industry Development by Universities Enterprises and Government under the Background of Rural Revitalization

Yingyou Meng*, River Chu, Honghui Yu, Xianyong Meng, Ling Wan

School of Logistics Management and Engineering, Zhuhai College of Science and Technology, Zhuhai, China

*253008054@qq.com

Abstract. This paper conducts an empirical analysis of the main influencing factors for the joint promotion of rural e-commerce industry development by Universities, Enterprises, and the Government (UEG). Its aim is to explore the interactive relationships among the three parties in terms of policy support, talent cultivation, technological innovation, and resource integration, and to deeply study the effective paths for the joint promotion of rural e-commerce industry development by UEG, in order to contribute to the "comprehensive revitalization of rural areas". The research shows that the main factors currently restricting the development of rural e-commerce industry include insufficient policy incentives, weak industry-academia integration, low enterprise participation, and the absence of a collaborative mechanism. To address these issues, this paper proposes strategies such as optimizing policy design, deepening Universities Enterprise (UE) cooperation, and improving digital infrastructure, to construct a three-dimensional driving model of "policy support-technological empowerment-in-depth cooperation", in an effort to provide theoretical basis and practical guidance for the deep collaboration among UEG to promote the high-quality development of rural e-commerce.

Keywords: The Rural Revitalization Strategy, Collaboration Between Universities and Enterprise, Rural E-Commerce, Analysis Of Influencing Factors.

1 Introduction

According to the data on the Ministry of Finance's website, in 2024, the online retail sales of agricultural products reached 679.78 billion yuan. Comprehensively promoting rural revitalization is a central task proposed by the 20th National Congress of the Communist Party of China from the perspective of coordinating the strategic overall situation of the great rejuvenation of the Chinese nation.

The "14th Five-Year Plan for Rural Revitalization Strategy" clearly states that "we should vigorously promote the 'Internet +' project for agricultural products to enter rural

areas and cities, and strengthen the construction of rural e-commerce infrastructure and service systems". This highlights the strategic position of rural e-commerce in rural revitalization. However, at present, the development of rural e-commerce in our country still faces structural contradictions such as low standardization of agricultural products, lagging logistics distribution system, shortage of professional talents, and insufficient coordination of the industrial chain. Especially in underdeveloped regions, these problems have restricted the driving effect of rural e-commerce on rural revitalization.

2 Research on the Current Development Status of Rural E-commerce Industry through the Cooperation of UEG

The collaborative cooperation between UEG, as an innovative model integrating government policy resources, enterprises' market capabilities and universities' intellectual support, provides a new approach to addressing the bottlenecks in the development of rural e-commerce. The government builds a development platform through policy guidance and public service provision, enterprises activate the industrial momentum through technological innovation and market operation, and universities offer intellectual support by providing talent training and research achievement transformation. The collaborative interaction among the three parties is expected to form an ecological closed loop for the development of rural e-commerce. Therefore, systematically analyzing the key factors influencing the development of rural e-commerce industry through the collaborative cooperation of UEG, and exploring the mechanism of the collaborative effect of multiple parties, have become important topics for improving the quality of rural e-commerce development and assisting rural revitalization.

Domestic and foreign scholars have conducted extensive research on the influencing factors of rural e-commerce development. Early studies mainly focused on macro-level aspects such as market demand and policy environment. Fan Zhuoqi et al. (2025) argued that policy support is one of the key driving forces for the development of rural e-commerce. The government provides a favorable development environment for rural e-commerce through measures such as formulating supportive policies, providing financial subsidies, and offering tax incentives [1]; Liu Gan et al. (2025) believed that the consumption capacity, consumption habits, and acceptance of new technologies of rural residents also affect the development of rural e-commerce [2]; Wu Zhiquan (2018) and Zhang Huaquan (2019) promoted the digitalization and intelligence development of agricultural production, agricultural product processing and circulation links, and the service industry, and vigorously developed rural e-commerce [3,4].

As the research progressed, the perspective of entity collaboration gradually gained attention. Wang Qin et al. (2021) analyzed the collaborative innovation of three e-commerce models (social e-commerce, live-streaming e-commerce, and community group buying) with rural e-commerce logistics, and constructed a new model for the supply, production and sales of agricultural products [5]. Liu Jingzhi et al. (2022) believed that there is target collaboration, information collaboration, process collaboration and capital collaboration between rural e-commerce and fresh food logistics, and verified the development order degree in the central, western and eastern

regions [6]. Yin Zhensheng (2025) believed that a multi-party participation platform for industry-education integration and collaborative education should be established, as well as the operation mechanism of such a platform, to promote the development of rural e-commerce [7].

In the field of agricultural product e-commerce research, Wernerfelt (1984) and other literature based on the resource-based theory proposed that the income-increasing effect of agricultural e-commerce would lead farmers to adopt this new sales model of agricultural products, which could increase the income from selling agricultural products [8].

In the research on the symbiosis of the entire agricultural production process and the e-commerce model, Yang et al. (2014) and other literature based on the symbiosis theory proposed that the symbiosis of the entire agricultural production process and the e-commerce model can be achieved through the deep integration of the two, and by leveraging the roles of each symbiotic element, the competitiveness and profitability can be enhanced [9].

This paper is based on the rural revitalization strategy and adopts the analysis framework of UEG collaboration. It focuses on the research on the influencing factors of rural e-commerce industry development. The core issue of the study is: How does the collaborative behavior of the three entities-Government, Enterprises, And Universities-affect the development of rural e-commerce industry, and which factors constitute the key driving variables of the collaborative effect. By constructing a theoretical model of "government promotion-enterprise participation-university support-collaborative effect", this paper will use quantitative research methods such as reliability analysis, validity analysis, correlation analysis, and path analysis to empirically test the influence paths of variables such as government policy support, the intensity of university-enterprise cooperation, enterprise development ability, and university participation degree on the collaborative development of rural e-commerce.

3 Analysis of the Influencing Factors for the Joint Promotion of Rural E-commerce Industry Development by UEG

3.1 Selection of Sample Data

This paper adopts online questionnaire survey as the main data collection method and optimizes the online questionnaire survey method. The joint development of enterprises and the government (EG) in rural e-commerce for promoting rural revitalization can facilitate the integration of urban and rural development. Rural characteristic industries can be developed through this process. Therefore, this paper mainly selects data from five aspects: prosperity of industries, livable environment, civilized village atmosphere, effective governance, and affluent life. It takes the level of cooperation between enterprises, the government and the community (EGC), the number of rural e-commerce talents, and the intensity of policy incentives as the entry points. Through the research of relevant indicators, it analyzes the impact of the joint efforts of EGC on the

development of rural e-commerce, and thus proposes countermeasures and suggestions for promoting the development of rural e-commerce industries under the background of rural revitalization. This provides scientific basis and support for the implementation of the rural revitalization strategy.

3.2 Indicator Selection and Data Sources

Yu Fuqiang et al. (2019) With the continuous advancement and wide application of mobile internet technology, the promotion and invitation methods of online questionnaires as well as the incentive mechanisms for filling out questionnaires have had a profound and significant impact on the overall quality of online questionnaires [10]. In this survey, the questionnaire was designed and released through "Wenjuan Network", and through the questionnaire, data on relevant influencing factors such as the government's promotion effect on rural e-commerce, the promotion effect of university-enterprise cooperation on rural e-commerce, the scale of agricultural-related enterprises, the cooperation effect between universities and rural e-commerce enterprises, the participation degree of universities in the development of rural e-commerce industry, the contribution degree of enterprises to the quality and innovation of rural e-commerce products, the policy support of the government, and the cooperation model of UEG were obtained.

3.3 Selection of Data Indicators

This paper aims to deeply explore the influencing factors of the collaboration between UEG on the development of rural e-commerce in the context of rural revitalization. Seven factors, namely government promotion, university-enterprise cooperation, enterprise development, university participation, enterprise contribution, government support, and synergy, were selected as dependent and independent variables to analyze their correlation.

3.4 Reliability Analysis

This paper uses the Cronbach's α coefficient to test the reliability. In the reliability analysis, if the α value is lower than 0.6, it is generally considered that the reliability is insufficient. If it is between 0.7 and 0.8, it is considered to have a relatively high reliability. If it is above 0.8, it is considered that the reliability of the scale is very high. The specific reliability test results are shown in Table 1:

Table 1. Reliability test results.

Measured variable	Number of measurement	The overall α value
Government promotion	6	0.757
UE cooperation	4	0.724
Enterprise development	6	0.74
University participation	4	0.724

Enterprise contribution	6	0.645
Government support	6	0.758
Synergistic effect	7	0.821
Overall variable	34	0.864

First, the overall reliability of the sample was analyzed. The α coefficient value was 0.826, indicating that the collected sample data had good reliability. Moreover, the α values of each variable were all within the range of 0.645 to 0.826, suggesting that the collected questionnaire data was relatively reliable. The measurement data of the questionnaire passed the reliability test, and the consistency of the data also passed the reliability test. Thus, the next analysis can be carried out.

3.5 Analysis of Validity

Validity analysis can directly reflect the rationality and effectiveness of the questionnaire design. The higher the validity, the more consistent the measured content is with the measurement results. Generally speaking, validity analysis involves testing the Bartlett's sphericity (Bartlett) and KMO values using factor analysis methods. When the KMO value is greater than 0.5 and the Sig value of the Bartlett's sphericity test is less than 0.05, it indicates that the questionnaire is valid. This study used SPSSAU to analyze the validity of the questionnaire, and the results are shown in Table 2. The KMO value is 0.788, which is greater than 0.5, and the Sig value of the Bartlett's sphericity test is 0.000, which is less than 0.05. This indicates that there is a certain degree of discrimination among the dimensions in this scale, which also demonstrates that the reliability of the questionnaire design in this study is relatively high.

Table 2. Validity analysis results

Test method		Test value
KMO value		0.788
	Approximate Chi-square	225.907
Bartlett's sphericity test	Degree of freedom (DF)	21
	Significance (Sig)	0

3.6 Correlation Analysis

This paper analyzes the correlations among variables such as government promotion, university-enterprise cooperation, enterprise development, university participation, enterprise contribution, government support, and synergy effect. The correlation matrix of these variables is shown in Table 3.

Table 3. Results of correlation analysis

	GP	U-EC	ED	UP	CC	GS	SE
GP	1						
U-EC	0.3***	1					
ED	0.358***	0.26***	1				
UP	0.079*	0.527***	0.157*	1			
CC	0.388***	0.42***	0.228**	0.352***	1		
GS	0.402***	0.443***	0.332***	0.256***	0.541***	1	
SE	0.208**	0.456***	0.266***	0.311***	0.507***	0.454***	1

Government promotion: GP, University-enterprise cooperation: U-EC, Enterprise development: ED, Universities participation: UP, Corporate Contribution: CC, Government support: GS, Synergistic effect: SE.

Note: ***, **, and * represent the significance levels of 1%, 5%, and 10% respectively.

By analyzing the relationships among variables such as government promotion, universities-enterprise cooperation, enterprise development, and university participation, this paper discovers that the correlation coefficient between universities-enterprise cooperation and university participation is the highest, indicating that the deep collaboration between universities and enterprises in promoting the development of rural e-commerce has a significant impact on the comprehensive revitalization of rural areas; the correlation coefficient between enterprise contribution and government support is also relatively high, indicating that government policy support has a strong promoting effect on enterprise contribution. The correlation coefficients of synergy effect with enterprise contribution, government support, and universities-enterprise cooperation are all above 0.45, indicating that the deep collaboration between UEG can significantly promote the development of rural e-commerce and play a significant role in promoting rural revitalization. The correlation coefficients of government promotion with other variables are relatively low, but they all reach a significant level, indicating that government policy support and other incentive methods will promote the development of rural e-commerce and contribute to the comprehensive revitalization of rural areas. This paper uses the principle of heat map analysis. The higher the correlation, the corresponding color will be darker; the smaller the correlation, the corresponding color will be lighter. This can more clearly show the correlations among various variables (see Fig. 1).

Synergistic effect: SE, Government support: GS, Corporate Contribution: CC, Universities participation: UP, Enterprise development: ED, University-enterprise cooperation: U-EC, Government promotion: GP.

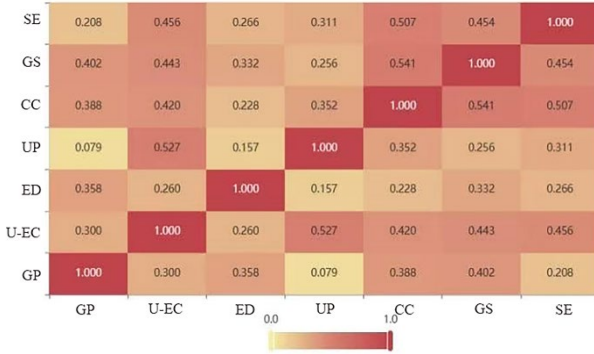


Fig. 1. Correlation heatmap of each variable

3.7 Analysis of Causal Relationships among Relevant Variables in the Coordinated Development of Rural E-commerce Industry by UEG

This paper analyzes the causal relationships among variables such as university participation, government promotion, enterprise contribution, enterprise development, and university-enterprise cooperation, and determines the relationship model among these variables. By constructing a structured model, it explores the statistical methods for investigating the causal relationships among the variables. If the standardized coefficient is positive, it indicates that the exogenous variable has a positive effect on the endogenous variable; if the standardized coefficient is negative, it indicates that the exogenous variable has an inverse effect on the endogenous variable. Therefore, based on the causal relationships among the variables, this paper determines the theoretical model for analyzing the influencing factors of university-enterprise-government assistance in promoting the development of rural e-commerce (see Fig. 2).

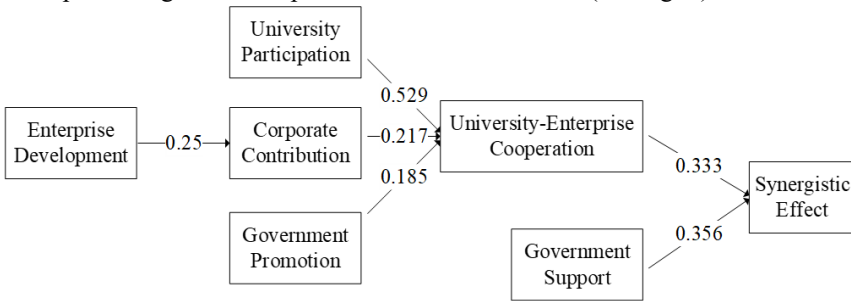


Fig. 2. The theoretical model for analyzing the influencing factors of rural e-commerce industry development.

The causal relationship results among the variables of university participation, government promotion, enterprise contribution, enterprise development, and university-enterprise cooperation are shown in Table 4. The analysis results indicate that university participation, government promotion, and enterprise contribution all

have significant positive impacts on university-enterprise cooperation. Among them, the impact of university participation is the greatest, followed by enterprise contribution and government promotion, which have relatively significant impacts on university-enterprise cooperation. In addition, enterprise development has a significant positive impact on enterprise contribution, indicating that the improvement of the development level of enterprises can significantly promote their contribution to the development of rural e-commerce industry. University-enterprise cooperation and government support both have significant positive impacts on the synergy effect, with standardized coefficients of 0.333 and 0.356 respectively. This shows that the strengthening of university-enterprise cooperation and government support can significantly enhance the effect of synergy, and university-enterprise cooperation can promote the development of rural e-commerce industry and achieve comprehensive rural revitalization.

Table 4. Causal analysis of the interrelated variables for the coordinated development of rural e-commerce industry by UE cooperation.

X	→	Y	Non-Std. Coef	Std. Coef.	S.E.	C.R.	P
Universities Participation	→	UE cooperation	0.483	0.529	0.071	6.772	0.000***
Government promotion	→	UE cooperation	0.202	0.185	0.086	2.362	0.018**
Enterprise Contribution	→	UE cooperation	0.222	0.217	0.079	2.786	0.005***
Enterprise development	→	Enterprise Contribution	0.351	0.25	0.136	2.577	0.010***
UE cooperation	→	Synergistic effect	0.311	0.333	0.081	3.842	0.000***
Government support	→	Synergistic effect	0.329	0.356	0.08	4.101	0.000***

Note: ***, **, and * represent the significance levels of 1%, 5%, and 10% respectively.

3.8 Analysis of Empirical Conclusions on the Coordinated Development of Rural E-commerce Industry through University-Enterprise Cooperation

Through correlation analysis, the results show that there are varying degrees of correlation among the factors, with correlation values ranging from 0.079 to 0.541, indicating that each factor has certain influence on the others. Through the causal relationship analysis of variables, the results show that: Firstly, university participation plays a leading role in university-enterprise cooperation, and the standardized path coefficient of university participation on university-enterprise cooperation is 0.529, which confirms the core position of talent supply and technological research and development in promoting university-enterprise cooperation. Therefore, to accelerate the development of

rural e-commerce, the professional talent cultivation of universities and the transformation ability of e-commerce technology are the key driving forces to activate the willingness of enterprises to cooperate. Secondly, the collaborative supporting effect of enterprise contribution and government promotion, the standardized coefficient of enterprise contribution on university-enterprise cooperation is 0.217, reflecting the positive correlation between the enterprise's own strength and the investment in cooperation; the standardized coefficient of government promotion is 0.185, although the influence intensity is weaker than university participation and enterprise contribution, it still shows a significant positive effect, indicating that the government can indirectly promote the in-depth development of university-enterprise cooperation through policy incentives. Thirdly, the transmission path of enterprise contribution, the standardized path coefficient of enterprise development on enterprise contribution is 0.25, this result reveals the internal logic between the enterprise's own development level and the social contribution ability. This path confirms the progressive relationship of "enterprise development - contribution enhancement - cooperation deepening", indicating that strengthening the internal driving force of enterprise development is the basic link to enhance multi-party collaboration. Finally, the driving path of synergy effect: university-enterprise cooperation directly drives the synergy effect, the standardized coefficient of university-enterprise cooperation on the synergy effect is 0.333, indicating that this path highlights the hub role of university-enterprise cooperation in integrating industry-university-research resources. In rural e-commerce, the technical cooperation between universities and enterprises can directly promote the coordinated improvement of e-commerce operation efficiency and policy implementation effect. In addition, government support has a key driving role in the synergy effect, the standardized coefficient of government support is 0.356, verifying the institutional catalytic role of the government in multi-party collaboration. In conclusion, this paper proposes measures such as establishing a "university-enterprise" precise connection platform, establishing a cross-departmental collaborative governance mechanism, and building a "three-in-one" collaborative service platform to promote the development of rural e-commerce and ultimately achieve rural revitalization.

4 Conclusions

This paper conducts an empirical analysis of the main influencing factors for the collaborative promotion of rural e-commerce industry development by universities, enterprises and the government. It studies the causal relationships among variables such as university participation, government promotion, enterprise contribution, enterprise development, and university-enterprise cooperation. By constructing a "government-enterprise-university" collaborative influence model, and through reliability and validity tests, variable correlation analysis and causal relationship modeling, this paper empirically analyzes the key driving factors for the development of rural e-commerce. Based on the empirical analysis results, this paper proposes that the effective way for universities, enterprises and the government to collaboratively promote the development of rural e-commerce industry is to strengthen government policy support, achieve deep

collaboration between universities and enterprises, and enhance the core competitiveness of agricultural-related enterprises. A three-dimensional driving model named "Policy Support-Technology Empowerment-Deep Cooperation" was constructed. The government provided tax incentives, established logistics parks and cold chain storage facilities as infrastructure. University offered talent cultivation and online marketing services for rural e-commerce. Agricultural-related enterprises provided technological innovation and deep processing of agricultural products.

Acknowledgement

This work is funded by the Project in Key Areas of Ordinary Universities in Guangdong Province (Science and Technology Services for Rural Revitalization) under Grant No. 2023ZDZX4070.

References

1. Fan Zhuojie. "Research on the High-Quality Development Path of Rural E-commerce under the Background of 'Quantitative Management for Agriculture' [J]. *Electronic Commerce Review*, 2025, 14(2): 1108-1113.
2. Liu Gan, Huang Mengqing. Research on the Impact of Rural E-commerce on Farmers' Income [J]. *Frontiers of Social Sciences*, 2025, 14(5): 446-459.
3. Wu Zhiquan. Research on the Development of Rural E-commerce in Changchun Area [D]. Jilin University, 2018.
4. Zhang Huaiquan. Research on the Influencing Factors of Consumer Satisfaction in Fresh Agricultural Products E-commerce [D]. South China Agricultural University, 2019.
5. Wang Qin. Discussion on Collaborative Innovation of E-commerce Model and Rural E-commerce Logistics [J]. *Commercial Economics Research*, 2021(16): 150-152.
6. Liu Jingzhi, Su Wei, Geng Xiao. Research on the Development Path of Rural E-commerce and Fresh Food Logistics in the Context of Common Prosperity [J]. *Commercial Economics Research*, 2022(12): 130-133.
7. Yin Zhensheng. Strategies for Integrating Vocational College E-commerce Innovation and Entrepreneurship Education with Rural E-commerce Development [J]. *Rural Scientific Research*, 2025, (09): 178-180.
8. Wernerfelt B.A Resource-Based View of the Firm[J].*Strategic Management Journal*,1984,5(02): 171-180.
9. Yang H, Klerkx L, Leeuwis C. Functions and Limitations of Farmer Cooperatives as Innovation Intermediaries: Findings From China[J]. *Agricultural Systems*. 2014, 127(05): 115-125.
10. Yu Fuqiang, Hu Penghui, Du ShaSha. Research on Data Quality Control in Online Questionnaire Surveys [J]. *Statistics and Decision*, 2019, 35(16): 10-14.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

