

E-commerce Development in Rural Anhui: Insights from a Resident Survey

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Abstract: This research gathered data from approximately 3,000 rural residents across 16 municipalities in Anhui using survey questionnaires and field visits. The study offers a comprehensive analysis of the present scenario and obstacles confronting e-commerce development in rural Anhui. Findings suggest that despite the immense potential of e-commerce to enhance rural economic growth, its proliferation in these regions remains hampered by multiple challenges. The disparity between the burgeoning interest among respondents to adopt e-commerce and its actual underdevelopment in rural areas of Anhui is noteworthy. An emerging trend is the escalating adoption of e-commerce by the middle-aged and senior demographic in these regions. Furthermore, the instrumental role of village cadres in championing e-commerce is emphasized. Drawing from these insights, the article forwards a set of strategic recommendations to foster robust and sustainable e-commerce growth in rural Anhui.

Keywords: Rural Anhui, E-commerce Development, Resident Survey, Village Cadres' Influence, Strategic Interventions

1 Introduction

1.1 Research Background

The swift progression and ubiquity of internet technology have ushered e-commerce into the forefront of global commerce. Particularly in China, e-commerce flourishes not just in urban precincts but is steadily permeating rural landscapes. Bolstered by state-backed initiatives like rural rejuvenation and the push for digital agriculture, rural e-commerce has seen an accelerated growth trajectory in recent times, serving as a pivotal driver for county-level economic upliftment. Yet, disparities in its development pace and depth are evident across regions. A marked gap persists between nation-wide propitious policies and the tangible aspirations of rural inhabitants. Anhui Province exemplifies this, with its county-level e-commerce lagging behind proximate provinces such as Jiangsu and Zhejiang. The e-commerce landscape in Anhui seems incongruent with its economic stature and geographical placement, necessitating an in-depth probe into amplifying its reach.

1.2 Research Purpose

This investigation seeks to delineate the prevailing landscape and challenges tethered to e-commerce in Anhui's rural milieu from the inhabitants' vantage point. We endeavor to administer a survey spanning approximately 3,000 questionnaires distributed across 105

counties in 16 Anhui cities, collating pertinent e-commerce insights from the rural populace. Through rigorous data scrutiny, we aim to uncover the inherent realities and predominant impediments of Anhui's rural e-commerce, culminating in actionable directives for its advancement.

1.3 Main Contributions

The cornerstone of this study is its holistic survey centered on Anhui's rural e-commerce, encapsulating the unfiltered sentiments and lived experiences of its rural denizens. Our exploration pinpoints the salient roadblocks and prospects of rural e-commerce evolution and forwards empirically-grounded policy recommendations to champion its sustained expansion.

1.4 Paper Structure

The manuscript unfolds as outlined: Section one introduces the topic; section two delves into prior scholarly works; section three outlines our research strategy; section four showcases our survey findings; section five involves rigorous data interpretation; section six encapsulates pivotal conclusions and advisories, with the final segment dedicated to references.

2. Literature Review

2.1 Global Dynamics of Rural E-commerce Evolution

Rural e-commerce has increasingly garnered global research attention. Kshetri (2018) explored the participation of rural communities in e-commerce within developing nations. He highlighted the e-commerce expansion from major urban hubs to smaller towns and villages. For example, certain e-retailers in countries like India and Indonesia accrue a significant share of their revenues from smaller towns and rural sectors. Kshetri also examined the disparities in e-commerce adoption between rural and urban settings, attributing them to factors such as lower incomes, absence of economies of scale, and elevated internet access costs [1]. Hajji (2021) emphasized the transformative role of e-commerce in contemporary trade, probing potential collaboration avenues for e-commerce development in remote and rural areas amongst BRICS nations. She underscored the brisk e-commerce expansion within BRICS, albeit with uneven regional development and a notable collaboration vacuum among these nations [2]. Shree's 2023 research delved into the factors motivating rural youth towards online shopping, suggesting a preference for the modality owing to its convenience, competitive pricing, and quality assurance. Popular purchases included books and electronics [3].

Cumulatively, these studies underscore the burgeoning role of rural e-commerce on a global scale, enhancing rural consumer convenience, augmenting employment prospects, and invigorating rural growth.

2.2 Rural E-commerce Landscape in China

In China, urban e-commerce maturity has been a catalyst for its rural counterpart's growth. This growth trajectory has been reinforced by governmental support. Marking a significant policy shift in 2016, the central government's inaugural document explicitly recognized rural e-commerce, ensuing a cascade of supportive policies that further amplified its growth. Data from

the "China Internet Development Statistics Report" and the Ministry of Commerce indicate that by the close of 2022, rural internet users numbered 308 million, with rural online retail sales registering 2.17 trillion yuan—an eleven-fold increase since 2014. In the same year, online retail sales of agricultural produce stood at 531.38 billion yuan, marking a four-fold increase from 2014 figures. However, stark regional disparities in e-commerce development persist. The 2022 report by the Ministry of Agriculture and Rural Affairs' Information Center highlighted that online retail sales in counties of provinces like Zhejiang, Guangdong, and Jiangsu constituted 61.1% of national county online sales. In stark contrast, Anhui and ten other provinces lingered between 1-10%, with other provinces registering less than 1%.

Several scholars have delved into the nuances of rural e-commerce in China. For instance, Han Meng (2017) utilized CNKI's clustering analysis to forecast China's rural e-commerce future developmental paradigms. He envisaged a future accentuated by the construction of agricultural e-commerce platforms, AI-driven logistics, and mobile payment infrastructures [4]. Xu Shuying (2023) postulated that within the "Internet+" framework, rural e-commerce could bridge urban-rural developmental chasms, bolster farmer incomes, facilitate rural revitalization, and drive holistic prosperity. However, she also highlighted challenges such as a nascent understanding of rural e-commerce, embryonic logistics systems, a smaller scale of rural e-commerce operations, and fragmented supply chains [5]. Zhu Zhiying (2023) shared insights from a province's successful e-commerce strategies, which encompassed governmental stewardship, village collaborations, cooperative establishments, differentiation in agricultural product offerings, and an intertwined ecosystem of e-commerce, express logistics, and logistical collaborations, especially in remote mountainous regions [6]. Jiang Yangge (2023) posited that while rural e-commerce could elevate rural consumer behavior, its impact may wane as the industry matures. Thus, he advocated for enhancing rural e-commerce development levels, stringent quality controls, and infrastructural advancements [7].

In essence, while research on rural e-commerce in China is burgeoning, a holistic examination from the rural populace's perspective remains limited. This study endeavors to bridge this gap, focusing on Anhui Province's rural e-commerce landscape, identifying developmental bottlenecks, proposing actionable strategies, and fostering Anhui's rural e-commerce evolution.

3. Methodology

3.1 Literature Synthesis

A comprehensive review of both domestic and international literature on rural e-commerce was undertaken for this study. This exercise allowed for the assimilation of prevailing perspectives and helped in identifying existing research gaps, thereby establishing a robust theoretical framework for the current investigation.

3.2 Field Surveys

Through direct engagement with the local communities and governmental bodies across various counties in Anhui, this study sought insights into the existing state of e-commerce development and gauged the residents' perceptions of the same. Such direct interactions enriched the subsequent questionnaire survey and enhanced the subsequent data interpretation.

3.3 Survey Questionnaires

Gleanings from the field surveys were instrumental in designing methodical questionnaires. By ensuring a judicious mix of respondents, the survey aimed to capture a genuine snapshot of the rural populace's stance on e-commerce, thereby bolstering the data's authenticity and relevance.

3.4 Analytical Techniques

Responses from the questionnaire were subjected to a battery of analytical techniques, including descriptive statistics, variance assessments, and correlation analyses. Utilizing statistical tools like SPSS fortified the research's analytical rigor, ensuring robust and precise outcomes.

4. Assessing the State of Rural E-commerce in Anhui

4.1 Preliminary Field Surveys

Before rolling out the questionnaire, initial forays were made into select governmental entities and rural communities within Anhui to fathom the depth of e-commerce penetration in the province. Preliminary observations suggested a pronounced variability in e-commerce growth at the county level within Anhui, possibly influenced by geographical nuances and economic disparities. Additionally, differential perceptions towards e-commerce among various demographic cohorts were palpable, potentially attributed to age and educational disparities. The feedback also underscored the pivotal role of local village leaders in shaping e-commerce perceptions. Thus, it was deemed critical to encompass these facets into the questionnaire, emphasizing the village leaders' influence on e-commerce proliferation.

4.2 Questionnaire Blueprint

Insights from the literature review and initial field visits shaped the questionnaire's architecture. Primarily, it aimed to assess Anhui's current e-commerce landscape and its associated challenges. The questionnaire was trifurcated: 1) Respondents' demographic details encompassing location, gender, age bracket, educational background, principal profession, and income levels – primarily structured as single-choice questions; 2) The pulse of e-commerce evolution in rural precincts, capturing online shopping trends, technological integrations, and agricultural product sales – a mix of single and multiple-choice questions; 3) Delving into the challenges facing rural e-commerce and gauging village leaders' enthusiasm in its evolution – comprising single and multiple-choice questions, interspersed with open-ended queries.

4.3 Survey Data Compilation

To uphold the research's integrity and authenticity, the survey was anonymized and randomized. The electronic questionnaire was crafted using the "Questionnaire Star" platform. The survey was disseminated both virtually (through local social media channels like QQ and WeChat) and via face-to-face interactions, especially targeting individuals in rural zones with limited smartphone accessibility. Spanning late May to early August 2023, the survey zeroed in on rural residents sprawled across 105 counties under Anhui's 16 cities. After filtering out incomplete and aberrant entries, a corpus of 2,994 valid responses was accumulated. This dataset was

geographically diverse with 985 entries from Northern Anhui, 1,019 from Central Anhui, and 990 from Southern Anhui, showcasing an equitable regional distribution.

5. Data Analysis and Findings

5.1 Descriptive Analysis

Demographics of the Respondents. Of the 2,994 valid responses, preliminary analysis captured the essential demographics of participants. The gender distribution was relatively balanced, with females slightly dominant at 58.15%. Age-wise, respondents were predominantly from the 41-50 age bracket. Educationally, a significant majority (65.97%) had attained at least a high school education.

Digital engagement insights revealed that nearly 73% of participants spent over an hour online daily. A whopping 93% had ventured into online shopping, with 17% relying exclusively on digital platforms for their purchases. A remarkable observation was the surge in e-commerce engagement among those aged over 50 - 57.95% in the current survey compared to 40% in Zhang Dongyue's 2019 study [8]. This spike underscores rural e-commerce's rapid evolution and its expanding demographic reach.

Rural Inhabitants' Perception of E-commerce. Table 1 delineates rural residents' sentiments towards e-commerce. When juxtaposed with other datasets, we discerned e-commerce's latent potential in rural areas.

Table 1 Statistics on Residents' Attitudes Towards E-commerce

Question	Category	Percentage (%)
Do you think e-commerce has an impact on rural economic development?	Significantly impacts,	38.78
	No noticeable impact	27.45
	Has a great impact, changing local development	22.28
	No impact at all	11.49
Are you aware of national or local government policies supporting the development of rural e-commerce?	Occasionally come across	41.49
	Unaware	21.22
	Haven't paid attention	19.95
	Yes, I often keep track	17.34
What do you think are the benefits of rural e-commerce development for farmers?	Convenience in life	25.76
	Increase employment, enhance income	23.68
	Promote infrastructure development	21.75
	Reduce the number of left-behind children and elderly	14.72
	Others	8.02
	No significant benefits	6.07
	Willing	40.35
	Indifferent	24.72

Would you be willing to sell your agricultural products online?	Very willing	13.99
	Not really willing	12.76
	Unwilling	8.18

The consensus was that e-commerce positively influences rural economic progress. 38.78% felt its impact was substantial, and 22.28% believed it profoundly altered local developmental trajectories. This sentiment underscores e-commerce's burgeoning role as a rural economic catalyst.

A majority were aware of policies steering rural e-commerce, with 41.49% occasionally encountering them and 17.34% frequently staying updated. This suggests that governmental awareness campaigns are effective, albeit requiring amplification.

The benefits of rural e-commerce resonated with most respondents. They believed it augments convenience (25.76%), creates job opportunities (23.68%), and fosters infrastructural development (21.75%). Furthermore, over half expressed willingness to vend agricultural products online, emphasizing the prevalent enthusiasm for this novel sales avenue.

However, there's a discernible developmental chasm in rural e-commerce between Anhui and its more advanced counterparts. Despite its 8th national GDP ranking in 2021, Anhui's online county retail volume lagged at 11th, trailing behind neighbors like Zhejiang (1st) and Jiangsu (3rd). In the top 100 county-level online agricultural retail data, Anhui's representation dwindled from three counties in 2020 to just Feixi county in 2021, which ranked 86th. The once illustrious "Dangshan model," which grossed over 4 billion yuan in 2017 [9], was conspicuously absent in 2021.

This disparity between Anhui's e-commerce development and its residents' enthusiasm necessitates bolstered policies that leverage Anhui's locational assets, harness rural e-commerce's potential, and cater to the masses' requirements.

Methods E-commerce's Influence on Selling Strategies of Rural Residents. The ascent of e-commerce has invariably left its imprint on the conventional selling mechanisms utilized by rural inhabitants. Delving into related data allows for an incisive understanding of Anhui's rural populace's sentiments.

The acquired data underscores that age-old sales methodologies, like direct market sales of agricultural produce (accounting for 35.57%), still reign supreme among rural denizens. Yet, an intriguing 14.46% have either embarked on or exhibited an inclination towards online sales of agricultural products. This indicates that while traditional paradigms remain resilient, digital avenues are carving a niche for themselves.

Touching upon the recurrent dilemma of unsold agricultural inventory, a staggering 86.17% voiced their experience with such predicaments—shedding light on the capricious nature of the agricultural marketplace in hinterlands. The predominant strategy to counteract these unsold goods has been price slashing (45.06%), potentially straining the farmers' financial well-being. This amplifies the urgency for devising efficacious sales tactics and identifying robust markets.

Concerning entrepreneurial ventures, the data singles out fruits and vegetables as the flagship products for Anhui's rural community. This synchronizes with big data revelations: in 2020, the e-commerce zeniths in Anhui were predominantly edible commodities—fruits (15.6%), floral teas (10.3%), and snacks (8.6%) constituted a lion's share of online agricultural transactions [10].

A notable 12.22% showcased enthusiasm for venturing into traditional Chinese medicinal ingredients. However, big data doesn't echo this sentiment, potentially due to ambiguous quality benchmarks and the convoluted nature of assuring online product quality for these ingredients.

In essence, the ripples of e-commerce in rural landscapes are becoming increasingly palpable. While conventional sales avenues retain their charm, the burgeoning reach of digital platforms forecasts a vibrant e-commerce future for rural domains.

Challenges in Rural E-commerce and Suggested Interventions. Statistical evaluations highlight that the predominant bottlenecks stymieing rural e-commerce's flourish are a dearth of e-commerce awareness (25.27%) coupled with limited technological prowess and e-commerce acumen (24.9%). This accentuates the imperative of persistently offering tailored e-commerce tutorials and upskilling sessions for agriculturists. Augmenting governmental endorsements can also bolster the agrarian community's trust and receptiveness towards e-commerce.

Pivoting to an optimistic vantage point, amplifying e-commerce-centric training for farmers can act as a catalyst for rural e-commerce evolution. This resonates with extant literature, underscoring the pivotal role of educational interventions in fostering technology adoption. Furthermore, infrastructural enhancements, encapsulating logistical streamlining and internet backbone fortification, are perceived as areas warranting attention.

While rural e-commerce in Anhui grapples with myriad challenges, astute strategies and robust support frameworks can turbocharge its trajectory. It's imperative for governmental bodies and pertinent agencies to meticulously align top-tier policy mandates with grassroots imperatives, amalgamate resources, and tap into the community's intrinsic dynamism.

5.2 Differential Analysis

Gender-Based Analysis. Examining gender differences reveals distinct preferences in online entrepreneurship platforms between males and females. Survey data manifests the following gender-based preferences for various online platforms: Business-oriented platforms like YiMuTian were chosen by 33.37% females compared to 30.57% males. Others were opted for by 35.61% females versus 32.48% males. WeChat Moments attracted 44.74% females, surpassing 41.10% males. Notably, TikTok or other live-streaming platforms saw a marked preference among females at 55.89%, considerably higher than the 42.70% for males. Third-party platforms such as Taobao/Jingdong garnered attention from 49.97% females compared to 39.59% males. Utilizing the Chi-squared test, a p-value of 0.0425 was obtained, confirming significant gender differences in platform choice, especially regarding the marked preference of females for platforms like TikTok.

Age-Centric Analysis. Evaluating the data from an age perspective, we discern a decline in online shopping experience as age advances, with a pronounced drop for individuals above 40. The responses to the question, "Do you usually shop online?", revealed that younger respondents (20-30 years old) are distinctly more adept and experienced in online shopping than their older counterparts. This trend begins to recede for individuals over 41, likely because younger demographics embrace and rely more on digital platforms, while older groups, possibly due to unfamiliarity or skepticism, gravitate towards traditional shopping avenues. Additionally, the data underscores a burgeoning trend of e-commerce adoption among the middle-aged and

elderly. As aging progresses, the shift in the consumption structure of the elderly from basic needs to a diversified array indicates a burgeoning market for health and wellness-focused e-commerce platforms catering to the elderly in rural terrains [11].

5.3 Correlation Analysis

Over the years, Chinese administrative bodies have promulgated a plethora of policies buttressing rural e-commerce. The actualization of these mandates hinges on the proactive involvement of village cadres, rendering their disposition and fervor pivotal to e-commerce proliferation. To delineate this relationship, we embarked on a comprehensive data analysis, targeting the potential correlation between rural residents' perceptions of village officials' enthusiasm and the e-commerce development score.

Grounded in the survey questionnaire, we devised an e-commerce development scoring schema. This was predicated on seven pivotal indicators from the survey, with values assigned to each, as elucidated in Table 2.

Table 2. E-commerce Development Scoring Indicators

Question	Category	Value Assigned
Do you usually shop online?	Extremely, preferably, Occasionally, Rarely, Never	4,3,2,1,0
How often do you go online?	More than 5 hours, 3-5hours, 1-3hours, 0-1hours, Never	4,3,2,1,0
How do you typically sell your agricultural products?	online channels, Local procurement, Self-delivery to the market, Other methods	4,2,0,0
Are you willing to sell your agricultural products online?	Extremely willing, Willing, Indifferent, Reluctant, Unwilling	4,3,2,1,0
Are you aware of the national or local government policies supporting rural e-commerce development?	frequently, Occasionally, Haven't followed, Unaware	4,3,2,1
Do you think e-commerce impacts rural economic development?	significant impact, noticeable impact, No noticeable impact, Absolutely no impact	4,3,2,1
What is the likelihood of you using online platforms to sell your agricultural products?	Very likely, Somewhat likely, Not likely	4,2,0

Following a weighted average computation and filtering counties with samples exceeding 40 (to circumvent potential skewness due to scanty samples), we procured e-commerce development scores for 23 counties.

Simultaneously, values were ascribed to the survey's enthusiasm indicator, yielding quantified data on village officials' e-commerce zeal across 23 counties, detailed in Figure 1.

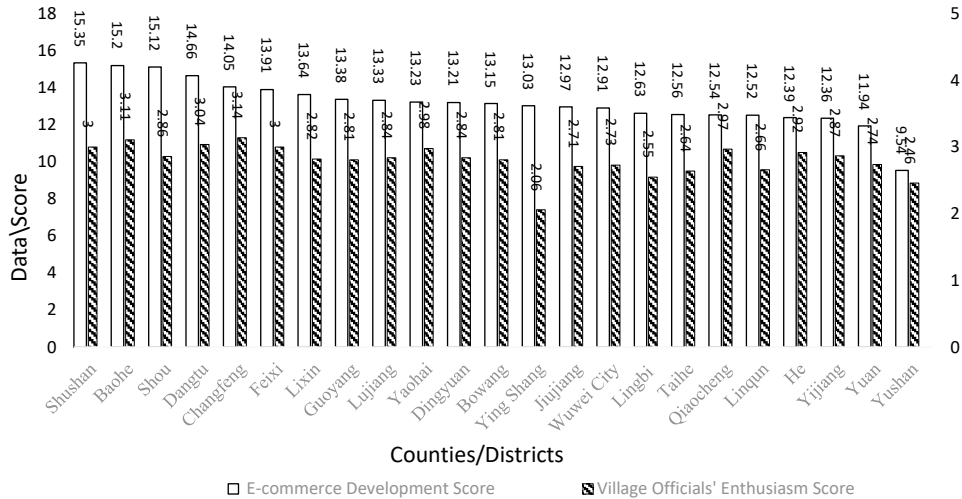


Fig. 1. Quantitative Data on E-commerce Development across 23 Counties/Districts

Leveraging the Pearson correlation coefficient, a relationship was discerned between the two datasets, manifesting a correlation coefficient of 0.546 and a p-value of 0.007. This suggests a moderate positive correlation, underscoring the village cadres' instrumental role in e-commerce propulsion. Their endeavors and strategic decisions are indispensable for local economic augmentation, especially in burgeoning domains like e-commerce. The data suggests that village cadres, when buoyed by a pro-e-commerce stance, are likely to champion growth-promoting initiatives, like training or collaboration with e-commerce platforms. The analysis also points towards other potential growth determinants, such as infrastructural investments.

6. Conclusions and Recommendations

6.1 Conclusions

From our in-depth analysis and research, we can draw the following key conclusions:

Discrepancy Between Rural E-commerce in Anhui and its Economic Standing. Despite being a strategically located province in central China, Anhui has yet to fully capitalize on its geographical advantages, with its rural e-commerce trajectory trailing behind its economic indicators.

Striking Contrast Between Rural E-commerce Progress and Residents' Aspirations. There exists a marked disparity between the burgeoning potential of rural e-commerce in Anhui and its current developmental trajectory, which is not aligned with the palpable demand from its rural populace.

Marked Uptick in Digital Engagement Among the Middle-aged and Elderly. Our findings indicate a notable surge in online shopping tendencies among the middle-aged and elderly in

rural Anhui. However, this segment still lags behind the younger demographics, particularly those over 40.

Undeniable Influence of Village Cadres. In the Anhui context, village cadres emerge as pivotal players in the e-commerce narrative, with their perspectives, decisions, and endeavors casting significant ripples in the e-commerce ecosystem.

6.2 Recommendations

To address the myriad challenges plaguing rural e-commerce in Anhui - from infrastructural gaps, technological barriers, to policy gaps - we put forth the following recommendations:

Intensify Training Initiatives. Considering the discernible knowledge and skills chasm among farmers vis-à-vis e-commerce, we recommend the rollout of expansive training and enlightenment initiatives across Anhui.

Amplify Governmental Involvement. Given the extant governmental interventions, it would be prudent for the Anhui provincial administration to frame and implement progressive policies that galvanize the rural e-commerce landscape.

Bolster Infrastructure. For a thriving rural e-commerce sector, there's an imminent need to enhance both logistics and digital infrastructure.

Augment Participation of Village Cadres. It's imperative to craft conducive policies that galvanize village cadres, spurring them to champion and steward rural e-commerce more proactively.

7. Epilogue

This comprehensive survey of Anhui's rural denizens has shed light on the nuances, impediments, and latent opportunities in the rural e-commerce arena. Even in the face of technological, logistical, and educational challenges, the unwavering enthusiasm of Anhui's farmers underscores the transformative potential of e-commerce. A synergetic alliance between governmental bodies, corporate entities, and local communities can truly unlock Anhui's innate potential, charting a path for a resilient and thriving rural e-commerce ecosystem.

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