

Individualized Perspective on Spatial Restructuring of E-commerce Villages: A Case Study of Village Q in Shaanxi Province, China

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Abstract: The introduction of e-commerce in rural areas is profoundly reshaping the modes of production and lifestyle in these regions, altering the developmental trajectories of villagers, and promoting the restructuring of rural spaces. This study uses Q Village in Shaanxi Province, China, as a case study, employing semi-structured interviews, activity log surveys, and sales data analysis to explore the spatial restructuring of the rural e-commerce landscape from an individual perspective. The findings reveal: (1) E-commerce provides unique developmental pathways for rural individuals, enabling them to transcend traditional kinship and geographic constraints and establish a nationwide economic network, thereby enhancing their economic income; (2) E-commerce expands the sales reach of rural individuals, shifting the traditional geographically-based economic patterns towards regionalization; (3) E-commerce transforms the traditional organization of production spaces in rural areas, moving from a village-centered to a layout centered around fields, residences, and towns; (4) Under the influence of e-commerce, the living time of rural individuals is compressed by production demands, increasing temporal pressures on individuals. These results offer insights for developing and constructing rural spaces influenced by e-commerce.

Keywords: E-commerce Villages; Spatial Restructuring ; Individualization ;Rural Revitalization

1. Introduction

The development of rural e-commerce is a crucial pathway for achieving rural revitalization. According to the "China Rural E-commerce Development Report (2021-2022)" released by the China International Electronic Commerce Center, online retail sales in rural China reached 2.05 trillion yuan in 2021, accounting for 15.66% of the national online retail sales, representing a 129.2% increase compared to 2016. The advancement of online e-commerce has brought significant opportunities to rural development and has profoundly impacted the spatial structure of rural areas.

Related studies indicate that e-commerce platforms based on "de-geographical centralization" algorithms have broken the traditional geographical constraints on spatial flow (Krivý, 2018, p.15), enabling rural areas to integrate into a broader regional cooperation system. Simultaneously, e-commerce has altered the internal operational mechanisms of rural areas, with interactions between virtual and real spaces driving the restructuring of rural spatial patterns. From a regional perspective, under the influence of e-commerce technology, rural elements have shifted from a unidirectional flow to a multidirectional flow between urban and rural areas and regions (Zhang, et al., 2014, p.6), giving rise to new industrial division chains and spatial organization models (Chen & Luo, 2020, p.69), thus restructuring the economic geographical space of rural areas. From the internal system of rural areas, the introduction of e-commerce has spurred the rise of numerous rural industries, leading to a

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diversification and de-agriculturalization trend in rural employment(Zhang, et al.,2022,p.207). The village space is transitioning from agricultural spaces to commercial spaces, and multifunctional spatial units incorporating production processing, design and development, and innovation are emerging(Zhou,2016,p.69), though residents' living spaces are also being compressed(Zhang, et al.,2019,p.954). Government support, industrial foundation, and elite-driven factors are key to the formation of e-commerce villages, further triggering a series of changes such as the "urbanization" of rural land structures, "commercialization" of spatial functions, "de-agriculturalization" of industrial development, and "non-localization" of social relations(Yang,2021,p.3076).

"Individualization" is a concept proposed by Ulrich Beck(2001)that reflects the trend of social change, referring to the process by which social members exert subjective initiative to detach from traditional institutions and ties. E-commerce provides a new pathway for the individualization process in rural areas, allowing rural individuals to quickly build new identities within the village using the convenience brought by e-commerce platforms, "detaching" from traditional urban-rural relations and rural social relations based mainly on kinship and locality, and "re-embedding" into new types of urban-rural relations and rural social relations centered on e-commerce platforms. Under the logic of algorithms and platforms, labor relations have shifted from traditional employment relationships to "platform-individual" relationships(Wu&Li,2019,p.137), and individuals' daily lifestyles and their perceptions of surrounding spaces are increasingly reliant on the internet(Longhurst,2016,p.135; Nafus&Sherman,2014,p.1793). Additionally, under the influence of the internet, rural individuals are part of larger spatial-scale groups and networks, enabling them to grasp new knowledge and ideas and apply them to rural development (Yang,2021,p.3085) , promoting economic development, the status of female subjects, and the reconstruction of social relations in rural areas(Xin,et al.,2022,p.1306).

Overall, current research on the reconstruction of rural areas by e-commerce often focuses on macro and meso-level changes in economic forms, power relations, and spatial distribution, with fewer studies focusing on the micro-level individualization processes that highlight the spatial reconstruction induced by e-commerce. Most research subjects are concentrated on industrial e-commerce villages, with results on land use, spatial function transformation, and development mechanisms being less applicable to rural areas primarily engaged in agricultural e-commerce. In terms of research data, most case studies are based on semi-structured interviews, lacking more refined research data to discern the impact of e-commerce on spatial changes in rural areas. Based on this, this paper, from the perspective of individualization, takes the e-commerce behavior of individuals in Q Village, Shaanxi Province, China, as the object of analysis to explore how rural individuals actively learn and utilize e-commerce technology in the process of engaging in e-commerce, promoting rural economic development, and reshaping rural production and lifestyles, thereby revealing from a micro perspective the mechanisms and spatial effects of individual behavior driving rural construction.

2 Research content and data collection

2.1 Research content and methods

This article selects Q Village in Shaanxi as the research subject and Mr. Y as the core case study, adopting an individualization theory perspective to explore the development trajectories of rural individuals, the organization of rural individual living time, and the reconfiguration of rural individual production space under the influence of e-commerce. The specific research contents are divided into the

following four parts: First, through a narrative analysis of rural individuals, it examines the motivation, trajectory, and effectiveness of their e-commerce entrepreneurship and discusses the impact of e-commerce on the changes in individual development paths. Second, it investigates the characteristics of regional economic linkages and division of labor collaboration of rural individuals under the influence of e-commerce, focusing on the sales scope of their agricultural products and collaborative network relationships. Third, it analyzes the differential characteristics of rural individual production space organizations under the varied outcomes of e-commerce dissemination. Lastly, it examines the changes in the allocation of residents' daily living time due to the influence of e-commerce.

2.2 Research Data

This study primarily employs methods such as participatory observation, semi-structured interviews, and activity log surveys to conduct semi-structured interviews with six villagers in Q Village regarding the changes in agricultural production and life in the village under the drive of e-commerce. It also collects data on the personal development history of the villagers, daily activity logs during the busy farming period (recording the type of activity every 15 minutes), GPS trajectory data, and daily mobile app usage data (Table 1). This approach aims to explore the impact of e-commerce on rural spaces from both qualitative and quantitative perspectives, focusing on individualization.

Table 1 Basic information of the 6 interviewees.

ID	Identity	Gender	Age	Online Sales Proportion (%)
1	Mr. Y	Male	56	100
2	E-commerce Intermediary	Male	60	100
3	Partial Online Sales Villagers	Female	69	80
4	Partial Online Sales Villagers	Female	75	50
5	Offline Sales Villagers	Female	71	0
6	Offline Sales Villagers	Male	76	0

3 Individualization Perspectives on E-commerce Rural Spatial Reconstruction

3.1 Changes in the Pathways of Rural Individualized Development Under the Influence of E-commerce

Before the introduction of e-commerce in Village Q, sales prices could only sustain the villagers' daily living needs. Around 2013, a group of villagers who had been working outside the village, along with some recent university graduates, brought e-commerce skills back to the rural area. They combined these skills with the local cultivation of kiwifruit, initiating entrepreneurial ventures. Mr. Y, a representative of those from Village Q who returned from working outside to start businesses, utilized the internet knowledge and skills he acquired while working away from home. By integrating e-commerce sales with the village's specialty agricultural products, he became the pioneer of e-commerce entrepreneurship in Village Q and a leader in driving local prosperity. Mr. Y said:

"Traditional agriculture was insufficient to support the economic needs of his family, prompting him to migrate to Dongguan, Guangdong, in 1998 to seek higher income and provide financial stability for his household. However, by around 2012, facing a downturn in the furniture manufacturing sector he was involved in, geographical separation from his spouse, and the upcoming high school education

of his child necessitating parental guidance, he returned to his village in 2013. Leveraging his urban living experiences, the internet skills he acquired, and the kiwifruit cultivated on his family farm, Mr. Y utilized e-commerce platforms like Taobao and WeChat to market his products to former city coworkers and their families, achieving impressive sales figures. "

Traditionally, the physical marketplace yielded around 3-5 yuan per jin (half a kilogram) for kiwifruit, whereas online sales enabled pricing between 6-10 yuan per jin, effectively doubling the unit sale price. With the burgeoning demand online outpacing supply, Mr. Y expanded beyond selling his own produce; he began purchasing kiwifruit from fellow villagers at above-market rates to assist in their sales efforts. This e-commerce venture not only delivered higher profitability for the sale of kiwifruit but also substantially increased the happiness and satisfaction within the community households. Mr. Y expressed :

"since he commenced the online sale of kiwifruit, the demand was so strong that his own harvest was insufficient, prompting him to also sell produce from neighboring villagers. This initiative significantly elevated his family's economic status—from an annual income of 50,000-60,000 yuan over a decade ago to a current annual household income of around 150,000 yuan. The revenue generated enabled him to expand his agricultural operations, purchase urban property for his children, and support their matrimonial needs. "

3.2 Restructuring of Rural Individual Regional Economic Spatial Connections under the Influence of E-commerce

3.2.1 E-commerce has restructured the spatial linkage between individual villagers and the regional economy, expanding the coverage area of product sales.

The utilization of e-commerce has enabled Mr. Y's production to form an extensive flow of online transaction information and offline product transportation. The real-time communication between online sales personnel and customers continues to shape a robust stream of information regarding product quality, price, after-sales service, etc., alongside considerable cash flow. The information flow and product flow together constitute the advantages of the commodity transaction model and have significantly facilitated the establishment of long-distance spatial networks. For ease of analysis, the spatial distribution pattern of product sales is illustrated (Figure 1) based on the 695 sales orders Mr. Y processed from September 2022 to November 2023. Using the natural break method, the ranks are divided into five levels to intuitively reflect the strength of connection between Mr. Y. as an individual and different cities. Looking at the individual network sales space, compared to traditional physical sales, the economic linkage of individual villagers has significantly increased, covering 107 prefecture-level cities nationwide. In contrast to the traditional sales scope of direct sales to a single province, the Internet has expanded the sales reach of agricultural products. Mr. Y stated:

"Before the advent of the internet, kiwifruits were sold directly to merchants. Once the merchants took the fruits, they would transport them directly to fruit markets in Zhejiang and Jiangxi to sell to distributors, who would then sell to retailers, and finally, the fruits would reach the consumers. The sales scope that I could access was just within the village. After the internet came into play, my family's kiwifruits have been sold all over the country."

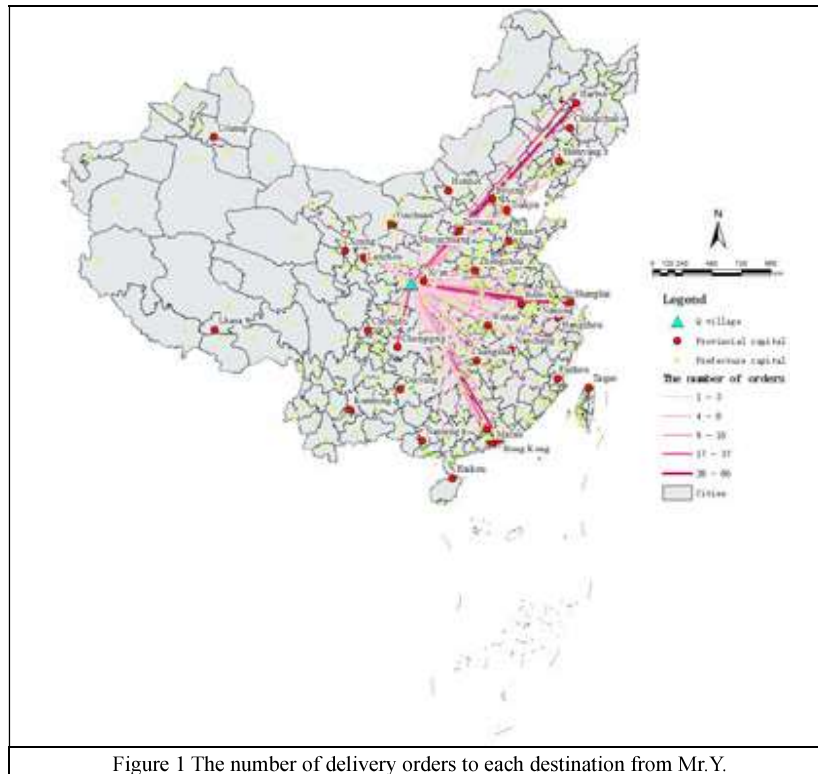


Figure 1 The number of delivery orders to each destination from Mr.Y.

3.2.2 Expansion of the Division of Labor and Collaboration System from Local to Regional Under the Influence of E-commerce

Individual villagers selling agricultural products online have reshaped their relationships with regional division of labor and collaboration systems. Under the influence of the Internet, a new business model has emerged, strengthening the connections and division of labor between urban and rural areas. The traditional individual sales model of agricultural products mainly involved merchants purchasing directly at the doorstep or selling to local markets and nearby towns, with the individual's sales radius and scope being quite limited. However, with the rise of e-commerce, villagers can now sell their agricultural products to any place within the country. To seize this business opportunity, many villagers have begun to experiment with online sales. The key to online sales lies in expanding sales channels, which requires the division of labor and cooperation between urban and rural areas. In this new model, households, predominantly residing in rural areas, mainly take responsibility for growing, packaging, and shipping agricultural products, while other family members and their friends gradually assume the role of online sales agents, selling through their own social circles, thus forming a regional network division of labor pattern (Figure 2). Mr. Y remarked:

"Initially, my online sales primarily targeted acquaintances in Dongguan, Guangdong, whom I knew through work. Subsequently, as relatives and friends from other regions tasted and appreciated the quality of our fruits, they began promoting them on their respective digital social platforms, leading to the formation of a stable cooperative network for distribution. Presently, my distributors are situated in cities like Shanghai, Suzhou, Harbin, and Baoji, where they facilitate the annual sale of several tens to hundreds of boxes of kiwifruits. Following the expansion of sales channels, my son and daughter-in-law also participate in marketing our fruits through their online social networks, returning home to assist with production during peak agricultural seasons."



Figure 2 Individual Regional Division of Labor and Collaboration Network

3.3 Diversification of Local Production Spatial Organization under the Influence of E-commerce

The increase in economic income further influences changes in production organization. In the cultivation of kiwifruit, e-commerce has not changed the villagers' traditional paths for purchasing agricultural inputs. Due to high-quality requirements for kiwifruit, villagers generally rely on traditional rural kinship and geographical social relationships to purchase pollen and fertilizers. Mr. Y said:

"There are also pollen and fertilizers available online at lower prices, but we dare not buy them because we don't know about the quality. We use a large amount, which relates to the selling price of kiwifruit; we must ensure quality and quantity. Also, there is no guarantee of after-sales service online,

so we generally buy from acquaintances in the village or town. The quality is good, and there is after-sales service. Generally, acquaintances charge us only after the kiwifruit is sold, so we do not need to pay in advance. "

In the sales aspect, the dissemination method in the village mirrors the general technology spread, where Mr. Y's success quickly catalyzed the learning and replication among neighboring villagers. This spread, leveraging social networks, follows kinship, geographical, and professional ties, eventually forming a wave-like spatial diffusion (Wang, 2023, p. 130). However, due to technical, social capital, and market access barriers in online kiwifruit sales, the sales models have diversified into fully online sales, partially online sales, and traditional offline sales at the household level. Specifically, villagers engaged in fully online sales market their agricultural products exclusively through the internet; those in partially online sales use their own and their distant relatives' or friends' social media platforms to sell some of their produce, with the majority still sold physically; and those in entirely physical sales directly market their goods to local or distant merchants. Compared to the traditional village-centered production space organization, the advent of e-commerce has led to noticeable differences in the organization of production spaces around fields, packaging points, purchase locations for distant merchants, and local merchants' buying spots due to the variation in sales models (Figure 3). Specifics are as follows:

In the realm of urban and rural planning and geography, the translation of the sales models in the context of e-commerce influence on agricultural practices is as follows:

Villagers engaged in fully online sales: Around the key nodes of online sales, a local support spatial system of "fields—residential areas—courier points" has formed. Due to the large volume of online sales, the primary method of dispatch is courier services for door-to-door pickup.

Villagers engaged in partially online sales: A hybrid virtual and physical collaborative space system of "fields—residential areas—village—town" is established. As the volume of online sales is relatively small, the main dispatch method for these villagers involves transporting goods to logistic points at the town or village level, while physical sales predominantly occur through direct pickups by merchants at the village.

Villagers engaged in traditional physical sales in the digital age: Different support spaces have formed, such as "fields—residential areas—village purchase points (for distant merchants)" and "fields—residential areas—town purchase points (for local merchants)." The primary method of dispatch in these models involves direct pickups by merchants at the designated purchasing locations.

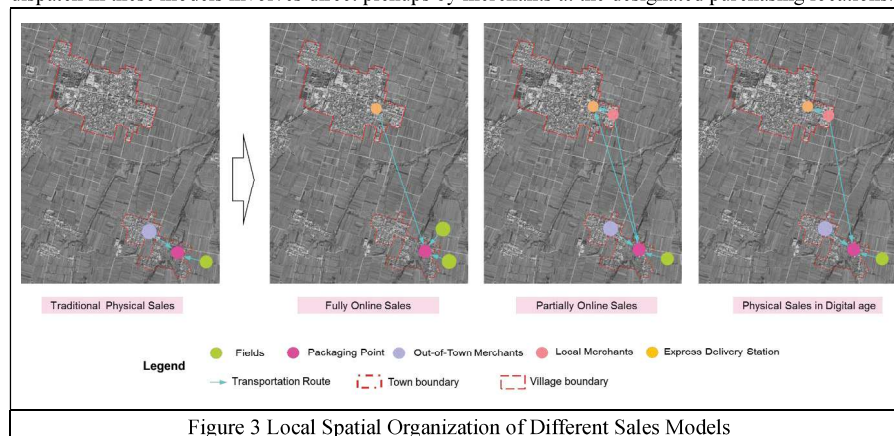


Figure 3 Local Spatial Organization of Different Sales Models

3.4 Compression of Living Time under the Influence of E-Commerce

Under the influence of e-commerce, individual villagers in agricultural product e-commerce villages have experienced a significant change in the rhythm of their daily living time. Compared to traditional agricultural product sales models, online sales not only enhance economic income but also impose more time pressures on their lives.

A comparison of daily living time and mobile phone usage between villagers who sell online and those who do not reveals that during the busy farming season, villagers engaged in kiwifruit sales (both online and offline) work an average of 17.19 hours per day, with only 0.63 hours allotted for leisure. In contrast, villagers operating under traditional sales models work a total of 7.65 hours, with 5.13 hours dedicated to leisure (Figure 4). Evidently, the development of e-commerce businesses significantly compresses villagers' personal living time. Under traditional models, they need only complete basic production processes like picking and sorting before selling the fruit to middlemen. However, in the e-commerce era, villagers not only have to complete these traditional processes but also invest considerable time and energy in online order handling, video shooting, and other promotional activities. These additional e-commerce operational tasks substantially occupy the time originally intended for rest and personal life. Furthermore, the time rhythm of e-commerce sales is much tighter. During peak sales seasons, villagers need to constantly monitor online orders and prepare shipments promptly to meet the demands of distant consumers. This real-time sales model forces them to adjust their daily routines, enhance work efficiency, and ensure immediate responsiveness. Additionally, e-commerce platforms' requirements for product presentation increase the workload for villagers. They are required not only to take high-quality product photos but also to edit promotional videos. Tasks traditionally performed by professional teams have now become essential skills for individual villagers, posing significant challenges to their time and energy. Mr. Y said:

"Before the advent of the internet, peaches were sold directly in the fields, with trucks arriving during the day to collect and transport them by night. Evenings were spent chatting at the doorstep or watching television at home before resting. However, with the shift to e-commerce, there is a constant need to process orders and dispatch goods throughout the day and night, as purchase times vary and volumes can be high. This requires continuous loading of goods in the evening to ensure delivery within 48 hours. Thus, the introduction of the internet has extended working hours, with busy nights followed by some time on the mobile phone before sleep. Sometimes, when there's nothing to eat at home, purchases are made online. Mr. Y is primarily responsible for handling orders and shipping during downtime, and also takes videos while working. After busy evenings, he spends his leisure time editing short videos for promotional purposes. "

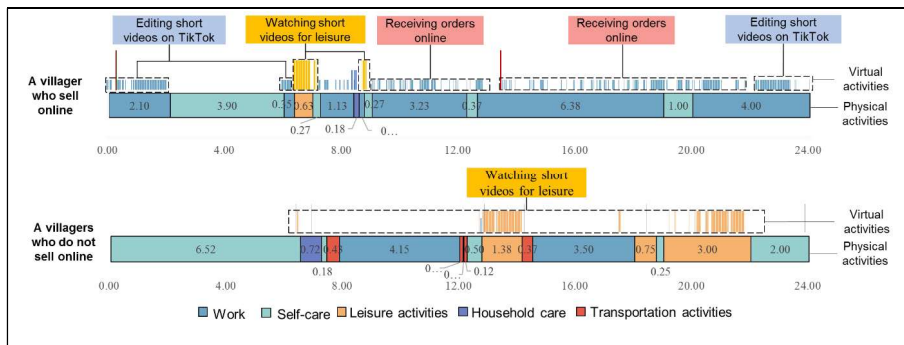


Figure 4 Comparison of daily time utilization between villagers who sell online and those who do not.

4 Conclusions and Research Prospects

4.1 Discussion and Conclusions

4.1.1 E-commerce Empowering Individualized Development Pathways from Urban to Rural Areas

The introduction of e-commerce has provided rural individuals with new economic development pathways, enabling them to transcend traditional geographical limitations and proactively integrate into broader socio-economic networks. This restructures the spatial connections between rural areas and regional economies, thereby accessing more developmental resources and opportunities. This process of identity "re-embedding" through individual agency promotes the transformation of rural social structures and brings new dynamism to rural economic development. It also encourages many villagers who have worked in cities to return to rural areas, using their acquired knowledge to further promote rural development. To fully leverage the potential of rural individuals in the e-commerce sector, it is advisable to encourage the cultivation of distinctive rural e-commerce brands that align with local resource endowments and industrial strengths. Through policy support and the establishment of e-commerce demonstration bases, rural individuals can be guided to focus on local specialty products to meet the personalized needs of urban and rural consumers, continuously enhancing their competitiveness in the e-commerce market.

4.1.2 E-commerce Inducing the Reshaping of Rural Spatial Relationships

The introduction of e-commerce has driven the restructuring of the economic space in rural areas. Through e-commerce platforms, rural individuals, previously limited by geographical constraints, can now overcome traditional spatial distances and establish cross-regional distribution networks that cover both urban and rural areas. This enables them to break away from the insular and singular local economic patterns, expanding connections with external markets and significantly enhancing their economic development space. Additionally, the advent of e-commerce profoundly affects the organization of local production and sales spaces in rural areas (Luo & He, 2017, p.36). Research has observed that the demand-driven nature of e-commerce prompts farmers to consciously adjust traditional planting structures and

production methods, such as adopting standardized agricultural practices to meet the demands of the e-commerce market. In terms of sales space organization, towns not only continue to provide traditional services like fertilizer sales but have also added new functions such as selling packaging boxes and offering courier services, thereby strengthening the connection between towns and villages.

4.1.3 E-commerce Empowerment: Contradictions and Balance in Rural Production and Living

The introduction of e-commerce has not only increased the economic income of rural areas but has also significantly compressed the villagers' leisure time. Under the online sales model, villagers are required to invest substantial time in handling orders, packaging, shipping, and other e-commerce operational tasks, which drastically reduces their personal leisure time. This adds more time pressure to the already busy rural life, potentially jeopardizing the physical and mental health of the villagers. This contradiction between economic development and quality of life reflects the dual nature of rural development empowered by e-commerce. On the one hand, e-commerce opens new channels for rural economic development, providing villagers with unprecedented opportunities for wealth accumulation. On the other hand, excessive involvement in e-commerce operations can lead to an imbalance between work and life, compressing leisure time and affecting the experience of well-being. Finding a balance between the economic benefits brought by e-commerce and the quality of life is an issue that needs careful consideration in future rural revitalization practices.

4.2 Research Prospects in Urban and Rural Planning and Geography

E-commerce is emerging as a pivotal force in the socio-economic spatial reconfiguration of rural landscapes. It not only avails rural inhabitants of unprecedented developmental prospects but also crucially redefines the organizational morphology of indigenous production systems. This trajectory of spatial reconfiguration heralds e-commerce as an instrumental catalyst in the resurgence of rural areas. To date, this investigation has concentrated on the influence of e-commerce on rural restructuring from a micro-perspective. Prospective studies in urban and rural planning and geography might extend the scope to embrace a broader array of subjects and enhance the sample magnitude to encompass a more diverse spectrum of agrarian household profiles. This approach would more comprehensively encapsulate the intricacies of rural spatial reconfiguration facilitated by the advent of e-commerce.

Conflict of interest

The authors declare no competing interest.

Acknowledgments

This work was supported by the National Natural Science Foundation of China under Grant [No. 52378069].

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