Environment and Social Psychology (2025) Volume 10 Issue 5 ISSN: 2424-8975 (O)
doi: 10.59429/esp.v10i5.3645 2424-7979 (P)

RESEARCH ARTICLE

Behavioral reconstruction in the digital environment: A study on the impact of rural E-commerce clusters in inner Mongolia on regional social psychology

Zhenqing Gao*, Batkhuyag Jamiyandorj, Baoyintaogetao

University of Finance and Economics, Ulaanbaatar, 13381, Mongolia

*** Corresponding author:** Zhenqing Gao, gaoqing188@163.com

ABSTRACT

Under the dual strategic frameworks of "Digital China" and "Rural Revitalization," rural e-commerce has become a transformative force in reshaping regional social behavioral mechanisms. This study examines the evolution of social psychological structures driven by the growth of rural e-commerce clusters in Inner Mongolia, aiming to transcend conventional economic-performance-oriented paradigms by focusing on the mechanisms of cognition, trust, and identity reconstruction in digital environments. Integrating Environmental Behavior Theory, Social Capital Theory, and Institutional Trust Theory, the study develops a four-dimensional analytical model: "Rural E-commerce Clusters → Social Capital → Institutional Trust → Social Psychological Structure." The model posits that rural e-commerce not only optimizes resource allocation through platform mechanisms and information flow but also reconstructs behavioral expectations and collective psychological logic through embedded community interactions and institutional rule-making. Based on a survey of 346 valid responses from Inner Mongolia, structural equation modeling (SEM) results confirm that the development of rural e-commerce clusters significantly and positively influences regional social psychological restructuring. Both social capital and institutional trust serve as significant mediators in this process, and a chained mediation effect is established, illustrating the layered psychological reconstruction mechanism under platform governance. This research advances the theoretical discourse on behavioral transformation in digitally mediated rural governance and offers policy-oriented insights for modernizing rural social structures in the context of digital economies.

Keywords: rural e-commerce clusters; social psychological structure; social capital; institutional trust; platform economy

1. Introduction

Driven by the dual strategies of the national "Digital China" initiative and rural revitalization policies, rural e-commerce is emerging as a significant force in reshaping regional development logic and social behavioral structures. As a frontier province in Northwest China, Inner Mongolia possesses inherent advantages in agricultural and livestock resources and has long served as a crucial national base for exporting agricultural and livestock products. However, the structural constraints hindering regional

ARTICLE INFO
Received: 18 April 2025 | Accepted: 27 May 2025 | Available online: 22 May 2025

CITATION
Gao ZQ, Jamiyandorj B, Taogetao B. Behavioral Reconstruction in the Digital Environment: A Study on the Impact of Rural E-commerce Clusters in Inner Mongolia on Regional Social Psychology. *Environment and Social Psychology* 2025; 10(5): 3645. doi:10.59429/esp.v10i5.3645

development—including inadequate transportation, short industrial chains, and weak market connectivity—present new opportunities for transformation amidst the rapid expansion of the digital economy. In recent years, rural e-commerce industrial clusters in Inner Mongolia have rapidly expanded, broadening the sales reach of distinctive agricultural and livestock products and fostering the coordinated evolution of regional logistics systems, digital service networks, and local governance mechanisms. According to data released by the Ministry of Commerce in 2022, total online retail sales in rural Inner Mongolia have reached nearly 28 billion yuan, an increase of over 40% compared to 2018. The gradual improvement of the e-commerce infrastructure system and county-level service networks has established the institutional and technical foundation for regional digital transformation. However, despite the initial progress of rural e-commerce in terms of transaction volume and policy support, its systematic driving effect on the regional economy remains constrained in several aspects. Firstly, e-commerce enterprises primarily operate in a decentralized and small-scale manner, lacking effective industrial chain integration mechanisms and cluster linkage effects. Competition among platforms tends to be self-defeating, resulting in low overall resource allocation efficiency. Secondly, the effects of various government support policies are lagging in some pastoral areas. Remote villages and towns still face significant shortcomings in information infrastructure construction, digital skills training, and talent acquisition. These practical problems not only restrict the in-depth development of rural e-commerce industrial clusters but also affect their ability to form a high-quality coupling with regional economic construction. Especially during the transformation of regional economic and social structures, digital platforms, acting as both 'virtual marketplaces' and 'information hubs,' are profoundly restructuring individual behavioral logic, social trust structures, and identification mechanisms.

Therefore, within the context of the new digital environment, the traditional research paradigm, which focuses on economic indicators such as GDP, employment rates, and sales figures, is no longer sufficient to fully reveal the profound impact of rural e-commerce clusters on regional social development. Especially in Inner Mongolia, a unique region with both abundant resources and a significant urban-rural divide, the development of rural e-commerce is more than just an economic phenomenon; it's a crucial medium for reshaping social behavior and psychological structures. The platform economy has fostered new social interaction logics, information acquisition methods, and value identification structures, profoundly impacting the social psychology of farmers and herdsmen in the region. With the robust intervention of the digital economy, the original psychological structures and behavioral patterns of rural society are facing significant challenges. Traditional social networks based on kinship, locality, and experience are being replaced by the data logic and institutional rules of the platform economy. Consequently, individual identity, risk awareness, social trust, and acceptance of institutions are exhibiting complex and dynamic changes. Existing research has extensively explored the economic impact of rural e-commerce clusters, primarily focusing on external indicators such as transaction volume, employment benefits, and logistics infrastructure development. However, a systematic analysis is lacking regarding the micro-level processes through which these clusters deeply embed themselves within the regional social psychology system via social capital reconstruction, institutional trust building, and shifts in cognitive mechanisms. Particularly in the unique geographical and cultural context of Inner Mongolia, how e-commerce clusters instigate social-psychological changes in group behavior within the digital environment remains an under-explored area in academic research.

Couldry and Hepp (2017) assert that platforms function not merely as economic intermediaries, but as institutional forces that actively construct social reality, thereby transforming individuals' information acquisition structures and social interaction paradigms[1]. Castells (2010), in his seminal work on the "network society," posits that the pervasive integration of digital space into everyday life will precipitate a systematic restructuring of cognitive modalities and behavioral trajectories[2]. Fei Xiaotong's (1998)

conceptualization of the "differential mode of association", along with the ethical framework it delineates for social relations, established a fundamental paradigm for comprehending social behavioral order within rural contexts[3]. Li (2021) and Qiu (2020), drawing upon the theoretical frameworks of "social mentality" and "psychological structure," respectively, illuminated the intricate mechanisms through which individuals' institutional trust, risk perception, and identity construction are reconfigured amidst modernization, thereby providing pivotal theoretical underpinnings for the examination of shifts in social psychological structure within this study[4,5].

Based on the evolutionary practices of rural e-commerce industrial clusters in Inner Mongolia, this study moves beyond the conventional development paradigm that relies solely on economic indicators. Instead, it explores the interactive relationship between "behavior, structure, and psychology" as a triple mechanism. It systematically examines how rural e-commerce clusters, through industrial organization, information networking, and institutional embedding, influence the generation of social capital and the construction of institutional trust, ultimately promoting the reconstruction of the regional social psychological structure. By constructing a four-dimensional theoretical model of "rural e-commerce cluster – social capital – institutional trust – social psychological structure," this study further situates individual behavioral transformation within the broader context of regional development and digital governance. It explores the processes of identity migration, psychological security reconstruction, and social identity reshaping in rural society under the dominance of digital platforms. The aim is to reveal the underlying mechanisms of the regional society's transformation from "acquaintance-based logic" to "institutional logic" and "platform logic," thereby providing theoretical support and practical guidance for building a novel regional social governance model in the digital era.

2. Description of the phenomenon

Against the backdrop of the rapidly developing digital economy, e-commerce is increasingly extending into rural areas. Driven by China's "Digital Village" strategy and "Rural Revitalization" policy, rural e-commerce is not only reshaping regional economic structures but also profoundly impacting grassroots social psychology and behavioral mechanisms. Inner Mongolia, a vast and sparsely populated region in China's northwest border characterized by the coexistence of agriculture and animal husbandry, faces relatively slow economic development. However, within this somewhat peripheral regional context, the development of rural e-commerce industrial clusters exhibits typical "bottom-up" social transformation characteristics.

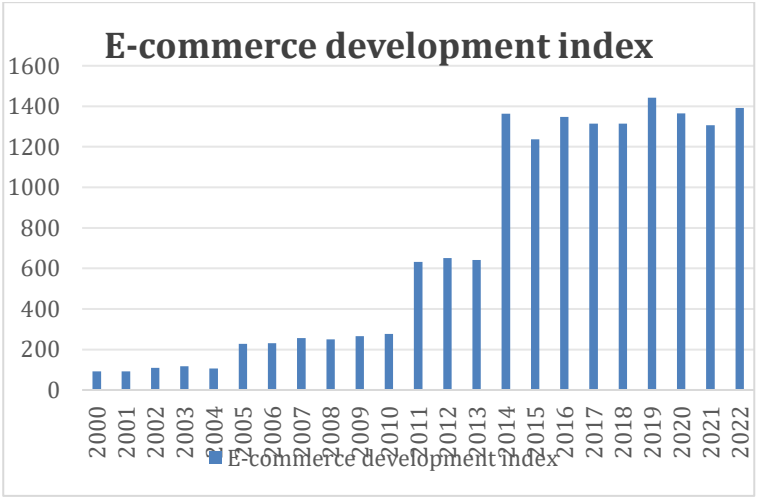

Figure 1. Development of E-commerce industrial clusters in inner Mongolia.

As shown in **Figure 1**, the development of e-commerce clusters in Inner Mongolia can be divided into three main stages: the initial cultivation stage (2000–2010), the rapid growth stage (2011–2016), and the steady maturity stage (2017–2022). This developmental process not only reflects the evolution of Inner Mongolia's e-commerce industry, but also reveals profound transformations in market expansion, technological upgrading, and policy support. During the initial cultivation stage from 2000 to 2010, the e-commerce development index remained at a relatively low level, with only minor fluctuations. Rising from 91.60 in 2000 to 276.63 in 2010, the overall trend was upward, but the growth rate remained relatively slow, indicating that the region's e-commerce sector was still in its early stages. Limited by the infrastructure, information technology level, and consumer market size at the time, Inner Mongolia's e-commerce industry during this period mainly relied on traditional retail sectors experimenting online. The market size was relatively small, and the logistics system remained underdeveloped. Furthermore, due to the low internet penetration rate, consumer acceptance of online shopping was limited, which further constrained the expansion of the e-commerce market. However, after 2005, with a significant rise in the E-commerce development index, the E-commerce industry entered its early stage of development, driven by government policy support, improvements in Internet infrastructure, and increased market awareness. In 2005, the E-commerce development index reached 228.30 and maintained steady growth from 2006 to 2010. During this period, the development of E-commerce benefited from the emergence of domestic E-commerce platforms. The increased market penetration of platforms such as Taobao and JD.com enabled local merchants to conduct online sales through national E-commerce platforms. Meanwhile, the construction of the logistics network has also been prioritized, laying the foundation for subsequent large-scale industrial development.

From 2011 to 2016, Inner Mongolia's e-commerce industry experienced a period of rapid growth, with its e-commerce development index soaring from 631.74 to 1,347.14 within just a few years. The growth rate far surpassed that of the previous period, indicating that Inner Mongolia's e-commerce clusters underwent rapid expansion during this stage, and the industrial structure also began to exhibit a trend toward diversification. Between 2011 and 2013, the e-commerce index exceeded 600 points, which was closely related to the explosive growth of the e-commerce industry across China as a whole. The continued expansion of e-commerce platforms such as Alibaba and JD.com has enhanced the e-commerce ecosystem. In particular, the rise of rural e-commerce has created more development opportunities for remote regions, including Inner Mongolia. In 2014, Inner Mongolia's e-commerce development index made a significant leap, reaching a historic peak of 1363.83. This transformation is closely linked to government support policies for the e-commerce industry, further improvements in logistics infrastructure, the maturation of payment systems, and the establishment of online shopping habits among consumers. In addition, the application scenarios of e-commerce have gradually expanded from the initial retail sector to multiple fields, including agriculture, animal husbandry, and tourism. Distinctive products from Inner Mongolia, such as beef, mutton, and dairy products, have also begun to enter the national market through e-commerce platforms. Meanwhile, the emergence of new business models such as livestream e-commerce and social e-commerce has driven innovation in e-commerce development models and increased market penetration. In 2015 and 2016, although the e-commerce development index fluctuated slightly, it remained at a high level overall. This indicates that, while market competition intensified, the industrial structure gradually stabilized, enterprises increased investment in the e-commerce sector, and the digital transformation of local enterprises was advanced. From 2017 to 2022, Inner Mongolia's e-commerce industry entered a phase of steady maturity. During this period, although the e-commerce development index continued to fluctuate at a relatively high level, the overall trend stabilized, indicating that the industry had entered a relatively mature stage of development. In 2017, the e-commerce development index reached 1314.14. From 2018 to 2020, it generally

remained above 1300 points, peaking at 1442.13 in 2019. The development of e-commerce during this period was closely linked to the further advancement of Internet technology, the improvement of intelligent logistics systems, the widespread adoption of mobile payments, and the stabilization of consumer shopping habits. It is noteworthy that the E-commerce Development Index declined in 2020 (1365.47), likely due to the global economic environment and public health events. However, the market gradually recovered in 2021 and 2022, with the index rebounding to 1305.89 and 1392.65, respectively, demonstrating the industry's resilience and sustained development potential. During this stage, new business models such as livestream e-commerce, social e-commerce, and cross-border e-commerce were more widely adopted, enabling enterprises to reach consumers more precisely and enhance market efficiency. Meanwhile, government support for the digital economy has been continuously strengthened, particularly in promoting the digital transformation of small and medium-sized enterprises (SMEs), facilitating the sale of local specialty products through e-commerce, and improving logistics infrastructure. These efforts have provided strong support for the sustainable development of e-commerce. Furthermore, the application of emerging technologies such as artificial intelligence, big data, and blockchain has made the operation of the e-commerce industry more intelligent, further enhancing supply chain efficiency and reducing business operating costs. Overall, during this stage, the e-commerce industry entered a period of stable growth, with increasingly intense market competition. Enterprises significantly increased their investments in branding, digitalization, and intelligence, thereby driving high-quality industry development.

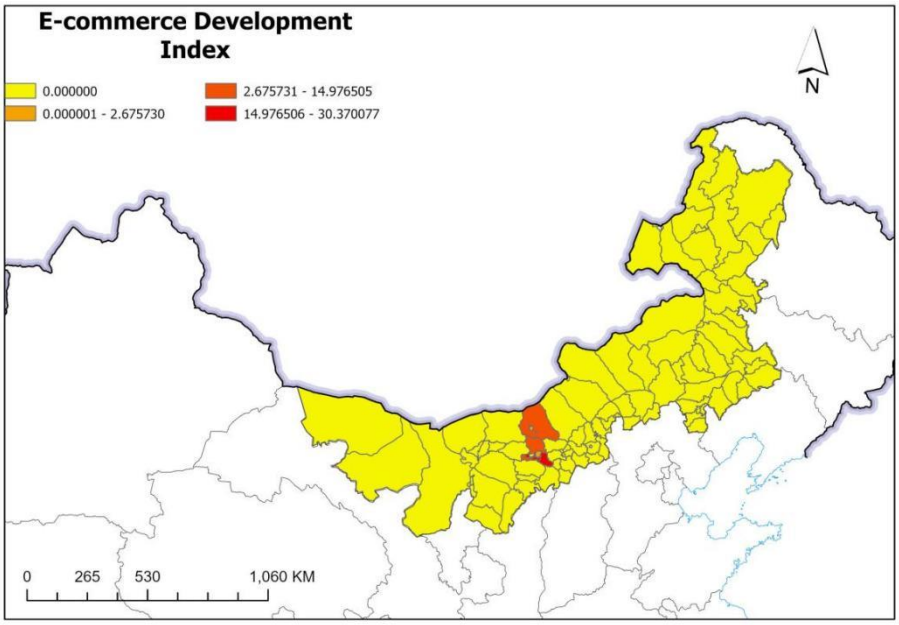

Figure 2. E-commerce industrial cluster regions in inner Mongolia: First stage.

As shown in **Figure 2**, the spatial distribution of the e-commerce development index indicates that, during the first stage, the development of e-commerce clusters in Inner Mongolia Autonomous Region exhibited significant regional disparities. The clusters were mainly concentrated in a few core areas, while most regions remained in the early stages of e-commerce development. Based on the color distribution of the e-commerce development index, most regions in Inner Mongolia exhibit relatively low e-commerce development indices, with pronounced regional development imbalances. Most areas are predominantly yellow and light orange, indicating that e-commerce development in these regions is at a relatively low level or still in its initial stages. The e-commerce cluster effect has only emerged in a few core cities, characterized by high-intensity agglomeration.

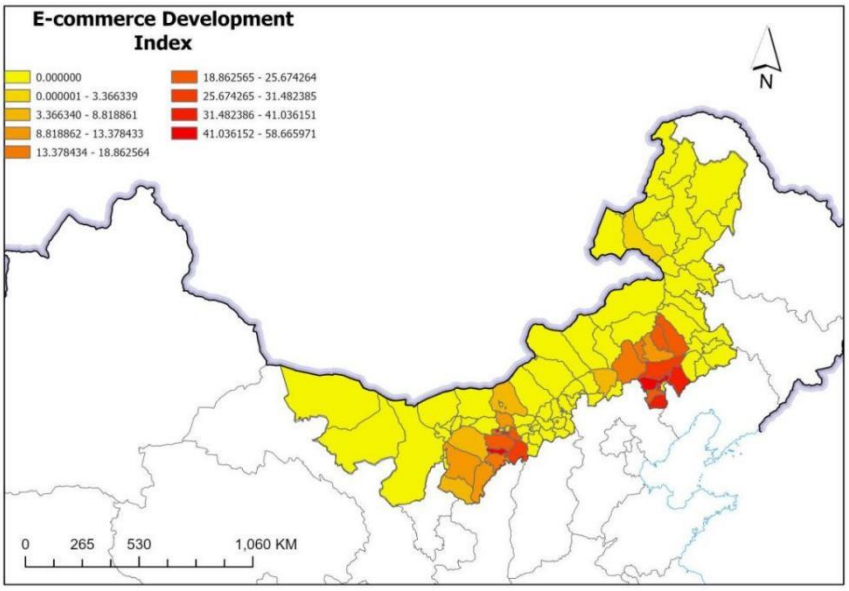

Figure 3. Regional E-commerce industrial clusters in inner Mongolia: Second stage.

As shown in **Figure 3**, during the second stage of development of regional e-commerce clusters in Inner Mongolia, the e-commerce development pattern demonstrates a clear trend of expansion compared to the first stage. The industrial agglomeration effect has been further enhanced, and while regional development disparities have narrowed, they remain significant. The distribution of the e-commerce development index shows that the core clusters of the e-commerce industry have shifted from an initial single-center pattern to a multi-center structure. Notably, in the eastern and central regions, the e-commerce development index has risen significantly across multiple areas, resulting in the emergence of new e-commerce hubs. Compared with the first stage, the number of regions with a high e-commerce development index has increased significantly, indicating further improvements in e-commerce penetration and market activity.

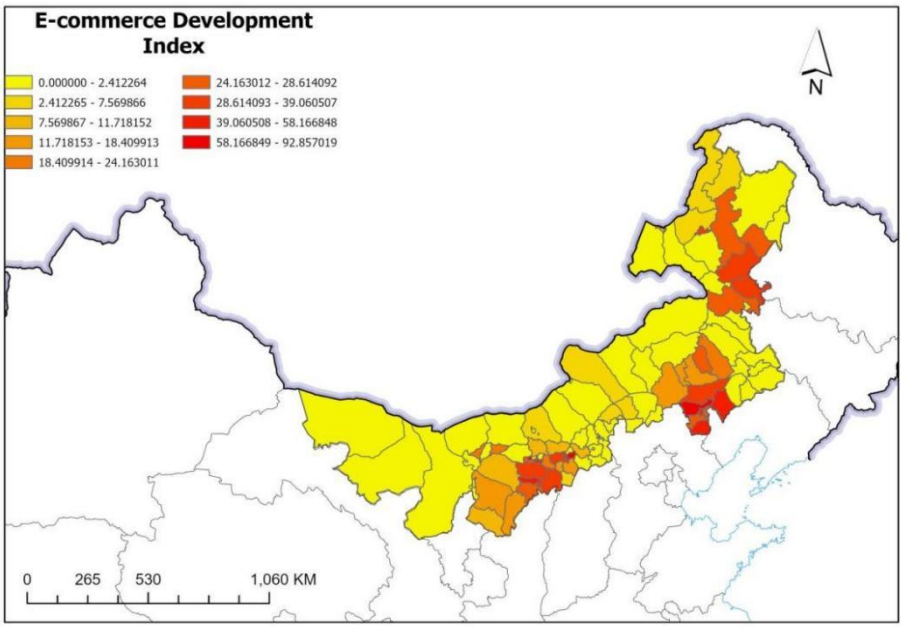

Figure 4. Development of E-commerce industrial clusters in Inner Mongolia during the third stage.

As shown in **Figure 4**, during the third stage, the development of e-commerce clusters in Inner Mongolia has further deepened, with a more pronounced trend of cluster expansion and a progressively refined gradient distribution of regional e-commerce development levels. From an overall perspective, the number of regions with high e-commerce development has increased significantly, with the spatial distribution expanding from a few relatively concentrated core cities to a broader range of areas. Particularly in the eastern and central regions, the e-commerce development index in multiple cities continues to rise, indicating a continuous strengthening of the industrial agglomeration effect. Compared with the previous two stages, the overall level of the e-commerce development index has risen significantly, with some regions even surpassing previous upper limits. This indicates that the e-commerce economy has become an important driving force for regional economic growth.

Amid the rapid development of the digital economy, e-commerce is increasingly extending into rural areas, becoming a key engine for addressing urban–rural development imbalances and optimizing resource allocation patterns. Particularly under the dual impetus of the national 'Digital Countryside' strategy and the 'Rural Revitalization' policy, rural e-commerce has not only become a key force in reshaping the regional economic structure, but has also profoundly influenced the evolution of grassroots social psychological mechanisms and the transformation of behavioral patterns. [6, 7] Scholars have noted that digital platforms are not merely intermediaries for commodity transactions, but also serve as mechanisms for social reconstruction, redefining information power, identity relations, and value recognition through processes of mediation. [8] As a significant region on the northwest frontier, Inner Mongolia is vast and sparsely populated, with a coexistence of agriculture and animal husbandry and a relatively weak industrial base. It has long occupied the periphery of the digital development gradient. However, it is precisely within this region—characterized by pronounced spatial tension—that the development trajectory of rural e-commerce industrial clusters demonstrates a distinctive 'bottom-up' logic of social transformation. This transformation is not only reflected in the shift of the economic paradigm, but is more profoundly manifested in the modernization of cognitive patterns, the goal-oriented nature of behavioral logic, and the networking of social identity structures. [9]

This paper divides the evolution of regional social psychology into three stages, aiming to reveal how the digital environment—through platform mechanisms, technological logic, and institutional embedding—gradually intervenes in and reconstructs the psychological order and behavioral logic of rural society.

In the first stage, namely the pre-digitalization period, regional society remained deeply constrained by both the agricultural economic structure and the mechanisms of an acquaintance-based society. The daily lives of rural residents are highly dependent on local networks, kinship ties, and experiential rules. Their social circles are closed, information spreads slowly, and individuals' worldviews, risk awareness, and perceptions of external markets all display marked tendencies toward conservatism and localization. [10] At this stage, the social psychological structure is founded on the ethics of acquaintanceship, with collective sense of belonging arising from traditional clan organizations and local connections, rather than from institutional or market-based platforms. Within this structure, individual behavior exhibits strong discipline and continuity, but lacks the initiative to engage proactively with the market and technology.

In the second stage, namely the initial phase of digital intervention, the government-led 'E-commerce into Rural Areas' comprehensive demonstration project has gradually unfolded. The logistics system and Internet infrastructure have rapidly extended into rural areas, with the widespread adoption of mobile Internet, the WeChat ecosystem, and E-commerce platforms becoming key nodes for the diffusion of digital technology . In this context, some rural youth have become 'early Internet adopters,' achieving both identity

transformation and changes in income structure through channels such as livestreaming sales and social e-commerce, thereby forming a social countercurrent of 'reverse urbanization'. Meanwhile, individuals' perceptions of market opportunities and policy environments have become more positive, risk tolerance has increased, digital trust is beginning to replace traditional kinship-based trust, and the behavioral logic of digital platforms and the rules of online interaction are gradually being embedded into daily life . However, due to the uneven distribution of educational attainment, technological literacy, and cultural capital within the group, the social psychological structure at this stage remains highly tense and fragmented, with a typical fissure between traditional values and modern technological logic .

As rural e-commerce clusters enter the mature stage, a stable collaborative system is established among digital platforms, logistics and distribution, supply chain finance, and local enterprises. E-commerce is no longer an isolated act of individual entrepreneurship, but has become an institutional force reorganizing the regional economy and social structure. As platform rules, user evaluation systems, and financial credit mechanisms become more stable, individuals gradually develop a high degree of trust in the digital transaction system. Consequently, their behavioral patterns shift from passive adaptation to active participation. Identity recognition is beginning to shift, as an increasing number of farmers and herders no longer regard themselves solely as 'producers,' but also assume multiple roles such as 'platform operators' and 'online entrepreneurs.' This process of identity reconstruction is underpinned by a reshaping of the social psychological structure, reflected in enhanced technological acceptance, increased behavioral rationality, and a stronger willingness for social participation. Meanwhile, the sense of belonging in society has shifted from traditional circles of acquaintances to a new networked relationship system centered on platform communities, online interactions, and evaluation mechanisms. Conventional 'face culture' and 'personal relationships' are gradually being replaced by institutional trust, credit incentives, and rule-based orientation. The logic of regional governance is also transitioning from personal mediation to platform governance and institutionalized coordination .

3. Theoretical analysis and hypotheses

In recent years, with the profound integration of digital technology, the behavioral logic and psychological structure of rural society have been undergoing significant transformations. In this process, behavioral reconstruction has become an important theoretical lens for understanding individual response mechanisms and the logic of collective action within the context of digital transformation. House (1981) noted, early in the field of social psychology, that cognitive restructuring and identity reconstruction, resulting from structural changes, constitute the fundamental pathway for the evolution of social mentality[11]. Giddens (1990) further emphasized that in a highly 'disembedded' modern society, individual behavior increasingly relies on the stability of abstract institutions and symbolic mechanisms, a phenomenon particularly salient in digital villages dominated by platform economies. Behavioral reconstruction is not merely a consequence of changes in the institutional environment, but a comprehensive manifestation of the interplay between social relationship networks, technological mediation systems, and psychological cognitive patterns. As a crucial component of the digital economy, e-commerce's impact has expanded beyond transactional convenience to encompass the reshaping of social structures and institutional systems[12]. Zhu and Chen (2013) demonstrated through a national survey that e-commerce usage is closely correlated with education level, platform trust, and information literacy, highlighting the socially embedded nature of e-commerce behavior[13]. Wrigley et al. (2015), in their study of e-commerce practices in rural Africa, suggested that digitalization is not only a technological input but also a "social learning" mechanism with a sustained impact on community relationships and value identity[14]. Within the Chinese context,

scholars such as Chen Wenling and Huang Zuhui (2017) have indicated that rural e-commerce not only restructures the agricultural value chain but also promotes a transition in rural society from a production-oriented model to an interaction-oriented one, thereby instigating psychological adaptation and responses. In e-commerce cluster research, the focal point has gradually shifted from 'economic performance' to 'social mechanisms'[15]. Research, as exemplified by Cao Xiang (2019) [16]and Xie Cheng (2024) [17], suggests that rural e-commerce clusters not only enhance industrial efficiency but also mold novel social relationship structures through platform collaboration mechanisms and community cohesion. Heeks (2018) [18], in his study of "digital inclusion," proposed that clustered e-commerce platforms are a crucial channel for informationally disadvantaged groups to integrate into digital society, with social functions extending far beyond what economic explanations alone can encompass. This platform-based, clustered collaborative structure is increasingly becoming a vital support mechanism for institutional trust and behavioral coordination in rural society. The socio-psychological structure, acting as an intermediary mechanism linking individual and society psychologically, reflects the cognitive, emotional, and affiliative reconstruction process of a group facing structural change. Li Qiang (2016) defines social mentality as the overall psychological disposition of the public towards institutions, the future, and the behavior of others during a period of social transition, emphasizing its critical impact on behavioral choices, identity recognition, and trust structures. [19] Qiu Zeqi (2020) further emphasizes that the evolutionary path of socio-psychological structures in the digital environment should comprehensively consider factors such as institutional embeddedness, platform trust, weak-tie networks, and cultural identity. [20] In the context of rural e-commerce, changes in the socio-psychological structure are reflected not only in the increased acceptance of digital tools, but also at deeper levels, such as changes in risk perception, shifts in the boundaries of trust, and the multiplicity of identity roles.

With the in-depth implementation of the 'Internet Plus' strategy, e-commerce has become a major driving force in transforming China's rural economy. Existing research primarily focuses on its positive effects on the upward mobility of agricultural products, employment and income growth, and the upgrading of industrial structures. For example, Huang Zhuhui et al. (2017) pointed out that rural e-commerce has broken the traditional 'bottleneck' in agricultural product circulation, effectively reduced transaction costs, and enhanced farmers' bargaining power [21]. Chen Wenling and Wang Xiaosong (2019) emphasized that rural e-commerce acts as an engine for the formation of regional industrial clusters and the growth of county-level economies[22]. Regarding the spatial restructuring of the regional economic structure, Wang Jici (2021) further proposed that rural e-commerce, through the formation of an 'industrial cluster + platform ecosystem' organizational model, has promoted the two-way flow of urban and rural factors and has exerted a reconstructive effect on regional development paths[23]. In international research, Wrigley et al. (2015), through an empirical analysis of the digital economy transformation in rural Africa, pointed out that the role of e-commerce platforms in activating local markets and facilitating cross-regional transactions is significant and cannot be overlooked[24]. Heeks (2018) regards rural e-commerce as a typical pathway to 'digital inclusion,' arguing that it not only reconstructs rural production logic but also initiates a new wave of institutionalization of social behavior. As early as 1980, Toffler, in 'The Third Wave,' noted that technological media would give rise to new psychological structures and social logic. In the Chinese context, Li Qiang (2016) defines social mentality as the overall psychological orientation of the public when facing structural changes during periods of social transformation, emphasizing its profound impact on behavioral choices, trust structures, and identity recognition. Particularly in rural areas where the digital environment is rapidly permeating, traditional social structures based on kinship and geopolitics are being deconstructed by platform logic and network mechanisms. Castells' (2010) theory of the 'network society' reveals how digital

platforms, through information structures and symbolic mechanisms, become embedded in everyday life, prompting individuals to undergo systematic changes in cognition, emotion, and behavior. However, there is currently a lack of practical theoretical models concerning the interactive mechanisms between the digital environment and psychological reconstruction. This is particularly evident in the context of rural e-commerce, where empirical research on the transformation of individual behavioral logic and the reorganization of regional social mentality remains relatively underdeveloped[25].

Environmental behavior theory emphasizes that individual behavior is the result of interactions between environmental and psychological variables. Behavior is influenced not only by the external physical space, but also by individuals' cognition and evaluation of the environment. [26,27] During the development of rural e-commerce clusters, individuals are confronted not with a single physical environment, but with a complex 'digital–institutional–platform' environment. This new environment, constructed through logistics facilities, E-commerce platforms, data systems, and transaction rules, creates a novel behavioral arena that brings about profound changes in individuals' cognitive structures. On one hand, E-commerce platforms offer an efficient and low-risk mechanism for information acquisition, breaking the closed perceptual structure toward the market and the outside world that exists in traditional society. On the other hand, platform algorithms, evaluation systems, and transaction rules establish new decision-making reference points for individuals, gradually reshaping their behavioral preferences and willingness to participate. Therefore, the development of E-commerce clusters not only optimizes the structure of resource allocation, but also drives individuals to undergo 'environment-driven' psychological transformation in dimensions such as risk perception, goal orientation, and social participation, facilitating the shift of regional social behavior from traditional experiential logic to platform-based rational logic. Putnam (1993) defines social capital as a system of social resources composed of trust, norms, and networks. This structure demonstrates new generative mechanisms in the process of digital platform integration[28]. As a space that intersects transactions and social interaction, digital platforms not only facilitate low-cost interactions among strangers, but also enable information to flow more rapidly and broadly within communities, thereby reconstructing the traditional acquaintance-based social structure rooted in geopolitics and kinship. The introduction of online evaluation systems, user relationship management systems, and digital community mechanisms has allowed rural individuals to establish new logics of social trust based on weak ties, thereby enhancing their social participation and sense of belonging. Individuals' interactions on e-commerce platforms are no longer solely based on kinship and obligation, but have shifted toward an institutionalized and contractual logic of collaboration. This process of reconstructing relational networks not only reflects the migration of social capital into digital forms, but also constitutes a micro-level pathway for the reshaping of the social psychological structure through interactive behavior. Luhmann (1979) and Giddens (1990) both point out that in highly complex and uncertain social structures, individuals must rely on institutional trust to establish stable expectations for action[29,30]. In traditional rural society, institutional trust is often attached to 'acquaintance authority' or 'local conventions,' whereas in platform-dominated digital environments, institutional trust is manifested as confidence in rules, fairness, feedback, and enforcement mechanisms. Rural e-commerce clusters, supported by government policy, the establishment of platform rules, and the integration of digital governance mechanisms, offer individuals unprecedented structural safeguards for their behavior. Institutional arrangements in areas such as complaint mechanisms, credit rating systems, logistics support, and financial settlement not only enhance the predictability of the platform but also significantly strengthen individuals' psychological sense of security in relation to the external environment. This process of building institutional trust provides individuals with a 'depersonalized' alternative path to trust, allowing

them to achieve new behavioral stability and a system of social identity even as they move away from traditional social protection networks.

This study adopts behavioral reconstruction as its core perspective, focusing on how rural e-commerce industrial clusters in the digital environment profoundly influence the reshaping of regional social psychological structures through economic resource integration, platform mechanism transmission, and the embedding of social relationship networks. The following model is constructed:

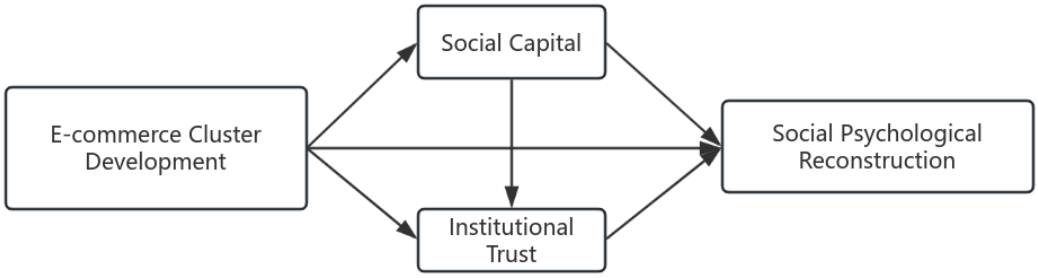

Figure 5. Mechanism of the impact of rural E-commerce cluster development on regional social psychology.

Specifically, e-commerce clusters not only alter individuals' economic behaviors and modes of information acquisition, but also foster the formation of new psychological patterns in areas such as risk perception, identity recognition, and social belonging, thereby driving the systematic evolution of social mentality within the region. Drawing on the integrated perspectives of environmental behavior theory, social capital theory, and institutional trust theory, this paper constructs a four-dimensional theoretical path model—'rural e-commerce cluster development–social capital–institutional trust–social psychological reconstruction'—and proposes the following research hypotheses:

H1: The degree of development of rural e-commerce clusters has a significant positive effect on the regional social psychological structure.

H2: Social capital serves as a mediating factor in the pathway through which rural e-commerce clusters influence the social psychological structure.

H3: Institutional trust serves as a mediating factor in the pathway through which rural e-commerce clusters influence the social psychological structure.

H4: Social capital and institutional trust exhibit a chain mediation effect in the pathway through which rural e-commerce clusters influence social psychological structure.

4. Empirical design

4.1. Dependent variable

To comprehensively evaluate the development level of rural e-commerce industrial clusters, this paper draws on an extensive review of relevant domestic and international literature,integrates the five core characteristics of rural e-commerce clusters—spatial agglomeration, market competitiveness, organizational cooperation, innovation capability, and economic output capacity—and, after thorough consultation with experts in the fields of digital economy, regional economy, and agricultural e-commerce, constructs an evaluation index system for the development of rural e-commerce cluster systems, comprising five primary indicators and thirteen secondary indicators (see **Table 1**). This system is designed to accurately reflect the overall development of rural e-commerce clusters and their interaction mechanisms with the regional socio-

economic system through a multi-dimensional, structured approach. Weighted results are calculated using the entropy weight method, as shown in **Table 1**.

Table 1. Evaluation index system for the development of rural E-commerce cluster systems.

Primary Indicators	Secondary Indicators	Description or Calculation Method of Secondary Indicators
Degree of Agglomeration	Number of Rural E-commerce Enterprises (units)	Reflects the scale and degree of agglomeration of rural e-commerce industrial clusters.
	Total Sales of Rural E-commerce (100 million yuan)	Reflects the sales scale of rural e-commerce industrial clusters.
	Number of rural e-commerce practitioners (persons)	Indicates the labor scale of rural e-commerce industrial clusters.
Level of competition	Internet coverage and utilization rate (%)	Indicates the competitiveness of industrial clusters from the perspective of information infrastructure.
	Market share of rural e-commerce (%)	Indicates the competitiveness of industrial clusters from the perspective of market control.
	Growth rate of rural e-commerce enterprises (%)	Indicates the impact of changes in the number of rural e-commerce enterprises on the competitiveness of industrial clusters.
Level of cooperation	Number of rural e-commerce cooperation platforms	Indicates the level of cooperation and resource sharing within rural e-commerce industrial clusters.
	Number of e-commerce training and support programs.	Indicates the extent of policy and support services for the development of rural e-commerce.
Innovation capacity.	Number of rural e-commerce innovation projects.	Indicates the number of innovation activities within rural e-commerce industrial clusters.
	Number of newly implemented online business technology applications.	Indicates the adoption of new technologies within rural e-commerce clusters.
Output capacity.	Contribution rate of rural e-commerce to GDP (%).	Indicates the contribution of rural e-commerce industrial clusters to the local economy.
	E-commerce consumption expenditure of rural residents (100 million yuan).	Reflecting the market size of rural e-commerce industrial clusters from the consumption perspective.
	Employment contribution rate of rural e-commerce (%).	Reflecting the contribution rate of rural e-commerce industrial clusters to local employment.

4.2. Independent variable

Social capital, as a key mediating variable in the evolution of digital social structures, has been widely used to explain the intrinsic connections among information flow, trust mechanisms, and collaborative behavior. Putnam (1993) was the first to propose, from the perspective of social networks and civic participation, that social capital is a social resource that can promote collective action, with its core dimensions including trust, norms, and network connections[31]. Coleman (1988) emphasizes that the generation of social capital relies on repeated interactions and a shared value base, and possesses functional characteristics embedded within social structures[32]. In the context of digital platforms, Wellman and Quan-Haase (2001) point out that digital networks enhance the activation of weak ties and resource sharing, introducing new forms of connection into traditional acquaintance-based societies[33]. Therefore, measuring social capital through the three dimensions of community trust, social participation, and frequency of information sharing enables a more precise assessment of the degree of social embeddedness and willingness to cooperate among rural individuals in the context of e-commerce clusters. This constitutes an important tool for evaluating the foundations of social behavior.

4.3. Mediating variable

Institutional trust, as the core psychological support for the stable functioning of modern society, plays a significant role in explaining both the stability of individual behavior and the degree of institutional compliance. Luhmann (1979) argues that trust serves as a 'simplification mechanism' for individuals when confronted with systemic complexity and future uncertainty, while institutional trust is a structural reliance built upon rules, procedures, and organizational stability[34]. Giddens (1990) further suggests that in the 'disembedded' modern society, individual behavior increasingly relies on trust in abstract systems rather than the continuation of specific interpersonal relationships[35]. Within the context of rural e-commerce platforms, institutional trust is primarily reflected in individuals' confidence in government support policies, fair trading mechanisms, and the responsiveness of the platform [36]. Accordingly, using trust in government support, trust in platform rules, and institutional responsiveness as measurement dimensions can effectively capture how the e-commerce institutional environment influences individuals' psychological safety and behavioral predictability.

As the core dependent variable in this study, the transformation of the regional social psychological structure refers to the systematic psychological reconstruction of individuals regarding risk, identity, technology, and the future within the digital environment. This concept originates from the research trajectory in social psychology on 'structural behavioral change,' emphasizing how environmental changes influence individual psychological states through cognition, emotion, and mechanisms of identification [37]. Against the backdrop of rural digitalization, Castells (2010) argues that platform logic, algorithmic governance, and the deep embedding of cyberspace are prompting rural individuals to gradually move beyond experiential cognition and develop a structured behavioral cognitive system.

4.4. Control variables

Basic sociodemographic variables such as gender, age, educational level, and marital status are widely used in social psychology research, as they profoundly influence individual values, risk attitudes, and mechanisms of identification. [38,39] Gender differences may affect trust perception and risk response; age and educational level are directly related to an individual's capacity to receive information and their understanding of the institutional environment, while marital status is often associated with the density of social support networks, thereby indirectly influencing the formation of social capital [40]. Meanwhile, occupational type and household income level, as key indicators of economic status, are major sources of variation in digital participation, frequency of information sharing, and perceptions of institutional trust. [41] In rural areas, these variables significantly moderate individuals' access to digital resources and their experience with platform transactions, as confirmed by numerous studies on the digital divide and technology adoption. [42]

In summary, as follows:

Table 2. Summary of the impact of rural E-commerce clusters in inner Mongolia on regional social psychology variables.

Variable Type	Variable Name	Variable Abbreviation
Dependent variable	Development level of rural e-commerce cluster systems.	RECI
Independent variable	Social capital	SC
Mediating variable	Institutional trust	IT
	Transformation of regional social psychological structure	SPC
Control variable.	Gender	GEN
	Age	AGE

Variable Type	Variable Name	Variable Abbreviation
	Education level	EDU
	Marital status	MAR
	Occupation type	OCC
	Household income level	INC

Table 2. (*Continued*)

5. Analysis of empirical results

5.1. Data sources

The selection of data sources in this study follows the principles of scientific rigor, systematic design, and regional relevance. The research primarily focuses on the development of rural e-commerce clusters in Inner Mongolia and their impact on the social psychological transformation of local rural residents. The objective is to explore how digital industrial systems interact with and reshape regional psychological structures. Accordingly, the study integrates multi-source data through structured and reliable channels to construct a comprehensive empirical model. In alignment with the conceptual framework, E-commerce Cluster Development is defined as the independent variable, reflecting the degree of industrial agglomeration, economic output, digital infrastructure, and platform service maturity. Data for this variable are primarily derived from official sources such as the Annual Report on the Development of Rural E-commerce in Inner Mongolia, operational statistics from regional e-commerce platforms, and government policy documents. The entropy weight method is employed to calculate a composite index that captures the overall development status of e-commerce clusters (RECI).

Social Capital and Institutional Trust serve as the mediating variables in the model. Both are measured using structured questionnaire responses collected from 346 valid participants, including rural e-commerce practitioners and users in key areas such as Hohhot, Chifeng, and Tongliao. Social capital is assessed via community trust, social participation, and frequency of information sharing. Institutional trust is evaluated through confidence in government support, trust in platform rules, and perceived institutional responsiveness. These measurement dimensions draw upon classical theoretical foundations from Putnam (1993) [43], Coleman (1988) [44], and Zucker (1986) [45], and have been adapted for local relevance.

To test the hypothesized relationships and validate the proposed mediating mechanisms, this study applies Structural Equation Modeling (SEM). SEM is particularly suitable for examining complex multi-path causal relationships and allows for robust analysis of both direct and indirect effects between latent constructs. This methodological approach ensures the internal consistency, theoretical coherence, and statistical validity of the model.

Data on control variables (GEN, AGE, EDU, MAR, OCC, INC) were also collected concurrently through the questionnaire, encompassing basic socio-demographic information such as respondents' gender, age, educational attainment, marital status, occupational type, and annual household income. These variables are primarily used to control for individual differences that may confound the main effect pathways, thereby enhancing the accuracy and robustness of the regression and structural equation model estimates. The theoretical foundation draws on the work of Inglehart (1997) [46], Bourdieu (1986) [47], and DiMaggio & Hargittai (2001)[48].

Moreover, this study explicitly adopts Structural Equation Modeling (SEM) as its core analytical method to test the hypothesized relationships and verify the mediating and chain mediation effects. SEM is

particularly well-suited for analyzing complex multi-path models involving latent variables, and enables simultaneous estimation of both direct and indirect effects. Its application enhances the theoretical coherence, internal consistency, and empirical robustness of the research framework.

5.2. Sample description

The data for this study are based on a questionnaire survey and statistical analysis of 346 samples.

Table 3. Basic information of the samples.

Characteristic	Category	Number of Samples	Proportion
Gender.	Male	168	48.5%
	Female	178	51.5%
Age	26–35 years old	146	42.2%
	36–45 years old	110	31.8%
	46 years old and above	90	26.0%
Education level.	Bachelor's degree or above	237	68.5%
	Associate degree or below	109	31.5%
Occupation type.	Management	111	32.1%
	Middle management	158	45.7%
	Frontline staff	77	22.2%
Marital status.	Technology-intensive	189	54.6%
	Traditional industry	157	45.4%
Income level	Greater than 250,000 yuan	102	29.5%
	10,000–25,000 yuan	124	35.8%
	Less than 10,000 yuan	120	34.7%

This study is based on a questionnaire survey of rural e-commerce practitioners and users in Inner Mongolia, yielding a total of 346 valid samples. The overall sample demonstrates good structural representativeness in terms of gender, age, educational attainment, occupational type, industry distribution, and income level. Regarding gender, males account for 48.5% and females for 51.5%, indicating a balanced ratio. The majority of respondents are aged between 26 and 45, accounting for 74.0%, with those aged 26–35 forming the main group. A total of 68.5% of the sample hold a bachelor's degree or above, indicating that respondents possess strong information comprehension and platform operation skills. In terms of occupational distribution, management and middle management personnel together account for nearly 78%, indicating that most respondents are involved in platform construction and operation. Regarding industry, technology-intensive practitioners slightly outnumber those in traditional sectors, demonstrating the trend of technological integration within rural e-commerce clusters. Income distribution is relatively balanced, yet significant economic disparities exist, providing a diverse foundation for subsequent analyses of institutional trust and psychological structure.

Overall, the sample is both representative and diverse, effectively supporting the empirical analysis of the relationship between rural e-commerce clusters and the transformation of social psychological structure in this study.

5.3. Reliability and validity analysis

To ensure the internal consistency and structural validity of the questionnaire scale, this study first conducted Cronbach's α reliability analysis, KMO test, and Bartlett's sphericity test on each latent variable dimension and its measurement items, in order to verify the scale's reliability and its statistical suitability for factor analysis.

Table 4. Cronbach reliability analysis.

Name	Alpha coefficient if item deleted	Cronbach α coefficient
GEN	0.811	
AGE	0.739	
EDU	0.780	
MAR	0.822	
OCC	0.749	0.780
INC	0.742	
SC	0.740	
IT	0.742	
SPC	0.741	

Note: *Standardized Cronbach α coefficient = 0.833*

To verify the reliability and structural validity of the scale, this study conducted Cronbach α reliability tests and KMO-Bartlett sphericity tests on the core variables and control variables. The reliability analysis results indicate that the Cronbach's α coefficients for all variables exceed 0.70, with the standardized total coefficient reaching 0.833, demonstrating that the scale possesses high internal consistency overall. The α values for core dimensions such as social capital, institutional trust, and transformation of social psychological structure are all above 0.740, and the control variables also fall within an acceptable range, indicating strong stability for each measurement.

Table 5. KMO and bartlett's test.

KMO Value		**0.837**
Bartlett's Test of Sphericity	Approximate Chi-square	4784.547
	df	45
	p Value	0.000

Further results from the KMO and Bartlett tests show that the KMO value is 0.837, meeting a high standard of suitability for factor analysis. Bartlett's test of sphericity yielded an approximate chi-square value of 4784.547 ($p < 0.001$), which significantly rejects the null hypothesis of no correlation. This indicates a strong correlation structure among the variables, making them suitable for factor extraction and structural model analysis. Overall, the questionnaire scale demonstrated high levels of both reliability and validity, providing a robust foundation for the subsequent construction and validation of empirical models.

5.4. Correlation and collinearity testing

This demonstrates that, although there is a certain degree of correlation among the main independent variables, most correlation coefficients fall within an acceptable range, and the VIF indicators clearly rule out the risk of multicollinearity. Therefore, the variables are set appropriately, laying a solid foundation for regression modeling and explanatory analysis in subsequent empirical research.

Table 6. Correlation and collinearity tests.

	VIF	GEN	AGE	EDU	MAR	OCC	INC	RECI	SC	IT	SPC
GEN	2.942	1									
AGE	1.282	-0.384**	1								
EDU	2.212	-0.094	0.148**	1							
MAR	2.166	-0.284**	0.718**	0.100*	1						
OCC	1.252	-0.378**	0.644**	0.397**	0.484**	1					
INC	2.907	-0.030	0.261**	0.200**	0.198**	0.264**	1				
RECI	0.932	-0.013	0.234**	0.206**	0.227**	0.245**	0.904**	1			
SC	1.464	0.012	0.257**	0.201**	0.185**	0.276**	0.928**	0.928**	1		
IT	2.364	0.027	0.277**	0.146**	0.169**	0.272**	0.866**	0.853**	0.949**	1	
SPC	1.991	0.047	0.264**	0.144**	0.175**	0.253**	0.876**	0.882**	0.964**	0.977**	1

** $p<0.05$ ** $p<0.01$*

As shown in **Table 4**, the VIF values for all variables are below the critical threshold of 10, with the highest being 2.942 for GEN. This indicates that there is no serious multicollinearity, and the prerequisites for conducting multiple regression analysis are satisfied. In terms of correlation coefficients, most variables exhibit relatively low correlations. Only the correlations between SC and IT, and between SC and SPC, are relatively high, with coefficients exceeding 0.9; thus, their potential overlap should be considered in the modeling process. AGE is strongly correlated with MAR and OCC, reflecting the structural relationships among demographic variables. The significant positive correlations between INC and variables such as RECI, SC, IT, and SPC indicate that income level has a positive impact on social capital and information technology capability. Overall, although there is some correlation among the variables, there is no significant collinearity issue. The data structure is reasonable and can support subsequent regression analysis.

5.5. Mechanism analysis

Based on the empirical regression results in **Table 7**, this paper tests Hypothesis H1: 'The development level of rural e-commerce clusters has a significant positive impact on the regional social psychological structure.'

Table 7. Empirical Analysis of hypothesis 1.

	(1)	Layer 2	Layer 3	Layer 4
Constant	0.153	0.225*	0.212	0.108
	(1.694)	(2.219)	(1.939)	(1.012)
SC	0.968**	0.973**	0.969**	0.689**
	(50.314)	(48.527)	(48.764)	(14.180)
GEN		-0.043	-0.039	-0.032
		(-1.558)	(-1.468)	(-1.217)
AGE		-0.011	-0.066**	-0.054**
		(-0.817)	(-3.797)	(-2.939)
EDU			0.023	0.032
			(1.104)	(1.474)
MAR			0.042**	0.040**
			(4.650)	(4.702)
OCC				-0.023
				(-1.448)
INC				0.297**
				(6.364)
Sample Size	346	346	346	346

	(1)	Layer 2	Layer 3	Layer 4
R 2	0.862	0.863	0.870	0.883
F Value	*F (1,406)=2531.509,p=0.000*	*F (3,404)=845.637,p=0.000*	*F (5,402)=537.986,p=0.000*	*F (7,400)=430.533,p=0.000*

Table 7. (*Continued*)

Note: *Dependent variable = RECI*

** p<0.05 ** p<0.01 Values in parentheses are t values*

From the estimated results of the stepwise regression models at each layer, it can be seen that the core independent variable SC (i.e., the development level of rural e-commerce clusters) exhibits a highly significant positive effect in all four layered models. The regression coefficients range from 0.689 to 0.973, and the t values in all models are well above the significance threshold (with a maximum of 50.314 and a minimum of 14.180), all at the p<0.01 significance level. This indicates that the e-commerce cluster variable has a very strong explanatory power for the transformation of the regional social psychological structure (dependent variable RECI), with a clear and stable direction of influence. The empirical results fully support Hypothesis H1, indicating that the development level of rural e-commerce clusters is a key determinant in explaining the transformation of the regional social psychological structure. Furthermore, this effect remains stable under the adjustment of multiple control variables, demonstrating strong theoretical explanatory power and statistical significance.

Based on the empirical results in **Table 8**, this paper further examines the validity and statistical significance of H2 and H3. A mediating path was constructed using multiple regression models, with relevant socio-demographic variables controlled.

Table 8. Empirical analysis of hypotheses 2 and 3.

	RECI	IT	SPC	RECI
Constant	0.108 (1.012)	0.145 (1.579)	0.036 (0.465)	0.148 (1.416)
GEN	-0.032 (-1.217)	0.041 (1.807)	0.056** (2.941)	-0.031 (-1.176)
AGE	-0.054** (-2.939)	0.057** (3.597)	0.043** (3.257)	-0.044* (-2.425)
EDU	0.032 (1.474)	-0.060** (-3.178)	-0.055** (-3.491)	0.024 (1.117)
MAR	0.040** (4.702)	-0.021** (-2.909)	-0.010 (-1.669)	0.035** (4.159)
OCC	-0.023 (-1.448)	0.011 (0.769)	-0.004 (-0.365)	-0.019 (-1.185)
INC	0.297** (6.364)	-0.092* (-2.271)	-0.116** (-3.432)	0.292** (6.285)
SC	0.689** (14.180)	1.053** (25.030)	1.101** (31.312)	0.797** (8.962)
IT				0.335** (4.037)
SPC				0.223* (2.242)
Sample Size	346	346	346	346
R 2	0.883	0.909	0.937	0.888
Adjusted R 2	0.881	0.907	0.936	0.885
F Value	*F (7,400)=430.533,p=0.000*	*F (7,400)=568.838,p=0.000*	*F (7,400)=846.746,p=0.000*	*F (9,398)=349.656,p=0.000*

** p<0.05 ** p<0.01 Values in parentheses are t values*

The empirical analysis confirms the mediating effects proposed in H2 and H3. Specifically, rural e-commerce clusters (SC) significantly and positively affect the transformation of regional social psychological structure (RECI), both directly and indirectly. SC enhances institutional trust (IT) and social psychological perception (SPC), and both variables, in turn, significantly impact RECI. When included together in the model, the effect of SC slightly decreases but remains significant, indicating that part of its influence is transmitted through IT and SPC. This demonstrates a stable and effective mediating mechanism.

Furthermore, IT maintains a significant independent effect on RECI, validating its role not only as a product of social capital but also as a key driver of psychological safety, behavioral stability, and institutional recognition in digital environments. These results confirm that the transformation of rural social psychology is jointly shaped by social relationships and institutional trust mechanisms.Finally, the analysis supports the chain mediation effect proposed in H4: e-commerce clusters foster social capital, which strengthens institutional trust, which in turn contributes to psychological transformation. This multi-level pathway reveals how platform economies reshape rural social behavior through interconnected relational and institutional channels.

Table 9. Empirical analysis of hypothesis 4.

X	→	Y	non-standardized path coefficient	*SE*	*z (CR value)*	*p*	Standardized path coefficient
IT	→	SPC	0.982	0.010	93.560	0.000	0.977
RECI	→	IT	0.837	0.025	33.059	0.000	0.853
SPC	→	SC	0.938	0.013	73.267	0.000	0.964

Note: *→ indicates a path influence relationship.*

The path analysis shows that social capital (SC) has a strong and significant positive effect on institutional trust (IT), indicating that stable social networks and frequent interactions greatly enhance individuals' confidence in institutional systems. This aligns with Coleman's (1990) and Putnam's (1993) views on the close link between social trust and institutional stability.Institutional trust, in turn, strongly influences individuals' perceptions of social psychological structure (SPC), shaping key dimensions such as risk perception, identity, and behavioral orientation. The development of rural e-commerce clusters (RECI) also significantly boosts institutional trust, highlighting the role of platform construction and governance mechanisms in building a trustworthy environment.

Together, these results confirm a clear chain mediation path: RECI → SC → IT → SPC. This reflects a layered transformation mechanism from economic activity to social relationships, then to institutional trust, and finally to psychological change. The empirical data support this theoretical model, emphasizing how rural e-commerce clusters reshape social psychology through both community interaction and institutional reinforcement.

In conclusion, Hypothesis H4 is validated: e-commerce clusters drive psychological restructuring by first enhancing social capital and then building institutional trust—offering key insights into the functioning of digital governance in rural settings.

6.Conclusion

In the context of the ongoing advancement of the national 'Digital Countryside' strategy and the continuous improvement of regional digital infrastructure, rural e-commerce is no longer merely an instrumental path for promoting regional economic growth; it is also fundamentally reshaping individual behavioral logic, social trust structures, and regional psychological order at a deeper level. Drawing on the

context of Inner Mongolia—a vast, sparsely populated border province with pronounced industrial differentiation—this paper constructs a four-dimensional path model of 'rural e-commerce cluster–social capital–institutional trust–social psychological structure' from the perspective of social psychological structure evolution. Utilizing multi-source data and structural equation modeling, it systematically verifies both the logical and mediating mechanisms through which rural e-commerce clusters influence the reconstruction of regional social psychology.

The degree of development of rural e-commerce clusters has a significant positive impact on the systematic transformation of the regional social psychological structure. Empirical results indicate that e-commerce clusters, by optimizing information flows, enhancing organizational operations, and strengthening economic mobilization capacity, reshape individuals' cognitive patterns regarding risk, identity, and the future. This drives a transformation in behavioral models from those characteristic of traditional 'acquaintance societies' to institutionalized psychological structures centered on platform rationality. Social capital, as a mediating mechanism, demonstrates a significant transmission effect. The increased frequency of platform interactions, higher levels of community trust, and greater density of information sharing have significantly enhanced individuals' sense of participation and sense of belonging, thereby activating their institutional identification and capacity for social action. Institutional trust also plays a stable mediating role in the relationship between e-commerce clusters and psychological structure. Trust in platform rules, government policy, and governance response mechanisms has become an important source of behavioral stability and psychological safety for individuals. More importantly, structural equation analysis further verifies the significant chain mediation effect between social capital and institutional trust. Specifically, rural e-commerce clusters enhance the accumulation of social capital, thereby increasing the level of institutional trust, and ultimately, systematically reshaping individuals' social psychological structure. This chain mechanism reveals how the reconstruction of micro-level behavior within the digital environment is jointly accomplished through the transformation of social relationship networks and the construction of institutional identification, thereby facilitating the gradual modernization of the social psychological structure. The platform is no longer merely a space for transactions; it is gradually becoming a field for the generation of embedded social order, driving a profound transformation in regional governance logic from 'relationship-based coordination' to 'institutional governance.'Therefore, this study not only theoretically breaks through the single research paradigm focused on economic performance and deepens the understanding of the social psychological effects of rural e-commerce clusters, but also empirically constructs an operational path analysis framework, providing a theoretical foundation and practical reference for digital countryside development, regional psychological governance, and the modernization of grassroots society. Future research could further integrate time series data and behavioral tracking mechanisms to deepen the comparative analysis of the dynamic evolution of behavioral changes and cross-regional adaptation mechanisms.

This study has achieved some progress in theoretical construction and empirical validation; however, certain limitations persist, necessitating further refinement and expansion in subsequent research endeavors. Regarding the sample composition, although this study is predicated on 346 valid questionnaires collected from rural e-commerce participants in Inner Mongolia, thereby possessing a degree of representativeness, the overall sample remains concentrated within relatively active e-commerce cluster zones. It thus fails to comprehensively encompass marginal or incipiently developed rural areas within the Inner Mongolia Autonomous Region characterized by lower economic development, inadequate information infrastructure, and a current lack of engagement in e-commerce practices. This, to some extent, restricted the general applicability and external validity of the research findings. Future research should expand the sample

coverage to include potential user groups not yet integrated into the Platform Economy system, particularly in third- and fourth-tier towns, pastoral hinterlands, and marginalized ethnic communities. This will enable a more comprehensive capture of the pathways of psychological structural changes across different stages of social development. Therefore, future research could further introduce cultural dimension variables to explore how factors such as ethnic identity, pastoral livelihood patterns, and language usage habits modulate the relationship between E-commerce participation willingness and the transformational pathways of socio-psychological structures. By adopting an interdisciplinary perspective encompassing culture, institutions, and psychology, this study aims to deepen the understanding of regional social structure transformation amidst digitalization, and to facilitate the construction of theoretical models grounded in local knowledge.

Conflict of interest

No conflict of interest was reported by all authors.

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