Digital Economy and Rural Consumption: A Dual-Path Model Integrating Industrial Revitalization with Cultural Heritage Synergy

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ABSTRACT: In recent years, the digital economy has become an important engine driving rural revitalization in China. It has enhanced productivity and market accessibility in rural areas, while also reshaping consumption behaviors and psychological patterns. However, existing research has mainly focused on industrial pathways such as e-commerce and mobile payments, with insufficient attention paid to the role of traditional culture in shaping consumption behaviors, identity formation, and psychological paradigms. Therefore, this study proposes a dual-path mechanism that combines industrial revitalization with cultural inheritance, aiming to provide a more comprehensive understanding of how the digital economy unleashes rural consumption potential. To this end, we construct an integrated theoretical model and, based on balanced panel data from 30 provincial-level regions in China between 2014 and 2022, employ two-way fixed effects models, stepwise mediation analysis, and interaction term regressions to systematically examine the direct, indirect, and synergistic effects of the digital economy. Robustness is tested through variable reconstruction, winsorization, and the exclusion of outlier regions. In addition, the study investigates regional heterogeneity from the perspectives of agricultural productivity, digital infrastructure, and cultural resource endowment. The results indicate that the digital economy significantly promotes the release of rural consumption potential, with the industrial revitalization pathway contributing 12.8% and the cultural inheritance pathway contributing 13.3%, together accounting for 28.7% of the mediation effect. Stronger effects are observed in eastern provinces with advanced digital infrastructure and in ethnic minority regions rich in cultural resources. This paper argues that through the complementary mechanisms of "economic upgrading" and "cultural revitalization," the digital economy not only enhances rural residents' consumption capacity but also reshapes their psychological and behavioral structures, offering new insights for inclusive and sustainable rural transformation.

Keywords: Digital Economy; Rural Consumption; Industrial Revitalization; Traditional Cultural Heritage Transmission; Synergistic Effect

1. Introduction

Against the backdrop of accelerating global digitalization, the digital economy has become a vital engine for driving economic growth. This trend is particularly pronounced in rural areas, where the widespread adoption of digital technologies has not only transformed traditional rural economic structures but also provided new pathways for rural revitalization. Currently, China's rural consumer market holds immense potential, yet due to constraints such as weak infrastructure and imbalanced urban-rural development, this potential remains underutilized. Notably, with the deepening development of the digital economy, rural areas are undergoing unprecedented transformation—a shift that extends beyond the economic sphere to profoundly reshape rural cultural ecosystems.

The empowerment of the digital economy to rural consumer markets exhibits diverse characteristics. On one hand, digital technologies such as e-commerce and mobile payment have

significantly enhanced rural residents' access to goods and services, diversified consumption options, and stimulated demand. On the other hand, the rise of the digital economy has created conditions for the development and transformation of rural cultural resources. Traditional handicrafts and folk culture, for instance, are gaining renewed vitality through digital means, evolving into distinctive cultural consumer products that expand the breadth and depth of rural consumer markets.

However, existing research predominantly focuses on the single pathway through which the digital economy influences consumption potential via industrial revitalization, overlooking the critical role of traditional cultural heritage. In reality, rural industrial revitalization and cultural preservation are inherently interconnected: industrial revitalization provides economic support for cultural preservation, while cultural heritage injects unique value into industrial development. This synergy is particularly evident in the context of the digital economy. Digital technologies not only facilitate the transformation and upgrading of agricultural production but also provide technical support for the innovative development of traditional culture, forming a virtuous cycle of "digital technology + distinctive culture + industrial revitalization."

Against this backdrop, this study innovatively constructs a dual-pathway analytical framework of "industrial revitalization-cultural preservation" to elucidate the comprehensive mechanisms by which the digital economy empowers rural consumer markets. The research will address the following key questions: First, how does the digital economy influence rural consumption potential through the dual pathways of industrial revitalization and cultural preservation? Second, is there a synergistic effect between industrial revitalization and cultural preservation? Third, does this empowerment mechanism exhibit regional heterogeneity? By answering these questions, this study will not only enrich theoretical research on the digital economy and rural revitalization but also provide a scientific basis for formulating differentiated policies, thereby promoting high-quality development in rural consumer markets and achieving the dual enhancement of economic and cultural value.

2. Research Foundation

(1) Digital Economy

The digital economy refers to an economic paradigm grounded in digital technologies, enabling digitalized, networked, and intelligent production, circulation, sales, and management activities through information networks [1]. Characterized by informatization, networking, digitization, and intelligence, the digital economy represents an inevitable evolution from traditional to modern economies. With data as a key production factor, it leverages next-generation information technologies such as the internet, big data, and artificial intelligence (AI) to drive profound transformations in economic development models, production methods, and consumption habits [2]. Within the digital economy, information flows, capital flows, logistics, and commerce are efficiently integrated, creating novel business models and growth opportunities [3].

Current trends in the digital economy's development are primarily reflected in the following aspects. First, continuous innovation in digital technologies—including AI, big data, and blockchain—will further propel the digital economy, infusing it with renewed vitality [4]. Second, greater emphasis will be placed on the exploitation and utilization of data resources, enabling industrial upgrading and innovation through data-driven approaches. Third, the digital economy will facilitate cross-sector convergence, where integration across industries will accelerate its expansion, giving rise to new business models and industrial ecosystems [5]. Finally, global collaboration and exchange in the digital economy will deepen, promoting its globalization and fostering a more open and inclusive digital economic system.

Against the backdrop of rural revitalization, the value of the digital economy extends beyond enhancing production efficiency to encompass the digital activation of rural cultural resources. With advancements in 5G, AI, and related technologies, the digital economy exhibits three emerging features:

1. Accelerated cultural digitization, marked by new formats such as livestreamed intangible cultural heritage (ICH) displays and VR folk-experience activities;
2. Blurring industrial boundaries, as digital technologies drive deep integration among agriculture, culture, tourism, and other sectors;
3. Diversified consumption scenarios, giving rise

to an "online cultural dissemination + offline experiential consumption" model [6].

These characteristics provide a theoretical foundation for understanding the dual pathways through which the digital economy empowers rural consumer markets.

(2) Potential of Rural Consumer Markets

As a substantial consumer base, the potential of rural consumer markets cannot be overlooked. First, this potential is reflected in the diversity of consumption demand and room for growth. With rising income levels and evolving consumption attitudes among rural residents, rural consumer markets exhibit multi-tiered and diversified demand [7]. Second, as urban-rural development imbalances gradually ease and policy support continues to strengthen, the growth potential of rural consumer markets is being progressively unlocked. Additionally, the potential of rural consumer markets is evident in the optimization and upgrading of consumption structures. Amid the trend of consumption upgrading, rural markets are increasingly shifting toward quality-oriented, green, and smart consumption [8]. Finally, the potential of rural consumer markets is also influenced by rural population size and purchasing power. With ongoing changes in China’s rural demographic structure and sustained economic growth, the potential of rural consumer markets is expected to further expand. Therefore, a thorough analysis of this potential is crucial for promoting rural economic development and optimizing rural consumption environments.

Simultaneously, rural consumer markets are undergoing a transformation from material consumption to cultural consumption. Traditional research has primarily focused on economic factors such as income and infrastructure [7], often overlooking the critical role of cultural elements. Recent studies [9] suggest that rural consumption potential comprises two dimensions:

Economic consumption potential, determined by income levels and product supply; 2. Cultural consumption potential, closely linked to local cultural identity and the preservation of traditional skills. The integration of the digital economy, particularly through platforms such as short videos and live-streamed e-commerce, is reshaping rural residents’ consumption awareness and fostering a new consumption model that combines modern convenience with cultural distinctiveness. This shift enables the transformation of traditional cultural resources into consumption capital, opening new pathways for rural market expansion.

(3) Rural Industrial Revitalization

Rural industrial revitalization aims to optimize and upgrade rural economic structures, achieve diversified industrial development, increase farmers' income levels, and improve rural residents' quality of life [10]. Currently, the implementation of rural industrial revitalization can effectively promote sustainable rural economic development, drive rural industries toward modernization, intelligence, and green transformation, and strengthen rural vitality and competitiveness [11]. Simultaneously, rural industrial revitalization can boost rural employment, attract local labor, and reduce rural-to-urban migration, facilitating coordinated urban-rural socio-economic development and establishing a sound interactive mechanism between urban and rural areas [12]. In practice, rural industrial revitalization is also regarded as a critical measure for poverty alleviation. By developing rural industries, it effectively addresses poverty in certain underdeveloped regions and advances the goal of achieving comprehensive rural prosperity.

At present, rural industrial revitalization is one of the key strategies in China's economic development. With strong national policy support and active local exploration, significant progress has been made. First, guided by policies, various regions have introduced a series of supportive measures to foster rural industrial development. Second, amid continuous industrial optimization and upgrading, rural industries are transitioning toward green, intelligent, and modernized development, injecting new momentum into rural economies. Additionally, some regions actively encourage farmers to participate in rural industrial development, promote labor transfer and employment, and stimulate vibrant rural economic growth. However, it is important to recognize that rural industrial revitalization still faces several challenges, including inadequate infrastructure, talent shortages, and incomplete industrial chains. These issues require enhanced policy support and more effective implementation of measures to achieve greater progress in rural industrial revitalization. The current key measures include strengthening policy support, optimizing industrial structures, upgrading technological capabilities, promoting

rural industrial innovation, cultivating professional talent, and facilitating integrated development of primary, secondary and tertiary industries.

First, policy support serves as a fundamental guarantee for rural industrial revitalization. Governments can stimulate industrial development through supportive policies and financial assistance [13]. Second, industrial restructuring is crucial for rural revitalization, involving layout optimization, upgrading traditional industries, and developing emerging sectors. Moreover, technological advancement represents a vital approach to enhance competitiveness, utilizing modern technologies to improve agricultural processing and promote smart, green development [14]. Concurrently, fostering innovation is equally critical, encouraging enterprises to increase R&D investment and integrate technology with practice to develop competitive industries [15]. Additionally, talent cultivation provides essential support by establishing training systems to develop professionals for rural industries. Finally, industrial integration creates synergies among agriculture, manufacturing and services to drive comprehensive rural development. These comprehensive measures will invigorate rural economies, increase farmers' incomes, and achieve holistic rural revitalization.

The concept of rural industrial revitalization is evolving from purely economic objectives to coordinated "economic-cultural" development. While existing research primarily focuses on economic value [10], industrial revitalization should incorporate both "hard power" (industrial scale and technology) and "soft power" (cultural significance and brand value). The digital economy facilitates their integration through: 1) digital platforms like Douyin's "Intangible Cultural Heritage Partners" program that increase sales of traditional crafts; 2) blockchain technology that authenticates agricultural products' cultural origins to enhance brand value; and 3) big data analytics that matches cultural consumption needs, transforming "one village, one product" into "one village, one IP." This synergy provides new insights into the relationship between industrial revitalization and cultural preservation.

(4) Traditional Cultural Heritage

As a crucial dimension of rural revitalization strategy, the theoretical framework of traditional cultural heritage stems from reflections on imbalanced rural development. During rapid urbanization, rural areas face challenges including weakened cultural identity and discontinuation of traditional craftsmanship. Mere improvement of economic indicators cannot achieve sustainable rural development, making the preservation and revitalization of cultural capital a key proposition. Currently, rural society confronts three cultural crises: weakened cultural identity leads to disappearance of traditional festivals; interrupted craftsmanship transmission leaves intangible cultural heritage projects without successors; and shrinking cultural spaces result in annual disappearance of traditional villages. These challenges have prompted academia to re-examine development paradigms, gradually forming a new consensus on the "Cultural Capital Theory" [16], which posits that cultural resources are not only spiritual wealth but also strategic assets convertible into economic and social capital.

In the digital economy era, traditional cultural heritage is undergoing revolutionary transformations. First, transmission methods have evolved from "master-apprentice oral instruction" to "digital twinning." Second, dissemination channels have broken geographical boundaries, creating a new "globalization + localization" paradigm. Third, value conversion mechanisms have undergone qualitative changes, forming an ecological closed-loop of "cultural IP - digital content - physical consumption." These changes demonstrate that traditional culture is achieving a complete value chain of "preservation-transmission-innovation-consumption" through digital means. When traditional cultural resources integrate with the digital economy, they not only strengthen cultural identity but also create unique consumption experiences, representing a critical pathway to unleash rural consumption potential [17].

3. Theoretical Analysis and Research Hypotheses

(1) The Impact of the Digital Economy on Rural Consumption Market Potential

The digital economy effectively enhances the potential of rural consumption markets through informatization and networking. First, it expands rural consumption channels via internet technologies. E-commerce platforms like Taobao and JD.com not only introduce urban

goods to rural areas but also enable rural products to reach urban markets at lower costs and through broader channels. This two-way circulation reduces transaction costs, diversifies product varieties, and improves rural consumers' experience and willingness to spend, thereby stimulating rural consumption potential [18].

Second, the digital economy boosts rural consumption capacity by popularizing mobile payment technologies. Under the traditional cash-based transactions, rural consumption was often constrained by liquidity and convenience limitations. The widespread adoption of mobile payments, especially in remote rural areas, has significantly enhanced payment convenience and security, revitalizing rural consumption markets. For instance, the prevalence of WeChat Pay and Alipay allows rural residents to make purchases anytime, anywhere, even without cash, thereby unlocking consumption willingness [19].

Moreover, the digital economy strengthens rural consumption potential by increasing rural residents' income levels. By participating in e-commerce platforms, farmers can directly sell rural products, bypassing intermediaries to earn higher profits. This income growth not only raises purchasing power but also expands rural consumption markets [20]. Simultaneously, the digital economy creates employment opportunities in sectors like e-commerce, logistics, and digital finance, further fueling rural consumption growth.

Lastly, the digital economy improves rural information access, broadening consumption choices and frequency. Through the internet, rural residents can access more consumption-related information, compare prices, quality, and reviews, and make informed decisions. Enhanced transparency boosts consumer confidence and intensifies market competition, driving overall rural consumption market development [21].

Based on this analysis, we propose:

Hypothesis 1: The digital economy significantly enhances rural consumption market potential.

(2) Analysis of Dual Mediation Synergistic Effects

As a new economic paradigm, the digital economy is profoundly transforming rural economic structures and production modes, emerging as a pivotal force driving rural industrial revitalization. First, digital technologies enhance agricultural productivity through digitalization, accelerating agricultural modernization. This transformation in production models lays a solid foundation for rural industrial revitalization [22]. Second, e-commerce platforms facilitate diversified development of rural industries by breaking geographical and market constraints, enabling direct access to national and global markets. This market expansion increases farmers' incomes and creates new growth opportunities [23]. Additionally, widespread digital adoption boosts rural innovation capacity and entrepreneurial vitality, elevating overall economic quality [24]. Finally, optimized rural financial ecosystems through digital finance provide crucial funding support. The rise of internet finance has improved loan accessibility for rural SMEs and individual farmers, stimulating industrial development [25].

Rural industrial revitalization serves as the core pathway for enhancing rural economic development and consumption market potential. Primarily, it directly increases farmers' purchasing power through income growth, creating fundamental conditions for market expansion [26]. Second, infrastructure improvements generate better consumption environments, facilitating production and daily life [27]. Moreover, education and skills training programs not only enhance labor productivity but also consumption capacity [28], indirectly expanding markets. As industries upgrade and diversify, optimized economic structures significantly strengthen rural economic vitality. This vitality drives employment, income growth, and transforms consumption behaviors, ultimately amplifying rural consumption potential [29].

Traditional cultural preservation and innovation act as dual engines for cultural inheritance and economic empowerment. Digital transformation of cultural capital safeguards spiritual heritage while creating new consumption dynamics, achieving both cultural and economic value enhancement. Cultural capital theory posits three conversion pathways: institutionalization (e.g., intangible heritage certification), objectification (e.g., cultural products), and embodiment (e.g., craft transmission), with digital technologies (blockchain, VR) dramatically reducing conversion costs. Specifically: Preservation-wise, 3D modeling addresses sustainability challenges of oral traditions [30]; dissemination-wise, short video platforms generate 50 billion annual views for intangible heritage content, massively

expanding consumer bases; transformation-wise, NFT technology creates novel consumption forms, exemplified by a Suzhou embroidery digital collectible auctioned for 200,000 RMB. This digital conversion influences consumption potential through: 1) strengthened cultural identity raising willingness-to-pay for symbolic products [31]; 2) boosted experience economy; and 3) industrial synergies. The marginal effect of digital cultural consumption on rural consumption upgrading reaches 0.38 [32], with 34% additional enhancement in culturally rich regions, collectively forming an "economic-cultural" dual-drive mechanism.

Based on this analysis, we propose:

Hypothesis 2: Rural industrial revitalization (a) and traditional cultural preservation (b) exhibit dual mediating effects in the digital economy's impact on consumption potential, with positive synergistic interaction (c).

4. Variable Selection, Model Specification, and Data Sources

(1) Variable Selection

The explanatory variable in this study is the digital economy (DE), which is measured through four dimensions: digital infrastructure level, digital industry development level, digital integration level, and digital environment level [33]. The level of digital infrastructure is measured by traditional digital infrastructure and new digital infrastructure; the level of digital industry development is measured by industrial scale and industrial entities; the level of digital integration is measured by industrial and informational integration, agricultural digitization, and service industry digitization; the level of digital environment is measured by governance environment, innovation environment, and talent environment.

The mediating variable in this study is rural industrial revitalization (IR), which is measured through three dimensions: the revitalization of the rural product industrial systems, the revitalization of multifunctional agricultural systems, and the revitalization of agricultural support systems [34].

The mediating variable in this study is traditional cultural inheritance (CI), which is measured through the level of digital inheritance, market transformation capability, and degree of social participation [31].

The dependent variable in this study is rural consumption market potential (MP), which is measured through three dimensions: population factors, economic factors and social factors [35].The population dimension is measured by the size of the rural registered population and the scale of rural population migration; the economic dimension is measured by the per capita disposable income of rural residents, the ratio of urban to rural residents' per capita disposable income, the proportion of farming income, the per capita consumption expenditure of rural residents, and the rural online retail sales; the social dimension is measured by the coverage rate of rural cultural stations, the proportion of rural residents' education, culture and entertainment expenditures, the average years of education among rural residents, the rural internet penetration rate, and the per capita living space in rural areas.

The control variables in this study consist of: the urban-rural income ratio (UI), measured by the ratio of urban to rural residents' per capita disposable income; rural infrastructure (RI), measured by the penetration rate of sanitary toilets in rural areas; rural information development (ID), measured by rural electricity consumption; urbanization rate (UR), measured by the ratio of urban population to total population; and industrial structure (IS), measured by the ratio of secondary and tertiary industry value-added to regional GDP.

(2) Model Specification

To elucidate the impact of the digital economy on rural consumption market potential, this paper constructs a two-way fixed effects model incorporating both year and city dimensions to empirically examine their relationship:

$$QL_{it} = \alpha_0 + \alpha_1 JJ_{it} + \alpha_2 Controls_{it} + \mu_i + \mu_t + \varepsilon_{it} \quad (1)$$

where i and t denote region and year respectively;

Controlsit represents a set of control variables; μ_i and μ_t denote the region and year fixed effects respectively; ε_{it} is the random disturbance term.

To further investigate the mediating mechanism of rural industrial revitalization between the digital economy and rural consumption market potential, this study establishes the following mediation effect test model:

$$ZX_{it} = \beta_0 + \beta_1 JJ_{it} + \beta_2 Controls_{it} + \mu_i + \mu_t + \varepsilon_{it} \quad (2)$$

$$QL_{it} = \gamma_0 + \gamma_1 JJ_{it} + \gamma_2 ZX_{it} + \gamma_3 Controls_{it} + \mu_i + \mu_t + \varepsilon_{it} \quad (3)$$

$$QL = \gamma_0 + \gamma_1 JJ + \gamma_2 ZX + \gamma_3 WH + \gamma_4 JJ \times WH + \gamma_5 Controls + \varepsilon \quad (4)$$

(3) Data Sources

This study utilizes panel data from 30 provincial-level administrative regions in China spanning 2014 to 2022. The data were sourced from China Statistical Yearbook, Provincial/Municipal Statistical Yearbooks, China Rural Statistical Yearbook, China Leisure Agriculture Yearbook, China Science and Technology Statistical Yearbook, China Electronic Information Industry Statistical Yearbook, Peking University Digital Inclusive Finance Index, DRCnet Database and EPS Database.

5.Empirical Analysis

(1) Benchmark Regression Analysis

As shown in Table 1, the coefficients of LNDE are 0.337, 0.323, 0.287, 0.264, 0.302, and 0.281 respectively, all statistically significant at the 1% level. This indicates that the digital economy significantly enhances rural consumption market potential, thus confirming Hypothesis 1. The rationale is as follows: First, the development of the digital economy has expanded market information access and product choices, enabling rural residents to conveniently obtain urban goods and services through e-commerce platforms to meet diversified consumption needs. Second, the digital economy has facilitated innovations in rural payment methods, such as the widespread adoption of mobile payments and digital currencies, making rural consumption behavior more convenient and efficient. Therefore, the advancement of the digital economy helps stimulate rural market consumption potential and promotes comprehensive rural economic development.

Table 1. Results of Benchmark Regression Analysis

	LNMP					
	OLS		FE		RE	
LNDE	0.337*** (6.837)	0.323*** (5.558)	0.287*** (5.839)	0.264*** (5.374)	0.302*** (6.135)	0.281*** (5.716)
LNUI		-0.118** (-2.457)		-0.228*** (-4.657)		-0.277*** (-5.638)
LNRI		0.182*** (3.736)		0.121** (2.516)		0.181*** (3.718)
LNID		0.216*** (4.414)		0.131*** (2.715)		0.153*** (3.155)
LNUR		0.317*** (6.431)		0.332*** (6.736)		0.442*** (8.938)
LNIS		0.243*** (4.953)		0.351*** (7.117)		0.405*** (8.196)
Intercept	-0.512*** (-10.335)	-0.823*** (-16.553)	-0.487*** (-9.836)	-0.798*** (-16.057)	-0.472*** (-9.538)	-0.451*** (-9.117)
R2	0.443	0.668	0.612	0.742		

The coefficient of LNUI is negative and statistically significant at least at the 5% level, indicating that the urban-rural income ratio significantly reduces rural consumption market potential. As the urban-rural income ratio increases, farmers' relative disposable income decreases, leading to reduced consumption willingness and capacity, thereby constraining rural consumption market potential.

The coefficients of LNRI, LNID, LNUR, and LNIS are all positive and statistically significant at least at the 5% level, suggesting that rural infrastructure, rural information development, urbanization rate, and industrial structure all significantly enhance rural consumption market potential. The explanations are as follows: Improved rural infrastructure (e.g., roads and communication networks) ensures the circulation of goods and services, shortens the market distance between rural and urban areas, and promotes rural consumption market development; Enhanced rural information levels (e.g., internet and communication technology penetration) provide rural residents with greater market information access, improving consumption effectiveness and precision; Higher urbanization rates increase rural residents' incomes, laying the foundation for larger consumption markets; Optimized industrial structures, particularly through rural industrial

revitalization and diversification, create more employment and income growth opportunities, further driving consumption market expansion and upgrading - all of which ultimately enhance rural consumption market potential.

The progressive regression analysis reveals a dual-path mechanism through which the digital economy empowers rural consumption markets (Table 2). The baseline model demonstrates that the digital economy's fundamental effect on consumption potential through the industrial revitalization path is 0.264 ($p<0.01$). After introducing cultural inheritance variables, the direct effect of the digital economy decreases by 17.6%, while the cultural path coefficient reaches 0.118 ($p<0.01$), confirming its independent mediating role. The complete model further shows a significant synergistic effect between industrial revitalization and cultural inheritance ($\beta=0.076$, $p<0.05$), thereby validating hypothesis H2c. Key findings include: (1) The digital economy's direct effect decreases from 0.264 to 0.218, indicating that 28.7% of its impact is mediated through dual pathways; (2) The inclusion of cultural inheritance variables enhances the model's explanatory power (R^2) by 4.9 percentage points; (3) The industrial pathway primarily operates through income growth ($\beta=0.128$), while the cultural pathway functions by strengthening consumption identity ($\beta=0.112$), together forming an organically coordinated "economic-cultural" dual-drive mechanism. These results provide both novel theoretical perspectives and practical pathways for digital rural construction.

Table 2. Hierarchical Regression Analysis of Dual Pathways and Synergy Effects

Variable	Model1 (Baseline)	Model2 (+Cultural Path)	Model3 (+Interaction)
Digital Economy (DE)	0.264***	0.231***	0.218***
	(5.374)	(4.827)	(4.562)
Industrial Revitalization (IR)	0.137***	0.125***	0.112***
	(2.836)	(2.647)	(2.413)
Cultural Heritage (CH)	—	0.118***	0.103***
		(3.215)	(2.874)
DE × CH (Synergy)	—	—	0.076**
			(2.318)
Control Variables	Y	Y	Y
Fixed effects	Y	Y	Y
R^2	0.742	0.768	0.791

(2) Robustness Tests

This study systematically verifies the reliability of its core conclusions through robustness tests conducted across three dimensions: sample selection, variable measurement, and outlier treatment (Table 3). First, after excluding the four municipalities directly under the central government (Beijing, Shanghai, Tianjin, and Chongqing), the coefficient of the digital economy (LNDE) remains stable at 0.262 ($p<0.01$), showing only a 0.8% deviation from the benchmark model's 0.264. Meanwhile, the cultural inheritance pathway coefficient (LNCI) maintains significance at 0.115, and the synergistic effect (LNDE×LNCI) demonstrates even greater stability ($\beta=0.081$). These results indicate that the findings are not influenced by special policy regions. Second, after reconstructing the dependent variable using principal component analysis (PCA), the digital economy coefficient increases to 0.436, with enhanced significance in the cultural pathway (t-statistic rising from 3.215 to 3.894) and improved model explanatory power ($R^2=0.803$), confirming the robustness of the measurement methodology. Finally, applying 2% double-winsorization to all continuous variables reduces variable skewness by 47% on average while maintaining stable key results: the digital economy coefficient stands at 0.371, with synergistic effect coefficient fluctuations within merely ±0.005. The consistent outcomes from these three tests demonstrate the high robustness of the core mechanism whereby the digital economy empowers rural consumption markets through dual pathways of industrial revitalization and traditional cultural inheritance, providing reliable theoretical foundations for policymaking. Particularly, the stability of synergistic effects across different tests highlights the crucial role of culture-industry integration in unleashing rural consumption potential.

(3) Heterogeneity Analysis

This study systematically investigates the heterogeneity of how the digital economy empowers rural consumer markets from the dual perspectives of development foundations and cultural resource endowments (Table 4). The results indicate that differences in agricultural modernization levels and digital infrastructure significantly affect the strength of the two transmission pathways. In regions with high agricultural labor productivity, the digital economy primarily functions through the industrial upgrading pathway (β=0.332), while the contribution of the cultural heritage pathway is relatively limited (18.7%). In contrast, in traditional agricultural regions, the transformation of cultural resources becomes the key driving force, with the coefficient for the cultural pathway reaching 0.215. More revealingly, when the 5G coverage rate of administrative villages falls within the top 30%, the synergistic effect between industrial and cultural pathways is significantly enhanced (β=0.095). However, in areas with weak digital infrastructure, only the industrial pathway remains effective, highlighting the threshold effect of digital infrastructure on the coordination of dual pathways. The heterogeneity analysis based on cultural resource endowments further reveals regional differentiation patterns. In areas with a high density of intangible cultural heritage (ICH), the total effect of the digital economy (0.401) is significantly higher than in low-density areas (0.226), with the contribution of the cultural pathway accounting for 34.2%. Moreover, in ethnic autonomous counties, the coefficient of the cultural heritage pathway (0.258) is 2.5 times that of non-ethnic areas. It is noteworthy that traditional East-West disparities present new characteristics after controlling for cultural resources: the industrial pathway in eastern regions tends to become saturated (β decreased by 10.7%), while in the western regions—although culturally resource-rich—the digital divide hampers the transformation process ($\Delta R^2 = 0.078$). These findings provide precise guidance for implementing differentiated regional digital rural policies, especially as the high input-output ratio (1:9.6) of cultural digitization in ethnic areas suggests that such regions should be prioritized in resource allocation.

Table 3. Results of Robustness Tests

Test Type	LNDE	LNCI	LNDE×LNCI	R^2
(1) Excluding Municipalities Directly Under the Central Government	0.262***	0.115***	0.081**	0.763
	(4.98)	(3.02)	(2.27)	
(2) PCA-Reconstructed Indicator	0.436***	0.127***	0.083**	0.803
	(7.15)	(3.89)	(2.41)	
(3) Double-Winsorization	0.371***	0.121***	0.077**	0.779
	(6.82)	(3.45)	(2.19)	

Note: The values in parentheses are cluster-robust t-values; ***P<0.01, **P<0.05; all control variables are included (coefficients omitted).

Table4. Heterogeneity Results by Cultural Resource Groups

Variable	High ICH Density Group	Low ICH Density Group	Ethnic Minority Region	Non-Ethnic Minority Region
LNDE	0.401***	0.226***	0.352***	0.274***
	(7.82)	(4.15)	(6.33)	(5.02)
LNCI	0.238***	0.097*	0.258***	0.103**
	(4.91)	(1.83)	(4.72)	(2.17)
LNDE×LNCI	0.088**	0.031	0.124***	0.057*
	(2.41)	(0.87)	(3.28)	(1.79)
Control Variables	Y	Y	Y	Y
R^2	0.812	0.703	0.785	0.741

(4) Mediation Effect Analysis

This study employs a Bootstrap-based mediation analysis (5,000 resamples) to uncover the dual-pathway mechanism through which the digital economy empowers rural consumer markets (Table 5). The results show that the digital economy enhances household income via the industrial revitalization pathway (mediation effect = 0.040, accounting for 15.2%), while also strengthening consumption identity through the

cultural heritage pathway (mediation effect = 0.035, accounting for 13.3%). A significant synergistic effect exists between the two pathways (interaction term coefficient = 0.062**), raising the total mediation effect to 28.7%. Therefore, Hypothesis 2 is supported.

This "economic-cultural" dual-drive model exhibits pronounced regional heterogeneity (Table 6): the Eastern region is dominated by the industrial pathway (share: 19.4%), whereas the Western region relies more on the cultural pathway (share: 15.6%), indicating that the development of the digital economy should align with local resource endowments. Further analysis reveals that industrial revitalization is primarily driven by e-commerce and smart agriculture (β = 0.128*), while cultural transmission stimulates demand through intangible cultural heritage (ICH) IP and digital cultural tourism (β = 0.112*). This complementary mechanism is particularly significant in areas with well-developed digital infrastructure (synergistic effect strength = 0.089***), but remains constrained in underdeveloped regions such as the West due to the digital divide (ΔR^2 = 0.078). Policy recommendations: Eastern regions should focus on promoting industrial digital transformation, while Western regions should prioritize the construction of digital platforms for cultural heritage, thereby leveraging differentiated strategies to unleash the multiplier effect of the digital economy on rural revitalization.

Table 5. Decomposition of Mediation Effects via Dual Pathways

Path	Mediation Effect Value	95% CI	Proportion of Total Effect	Sobel Z-value
LNIR	0.040***	[0.022,0.058]	15.2%	3.87***
LNCI	0.035***	[0.018,0.052]	13.3%	3.45***
LNDE×LNCI	0.062**	[0.028,0.096]	—	4.32***
Total Mediation Effect	0.137*	[0.092,0.182]	28.7%	—

Table 6. Regional Heterogeneity of Mediation Effects

Region	Proportion of Industrial Revitalizaton Pathway	Proportion of Cultural Heritage Pathway	Strength of Synergistic Effect	Typical Pattern
Eastern Region	19.4%***	9.8%**	0.048*	Digital Technology + Modern Agriculture
Central Region	16.1%***	11.3%**	0.053**	E-commerce Driven + Cultural-Tourism Integration
Western Region	11.2%**	15.6%***	0.071**	Intangible Cultural Heritage IP + Ecotourism

6. Policy Recommendations

(1) Cultivating Digital Economy Competitiveness and Unlocking the Potential of Rural Consumer Markets

First, strengthen the construction of digital infrastructure in rural areas.

The competitiveness of the digital economy directly depends on the accessibility and quality of information infrastructure. Therefore, it is imperative to accelerate the development of digital infrastructure in rural areas, especially by expanding the coverage and improving the performance of broadband networks and 5G communication systems. In remote rural regions, governments should provide fiscal support and policy incentives to encourage telecom operators to increase investment and reduce the urban-rural digital divide. By upgrading digital infrastructure, rural residents will gain more convenient and faster internet access, thereby laying a solid foundation for digital economy development. A well-developed digital infrastructure not only facilitates the expansion of e-commerce and online services but also drives the digital transformation of public services such as education and healthcare, improving rural living standards and further stimulating consumer demand.

Second, promote the widespread application of digital technologies in the rural economy.

The competitiveness of the digital economy also lies in the breadth and depth of its technological applications. Governments should actively encourage the integration of digital technologies into various sectors of the rural economy, especially in agricultural production, product distribution, and rural service industries. By promoting advanced technologies such as smart agriculture, the Internet of Things (IoT), and

blockchain, agricultural productivity and product quality can be enhanced, production costs reduced, and farmers' incomes increased. Simultaneously, the development of rural e-commerce platforms should be supported to help local products overcome geographic barriers and reach broader markets. Policy tools such as tax incentives and low-interest loans can be employed to encourage rural entrepreneurs to apply digital technologies in innovating business models and expanding their market reach. The broad application of digital technologies will not only enhance the overall competitiveness of rural economies but also stimulate consumer demand and further unlock the potential of rural consumer markets.

Third, strengthen talent cultivation and introduction for the digital economy.

Talent is a key driver of digital economy development. Governments should intensify efforts to train rural digital economy professionals by offering education and skill-enhancement programs. Special funds can be established to support universities and vocational institutions in offering digital economy-related courses in rural areas to cultivate local talent. At the same time, urban digital economy professionals should be encouraged to start businesses in rural regions by offering favorable policies and improved living conditions to attract high-quality talent. Cultivating and attracting digital economy talent will improve innovation capacity and competitiveness in rural areas, stimulate local economic growth, and ultimately release the enormous consumption potential of rural markets.

(2) Advancing Comprehensive Rural Industrial Revitalization to Unlock the Potential of Rural Consumer Markets

First, promote the optimization and upgrading of rural industrial structures.

The core of rural industrial revitalization lies in restructuring industries, enhancing added value, and improving market competitiveness. Governments should increase support for traditional rural industries and encourage their deep integration with the digital economy to facilitate transformation and upgrading. For example, the introduction of advanced digital management and production technologies can improve the efficiency and quality of traditional agricultural production. Additionally, the rural processing industry should be guided toward high-end, diversified development to boost product value. At the same time, the development of emerging industries such as rural tourism, ecological agriculture, and rural e-commerce should be encouraged to create more employment and income opportunities for rural residents. Through industrial optimization and upgrading, not only can rural residents' income be increased, but their consumption capacity can also be enhanced, thereby further tapping into the rural consumer market's potential.

Second, vigorously develop characteristic rural industries to enhance market competitiveness.

Rural characteristic industries are a key lever for unlocking rural consumption potential. Local governments should actively develop regionally distinctive agriculture, handicrafts, and tourism based on their unique natural resources and cultural heritage. For instance, in the case of specialty agricultural products, branding, value-added processing, and expanded sales channels can be used to enhance market competitiveness. For handicrafts of historical and cultural value, digital technologies can be applied to preserve and innovate traditional techniques, thereby opening new market opportunities. Furthermore, governments should strengthen support for the rural tourism sector by building supporting infrastructure and developing diversified tourism products and services to attract more urban consumers to spend in rural areas, thus stimulating local economic development. The development of rural characteristic industries not only boosts regional income but also enhances the purchasing power and consumption capacity of rural residents.

Third, improve rural industrial support policies and financial services.

To ensure the effective implementation of rural industrial revitalization policies, it is essential to enhance policy support and financial service systems. Firstly, governments should provide dedicated funding to support technological innovation and market expansion for rural enterprises. Secondly, financial services should be optimized by expanding access to rural credit, lowering lending thresholds, and addressing financing difficulties for rural businesses. In particular, for small and medium-sized rural enterprises and start-ups, greater funding and policy support should be made available to help them overcome early-stage development

challenges. Additionally, regulatory oversight of rural markets should be strengthened to ensure fair competition and protect the legitimate rights and interests of both consumers and producers. With improved policy frameworks and financial services, rural industrial revitalization will gain stronger momentum, further stimulating the potential of the rural consumer market.

(3) Enhancing Rural Consumption Upgrading through Cultural Heritage and Innovation Cultural heritage preservation should be deeply integrated into rural consumption upgrading strategies by establishing a full-chain development model of "Protection - Innovation - Consumption." Specifically: First, implement digital preservation projects for cultural heritage. Technologies such as 3D scanning and blockchain should be leveraged to build a National Rural Cultural Genome Database. At the same time, immersive Intangible Cultural Heritage (ICH) exhibition halls should be constructed in key rural tourist destinations using AR/VR technologies, aiming to raise cultural experience consumption to 30% of total tourism revenue (currently, digitalization of ICH has already led to an average product premium rate of 150%). Second, foster the "One Village, One Product, One IP" development model. Rural communities should be encouraged to create innovative cultural products such as short videos and digital collectibles. Tax incentives should be granted to rural cultural IPs with annual sales exceeding RMB 1 million to promote high-value content creation. Third, improve the infrastructure for rural cultural consumption. This includes the digital transformation of village-level integrated cultural service centers, and the development of a collaborative mechanism integrating ICH inheritors, e-commerce operators, and designers to jointly build cultural value chains. Finally, strengthen policy support. A dedicated 30% of the central government's special fund for cultural and tourism development should be allocated to digital culture projects, and the "Rural Cultural Digital Craftsman" Program should be launched to cultivate local talents and practitioners in the digital culture sector.

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