Musik in Bayern
ISSN: 0937-583x Volume 90, Issue 11 (Nov -2025)
https://musikinbayern.com DOI https://doi.org/10.15463/gfbm-mib-2025-503

Examining the Link Between Social Capital and Economic Growth in the Context of Rural

Yumei Wang

University and school: Suzhou University of Science and Technology

Address: Suzhou, China. Email: wym8010@163.com; Phone number: 13862172558

Sheng Cheng* (Corresponding author)

University and school: Suzhou University of Science and Technology

Address: Suzhou, China. Email: cenes9358@126.com; Phone number: 15860796655

Yixin He

University and school: Suzhou University of Science and Technology

Address: Suzhou, China; Email: 18915377682@163.com; Phone number: 18915377682

To Cite this Article

Yumei Wang, Sheng Cheng, Yixin He. **Examining the Link Between Social Capital and Economic Growth in the Context of Rural.** *Musik In Bayern, Vol. 90, Issue 11, Nov 2025, pp 262-277*

Article Info

Received: 09-08-2025 Revised: 03-09-2025 Accepted: 14-10-2025 Published: 20-11-2025

Abstract: Building upon the essential meaning contained within the concept of social capital, this paper examines the specific mechanisms through which rural social capital exerts an influence upon economic expansion, analyzing it from the distinct dimensional perspectives of social capital. By applying the established principles of social capital theory in conjunction with economic growth theory, a three-part conceptual structure for social capital, identified as the "trust-network-norms" framework, is constructed for the purpose of investigating the connections related to the rural digital economy. The necessary data are acquired by means of a methodology combining stratified sampling techniques with random selection processes, and a total of 16 separate villages located within a single province are chosen as subjects for direct on-site investigation, which serves to comprehend the fundamental attributes and the statistical spread of every variable involved and to empirically evaluate the hypotheses that were put forward. The final outcomes confirm that the calculated regression coefficients for structural social capital and for cognitive social capital in relation to economic growth are 0.366 and 0.7501, respectively, and they further confirm that a statistically significant connection exists among structural social capital, cognitive social capital, innovation capacity, and the rate of economic growth, while also showing that the rural digital trust index exerts a stronger influence on economic growth specifically in those rural regions which possess a high level of existing economic development. Conversely, within rural areas characterized by a low level of economic development, participation on rural digital social platforms demonstrates a more substantial effect upon economic growth. Through the act of

revealing the various economic impacts resulting from the accumulation of social capital during the ongoing process of rural digitalization, this research is valuable for addressing the persistent challenges facing the rural economy and for offering a potential pathway toward strengthening the sustainable, long-term growth of the rural economic sector.

Keywords: social capital theory; economic growth theory; rural digital economy; economic effects; rural economy

1. Introduction

Due to the swift advancement of science and technology, digital transformation has emerged as a significant power propelling economic and social transformation. As a major nation with an agricultural sector, China views the agricultural industry as the cornerstone of national stability and security, as well as the essential element for effective administration. The countryside has consistently represented the weak link and the constraining factor in the nation's economic progress, making the resolution of the "agriculture, rural areas, and farmers" issues the most crucial task [1]. To more effectively foster the growth of the agricultural sector and rural regions, the strategy for rural revitalization has been introduced, providing clear guidance for the work conducted in the countryside. The digital evolution of rural areas, being a vital component of overall economic and social advancement, is connected not only to the rural areas' own transformation and enhancement but is also the essential factor for encouraging the combined development of urban and rural zones and for actualizing the rural revitalization strategy [2-3]. The accumulation of social capital, which is a principal engine for economic expansion, also has a role that cannot be overlooked within the progression of rural digitalization [4].

Current academic studies still do not possess a methodical examination of the cooperative interaction between the gathering of social capital and the digital advancement of rural areas, along with its input to economic expansion. This is particularly true for data-driven research that is propelled by digital technology, concerning the ways in which social capital can realize an increase in economic value by improving human capital, encouraging the blending of industries, and improving the distribution of resources, among other aspects. A shortfall exists in the experimental study regarding the manner in which social capital is established via the use of digital technology. How social capital can create a positive feedback loop of "trust-network-rules" through the implementation of digital tools still requires verification from both a conceptual and a data-supported standpoint. This article concentrates on the progression of digital transformation in the countryside and intends to examine the relationship between the establishment of social capital and the increase in economic output. At the conceptual level, we dissect the theory of social capital in detail, which encompasses its fundamental meaning, its various facets, and the diverse viewpoints from which it is studied. It also recaps the evolution of theories on economic growth, creates a three-part analysis structure for social capital in rural digital progress involving "trust-network-rules," and brings to light the connection between the route of social capital accumulation and economic growth. Two specific propositions are put forward to address the actual challenges present in rural digital development, with the goal of uncovering the economic impacts generated by the build-up of social capital during the rural digitalization process, thereby supplying a factual foundation for those creating policies and advancing the continued growth of the rural economy.

2. Theoretical Foundation and Working Hypotheses

2.1 Conceptual Underpinnings and Provisional Assumptions

The concept of social capital emerged during the 1990s, a period when practical observation indicated that the norms adhered to or collectively accepted by the citizens of a nation or area, along with the web of diverse social connections, exert a powerful effect on the caliber of civic life and the efficacy with which a society's economic system functions. Furthermore, those geographical areas possessing more advanced social capital exhibit a higher propensity to rise out of poverty and to attain more significant economic accomplishments [5]. Consequently, social capital theory has slowly developed into a novel subdivision within the broader field of new institutional economics. Investigations within this domain can be generally divided into three tiers: micro, meso, and macro. Research at the micro level, which is alternatively termed the embedded-self viewpoint, concentrates on the capacity of individual actors, situated within a specific social framework, to access and utilize resources by means of their social networks; this perspective is primarily interested in

outcomes for the individual. The meso-level analysis, also referred to as the structural standpoint, centers its attention on the configuration of a specific social capital network, the established patterns of linkages among the individuals inside that network, and the methods by which resources circulate throughout that network as a direct result of its unique architecture, with its emphasis placed on the procedure of network formation and the consequences for resource distribution.

The core components of social capital encompass the primary facets of trust, social networks, norms, and civic participation. Trust is defined as the assured belief that one participant in a transaction will fulfill its commitments despite the potential for the other party to act opportunistically, will act in a foreseeable manner, and will engage equitably during discussions and conduct. Norms are the informal regulations of conduct that are acknowledged and observed by the overwhelming majority of individuals within a community. These norms function as significant limitations on personal conduct, encouraging people to relinquish some personal gains to instead perform in the collective good, thereby facilitating the achievement of specific objectives, and are thus a crucial facet of social capital to analyze. The diverse groups and institutions established through widespread civic involvement assist in instilling a philosophy of collaboration and a feeling of shared duty amongst societal participants, thereby encouraging their endeavors to strive for mutual aims. The interconnected system created by interpersonal relations among economic actors assists in advancing cooperation and synchronized behavior amongst members inside these network relationships, enhancing economic productivity, and reducing information imbalance in commercial dealings through the mutual exchange of knowledge, consequently boosting the allocation effectiveness of resources [6]. Certain tight interconnections exist among the different facets of social capital; for instance, thick social networks supply vital prerequisites for civic engagement, and they lay the groundwork for the formation of trust and collaborative efforts between individuals and for collective action.

2.2 Doctrines of Economic Development

As economic inquiry has progressed in depth, a mathematical framework centered on general equilibrium analysis has been established by integrating the insights from the “marginal revolution.” Following its developmental path, the theory of economic growth has approximately progressed through these distinct phases:

(1) The initial period is defined by the classical theory of economic growth. The central concern for early classical economists was focused on the methods for augmenting a nation's output of final products or its national wealth. This inclination is visible in the seminal work “An Inquiry into the Nature and Causes of the Wealth of Nations.” A key assertion was that the specialization of labor not only generated wealth but also endowed workers with increased “dexterity, skill, and judgment.” Capital accumulation during this era was understood to encompass the synergistic impact of accumulating both physical assets and human capital.

(2) The subsequent period is characterized by the neoclassical economic growth theory. This framework intentionally omits technological factors as a variable, leading to a potential divergence between the economy's “natural rate of growth” and its “warranted rate of growth.” This discrepancy makes the attainment of long-term, balanced growth challenging, and the model itself lacks stable equilibrium properties. Within Western economics, this specific and unstable growth trajectory is famously referred to as “knife-edge” growth.

(3) The third phase is the new economic growth theory, which emerged from the interpretation and debate surrounding the “Solow residual.” The necessity of assuming technology to be exogenous highlighted that the neoclassical growth theory provided an incomplete and not entirely persuasive explanation for the drivers of economic growth. For instance, the “learning-by-doing” model proposes that the build-up of practical production experience is considered a source of enhanced productivity for firms. Because markets are open and accessible, this implies that other firms can generate an economy-wide scale effect through comparable activities of learning and imitation, which inadvertently results in a rise in productivity for the entire society. This also signifies that technological advancement is no longer an externally given factor but rather a consequence emerging from the process of capital accumulation itself, thereby overcoming the limitation of the neoclassical model which treated technological progress as an exogenous variable [7].

2.3 A tripartite analytical model grounded in social capital theory

The digital economy, representing a newly developing economic model, incorporates a range of modern digital technologies like the intelligent functioning of the Internet and the management of digital platforms. This presents both a potential advantage and a significant difficulty for rural inhabitants who are familiar with conventional economic practices. Consequently, when encountering this novel development, villagers

Musik in Bayern
ISSN: 0937-583x Volume 90, Issue 11 (Nov -2025)
https://musikinbayern.com DOI https://doi.org/10.15463/gfbm-mib-2025-503

frequently require assistance from multiple types of resources, and this procedure, to some extent, demonstrates certain features indicative of social capital. As a resource that is integrated within a network of social relationships, social capital possesses a distinct productive capacity; it can supply both internal and external assets to support villagers' involvement in the digital economy and can improve collaboration and interaction among the villagers themselves. The three fundamental components of social capital, specifically "trust, networks, and norms," exhibit a strong connection and alignment with villager engagement in the rural digital economy and can efficiently facilitate their participation.

Social capital is categorized into three distinct aspects: social trust, social networks, and reciprocal norms. Within rural communities, social trust capital primarily denotes the secure and confident relationships built during the interplay between villagers and the broader community, as well as between residents and the organizations operating inside the community. Social network capital encompasses the web of connections formed through villagers' communication, exchange, and interaction with other residents or organizations in the community, a network capable of offering residents numerous advantageous resources. Meanwhile, reciprocal norms capital is manifested in the various agreed-upon rules and behavioral standards that villagers adhere to while coexisting within the community [8]. Following this three-part division of social capital, we can analyze how these three core components assist villagers in engaging with the digital economy. By leveraging the network, normative, and trust elements of social capital, it allows participants to pursue shared objectives more effectively, and social capital exerts a notably positive influence on villagers' income derived from property, business ventures, and transfers.

The mechanism of social capital for villagers participating in the rural digital economy is illustrated in Figure 1. During the process of villagers engaging with the digital economy, social capital serves to enhance the rate at which villagers utilize digital resources and awakens their inherent demand. Furthermore, the three core elements of social capital create strong connections between villagers and other villagers, between villagers and organizations, and between villagers and the government. This interconnectedness, in turn, encourages even tighter links and more dynamic interactions among the various actors involved in the rural digital economy.

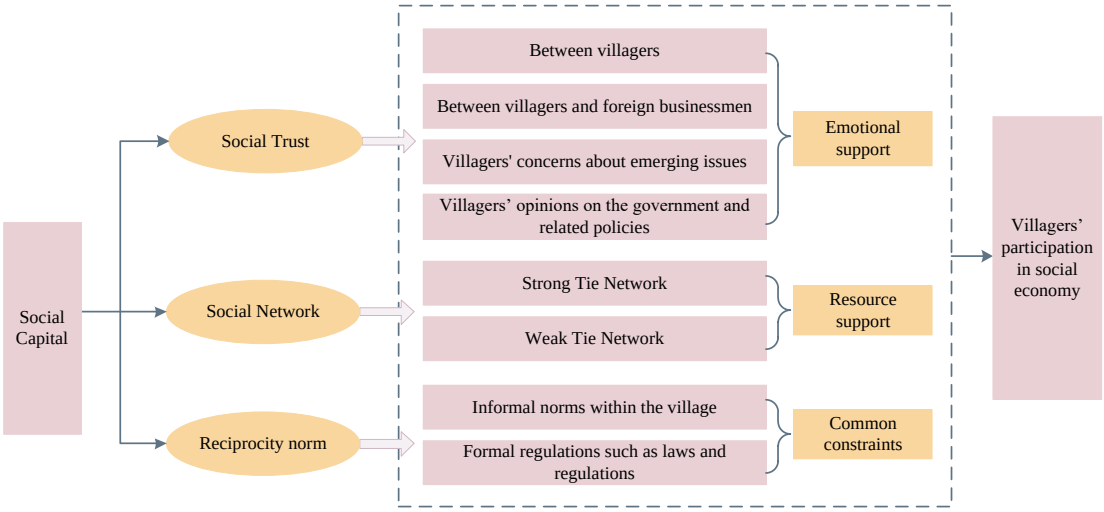

Figure 1 Social capital of villagers participating in the rural digital economy

2.4 Study theory

2.4.1 Affirmative impression on economic development

Rural digital social capital, which functions as a commitment agreement consciously followed within the digital realm, is a crucial component in building a supportive soft environment. Trust emerges organically from interactions within social networks and subsequently influences the scale and robustness of those networks. Positive trust relationships encourage individuals and organizations to become involved in social networks; this leads to an expansion in the size of rural social networks, strengthens the connections between members within each network, and accelerates the ability of these rural social networks to fulfill their roles in economic activities.

The study by Wang, P. et al. employs unbalanced panel data from 622 counties across 6 provinces spanning from 2018 to 2021 to empirically investigate the effect of digital village development on economic growth at the county level in China. Their findings indicate that digital village initiatives significantly boosted county-level economic growth, with more pronounced effects observed in the southern region, the eastern region, and in counties where the economy is not predominantly agricultural. The study pinpoints the essential factor for digital village development in China, confirms the beneficial effect of rural innovation capacity on local economic expansion, and demonstrates the positive role played by structural capital [9].

In a separate study, Rahayu, M. J. et al. developed an "Innovation Social Capital Index" and discovered a two-way causal relationship between this index and GDP in a sample of 26 countries. Their research outlines the internal and external circumstances of an organization and provides empirical evidence for the development strategy of BUMDes (Village-Owned Enterprises). The results indicate that norms, trust, social networks, and infrastructure all exert a favorable influence on the development of BUMDes [10]. Regarding internal networks in rural areas, these networks subsequently reinforce and encourage knowledge management and the spread of technology throughout the countryside. Organizational learning occurs naturally through work-based interactions, which in turn strengthens and promotes the management of knowledge within the organization and holistically enhances the quality of the organization's human resources. This improvement, subsequently, leads to progress in local industry and the broader socio-economy.

Based on the preceding analysis, this paper puts forward hypothesis H1a: rural digital structural social capital exerts a positive influence on economic growth.

A network environment characterized by mutual trust creates a favorable atmosphere for interaction, lessens the social pressure carried by individuals, and increases their sense of responsibility and well-being. Active involvement in social activities helps individuals to acquire more information about healthy lifestyles, improves the overall physical health standard of the population, and enriches the society's reserve of healthy human capital. Pylypenko, H. M. et al. constructed an "Innovation Social Capital Index" and found that, within a 26-country sample, this index has a positive impact on economic growth. A strong, bidirectional, and direct relationship exists between the "Innovation Social Capital Index" and GDP, with a high average level of statistical significance. The existence of this dependency can help to explain the unevenness of innovation development globally and clarifies the impact of social capital on a nation's capacity for innovation [11].

Liu, Z. et al. utilized a mediated effects model, demonstrating that the use of digital information technology enhances social capital and thereby alleviates multidimensional poverty through the channels of social networks, social participation, and social trust. It is shown that digital information technology mitigates multidimensional poverty by strengthening cognitive capital, such as social trust; this improves multidimensional poverty conditions for all demographic groups and in turn facilitates economic growth [12]. Furthermore, trust at both the personal and societal levels in rural areas has also been shown to have a significant positive correlation with trust in the government. Rural citizens with stronger trust are more inclined to obey the law, respond positively to government policies, and voluntarily follow political leaders without the need for coercion. This reduces the occurrence of incidents that oppose the political system, such as corruption and destructive conflict, enabling a collective effort to promote economic development within a context of political support.

Based on the preceding analysis, this paper proposes Hypothesis H1b: Rural digital cognitive social capital has a positive impact on economic growth.

2.4.2 Influence on Digital Innovation Capability

The external network can accelerate the flow of resources, but cannot make the resources completely free flow, the heterogeneity of core strategic resources of different organizations can be preserved for a long time, but the preservability is getting lower and lower, timely and effective innovation is the main driving force for the sustainable development of the organization. From within the network, mutual communication and information sharing within the organization reduces communication barriers and lowers personnel resistance to project execution, which is conducive to mutant innovation in the organization.Yang, F et al. revealed the interplay of digitization in moderating the impact of intellectual capital on sustainable open innovation, and

found that digitization and intellectual capital act as synergistic drivers of the potential for change, and that intellectual capital containing structural capital driving sustainable open innovation [13]. In addition, communication also accelerates the rate of new knowledge dissemination and absorption, which is conducive to the spread of new ideas and concepts and improves the efficiency of innovation.

In view of the above, this paper proposes hypothesis H2a: rural digital structural social capital has a positive effect on digital innovation capacity.

At the level of trust, the social exchange that takes place between two actors, rural individuals, firms, etc., leads to actors modifying their own resources in accordance with the expectations of others, reduces inappropriate transactions, and allows limited resources to be targeted to the process of rural digital technology innovation. In conditions of economic transition, where institutions are not sound and effective, trust is a complementary mechanism to legal protection, bringing recognition and reputation, attracting investment from high-tech firms outside the country, accessing strategic innovation resources controlled by the Government, and an inevitable increase in knowledge production and innovation activities. Cui, Y et al. conducted hierarchical regression and chained mediation effect tests based on Maslow's hierarchy of needs theory and stress coping theory using the China Family Tracking Survey (CFPS) to analyze the cultural capital of the agricultural economy on the determinants of the digital divide among rural older adults and its impact on sustainable development. Cultural capital has a significant positive effect on the digital divide among rural older adults, and cognitive ability helps rural older adult groups bridge the digital divide, concluding the importance of social cognitive cultural capital for the sustainable development of rural digital economy [14]. Rural digital activities are highly risky, if venture capitalists and innovators trust each other, it reduces the cost of searching while enhancing the fault tolerance of innovation, which is conducive to the introduction of new technologies and new ideas, and improves innovation performance.

In view of the above analysis, this paper proposes the hypothesis H2b: rural digital cognitive social capital has a positive influence on digital innovation capacity.

Digital innovation capacity has obvious spatial dependence and spillover effect, strengthening the members of the social network in the form of innovation subjects exist, and based on altruism constantly cooperate with each other to improve their own competitiveness, and the spillover effect of innovation constantly attracts other members to join, the scale of the rural digital network is gradually expanding, which provides the conditions for the adjustment of industrial structure. Innovative activities break the traditional industrial structure and lead to the emergence of new dominant industries, which leads to the rationalization and heightening of the industrial structure of rural digital areas.Pan, Y et al. deeply explored the potential impact of farmers' innovation and entrepreneurship on China's agricultural and rural economic development, taking into account the diversified spatial weights. It was found that farmers' innovation and entrepreneurship have positive impacts and spatial spillover effects on agricultural and rural economic growth, supporting the innovation of farmers in the new economic normal [15]. Wang, Y et al. constructed an indicator system for the development of digital economy and urban-rural integration, and carried out a systematic measurement and analysis to study the digital economy and urban-rural integration. Give full play to the digital innovation

capacity of the digital economy helps to make full use of idle resources, can transform knowledge into technology, so that the factors of production are constantly advanced, improve the knowledge-intensive degree of the rural digital industry, promote the development of high-tech industries, improve the traditional economic development mode of high energy consumption and high input, and realize the effective unity of the transfer of factors of production, industrial upgrading and economic growth [16].

In view of the above analysis, this paper puts forward the hypothesis H2c: innovation capacity has a positive impact on rural economic growth.

3. Data sources and variable descriptions

3.1 Data sources

The data came from the research conducted in a province from January 2024 to May 2024, and in order to ensure the representativeness of the survey sample, it was based on a number of lists of villages selected as model villages of beautiful villages in a province, model villages and townships of national rural governance, and model counties, townships and villages for the improvement of the human habitat environment in a province. Using a combination of stratified sampling and random sampling, six counties and districts were selected first, followed by townships and villages in the same sampling method [17]. Field research was finally conducted in a total of 16 villages within these 6 county districts, and the basic characteristics of the interviewed farmers are shown in Table 1. A total of 1,000 questionnaires were distributed, and after excluding invalid questionnaires, 998 valid questionnaires were finally obtained, and the validity of the questionnaires was 99.8%.

Table 1 Basic characteristics of the farmers interviewed

Statistical indicators	Classification indicators	Sample size	Percentage
Gender	Male	446	44.69%
	Female	552	55.31%
Age	30 years and below	145	14.53%
	31-40 years old	180	18.04%
	41-50 years old	210	21.04%
	51-60 years old	230	23.05%
	60 years and above	233	23.35%
Annual household income	Less than 10000 yuan	179	17.94%
	10000-30000 Yuan	216	21.64%
	40000-60000 yuan	145	14.53%

	70000-90000 yuan	280	28.06%
	100000 yuan and above	178	17.84%
Residence time	5 years and below	189	18.94%
	6-10 years	138	13.83%
	11-15 years	231	23.15%
	16-20 years	195	19.54%
	21 years and above	245	24.55%
Education	Primary school and below	266	26.65%
	Junior high school	210	21.04%
	High school	169	16.93%
	Associate and Bachelor Degree	196	19.64%
	Master degree and above	157	15.73%
Family size	1 person	120	12.02%
	2 person	176	17.64%
	3 person	122	12.22%
	4 person	330	33.07%
	5 people and above	250	25.05%

3.2 Selection of variables

3.2.1 Independent variables

Structural social capital focuses on the degree and structural characteristics of individual or organizational participation in social networks. Considering that, in the context of rural digitalization, online social platforms and digital cooperation networks have become an important part of rural social networks, the "degree of participation in rural digital social platforms" is used as a measure. The statistic is expressed by investigating the ratio of the number of active accounts of rural residents on various digital social platforms to the total rural population, which can completely show the degree of intuitive rural residents' participation in digital social networks. Rural digital cognitive social capital, cognitive social capital is to emphasize the cognitive level of trust, norms and other factors [18]. The "Rural Digital Trust Index (TRUST)" is used to measure, through the design of the trust level, including a total of 16 villages in 6 counties in a province, including the degree of trust of villagers in online transactions, the level of trust in the information provided by the digital platform, as well as the trust of the network partners, the use of principal component analysis to calculate a Composite index [19].

3.2.2 Mediating variables

Digital innovation capacity (IN) uses the comprehensive utility value of innovation capacity in each region, including the number of digital technology patent applications in rural areas, the frequency of application of e-commerce innovation models, the number of agricultural digital technology achievements, and other dimensions, which is used to analyze its mediating role between rural digital social capital and economic growth [20].

3.2.3 Control and Dependent Variables

The control variable is the number of employed persons (LABOR), which is expressed using the number of employed persons at the end of the rural year. “Degree of government intervention (GOV)”, measured using rural government fiscal expenditure as a share of the region's GDP. “Physical capital stock (K)”, expressed as the share of rural year-end fixed asset investment in the region's GDP. The dependent variable is “economic growth (PGDP)”, which is expressed as rural per capita GDP, reflecting the average level of economic output of the rural population and is the core indicator of rural economic development [21-22].

4. Analysis of empirical results

4.1 Descriptive statistics

Table 2 shows the results of descriptive statistics for each variable, descriptive statistical information and correlation test results for the seven variables (V). From the descriptive statistics, the mean value of rural digital social platform participation (M) is 3.868, and the standard deviation (SD) is 1.24, which indicates that the data of this variable is relatively concentrated around the mean value with a moderate degree of dispersion. The rural digital trust index (RDI) has a mean value of 5.298 and a standard deviation (SD) of 16.329, indicating that the data for this variable is relatively concentrated around the mean. In terms of correlation, Rural Digital Social Platform Participation (RD) is significantly positively correlated with the Rural Digital Trust Index, with a correlation coefficient of 0.351*** (p= 0.000), indicating that there is a more synchronized increase in the Rural Digital Trust Index as the value of Rural Digital Social Platform Participation increases. The correlation between digital innovation capacity (DCI) and the rural digital trust index and the number of employed people (CE) is particularly prominent, with a correlation coefficient of 0.833*** (p=0.000) with the rural digital trust index and 0.704*** (p=0.000) with the number of employed people, showing that there is a strong positive correlation between the capacity for innovation and these two variables. In addition, GID is the degree of government intervention, PCS is the stock of physical capital, and there is a significant relationship between structural social capital cognitive social capital, innovativeness and economic growth (EG), indicating that the selected variables are scientifically sound and provide initial support for the research hypotheses, which can be carried out for further research.

Table 2 Descriptive statistics of variables and correlation test coefficients

V	M	SD	RD	RDI	DCI	CE	GID	PCS	EG
RD	3.868	1.24	1	-	-	-	-	-	-
RDI	5.298	6.329	0.351***(0.000)	1	-	-	-	-	-
DCI	28.914	10.237	0.316***(0.000)	0.833***(0.000)	1	-	-	-	-
CE	943.330	708.188	0.281*** (0.000)	0.784*** (0.000)	0.704*** (0.000)	1	-	-	-
GID	0.260	0.203	-0.255***(0.001)	-0.344***(0.000)	0.447***(0.000)	-0.492***(0.000)	1	-	-
PCS	0.740	0.197	-0.053	-0.629*** (0.000)	-0.752*** (0.000)	-0.507*** (0.000)	0.453*** (0.000)	1	-
EG	4.260	2.023	0.399*** (0.000)	0.634*** (0.000)	0.701*** (0.000)	0.401*** (0.000)	-0.354*** (0.000)	-0.547*** (0.000)	1

4.2 Regression test

In this paper, the relevant variables have been standardized, and the results of the benchmark regression are shown in Table 3, with IV denoting the independent variable. Model 1 and Model 2, respectively, are structural social capital and cognitive social capital regressed on economic growth. The results show that the regression coefficients are 0.366 and 0.7501, respectively, both of which pass the significance test at 1% statistical level, and the impact on economic growth is verified. It shows that in the process of rural digitization, the impact of social capital aspects of network-related factors such as the construction of network infrastructure, online socialization, etc., has a significant role in promoting rural economic growth, verifying that hypotheses H1a and H1b hold. Model 3 and Model 4 are regressions of structural social capital and cognitive social capital on innovation capacity, and the regression coefficients are 0.189 and 0.501, respectively, which have passed the significance test at 1% statistical level, and the hypotheses H2a and H2b are verified. It indicates that the trust relationship in rural society, as an important part of social capital, has a positive effect on rural economic growth. Model 5 is the regression of innovation capacity on economic growth, and the regression coefficient is 0.933, which passes the test of significance at the 1% statistical level, indicating that innovation capacity has a positive impact on economic growth, and further verifying hypothesis H2c.

In Models 3 and 4, the coefficient of the number of employed persons is positive and significant at the 1% or 2% level, 0.411*** and 0.182***, with p-values of 0.000 and 0.002, respectively, indicating that the rational allocation of the labor force promotes the ability to innovate digitally, and the coefficients of the variable of the degree of government intervention are inconsistent in different models. In Model 2, the coefficient is -0.285*** (p=0.003), which is significantly negative at the 1% level. In model 3, the coefficient is 0.069* (p=0.085), which is significantly positive at the 10% level. In model 5, the coefficient is -0.121** (p=0.045), which is significantly negative at the 5% level, indicating that the impact of relevant government policies or behaviors on rural economic growth is more complex, and may play a facilitating role in some areas and inhibitory role in others. The impact of physical capital stock on rural economic growth is not a simple linear relationship, and there may be other factors that influence its role.

Table 3 Benchmark regression results

IV	EG		DCI		EG
	Model 1	Model 2	Model 3	Model 4	Model 5
RD	0.366*** (0.000)	0.189*** (0.000)	0.213*** (0.000)	-	-
RD	0.701** (0.000)	0.501*** (0.000)	0.361*** (0.004)	-	-
DC	-	-	-	0.933*** (0.000)	0.848*** (0.000)
CE	0.039	-0.383*** (0.000)	0.411*** (0.000)	0.182*** (0.002)	-0.395*** (0.000)
GI	-0.018	-0.285*** (0.003)	0.069* (0.085)	-0.044	-0.121** (0.045)
PC	-0.501*** (0.000)	-0.169** (0.036)	-0.529*** (0.000)	-0.309*** (0.000)	0.054
-	166	168	155	152	152
-	0.423	0.480	0.789	0.848	0.539

4.3 Robustness Tests

In order to prevent the contingency of the conclusions and avoid the mutual causality of social capital, innovation capacity and economic growth in the same period, this paper adds the robustness test to maximize the correctness of the conclusions, and Table 4 shows the results of the robustness

test. Models 1, 2 and 5 respectively select social capital lagged by one period as the independent variable (IV), and it is found that in Model 1, the coefficient of rural digital social platform participation is 0.355 and significant at the 1% level (p=0.000). This indicates that there is a significant positive correlation between rural digital social platform engagement and PGDP, i.e., when NETWORK increases by one unit, PGDP is expected to increase by 00.355 units. In Model 2, the coefficient of rural digital social platform engagement is 0.136, which is significant at the 10% level (p=0.051), again showing a positive correlation but weaker in strength than column 1. In Models 4, 5, IN itself as the independent variable, the coefficients are 1.085, 0.933, and 0.824, respectively, all significant at the 1% level (p=0.000), indicating that there is a significant positive correlation between IN and itself and that this positive correlation is more stable under different model settings, implying that changes in IN have an isotropic and significant effect on itself. The rural digital trust index of model 2, 0.573, and the coefficient of model 3, 0.285, are both significant at the 1% and 5% levels, further confirming the positive correlation between the rural digital trust index and economic growth, and the regression coefficients of the variables in the model with the degree of significance of the changes are small, and except for the control variables, they all passed the significance test. Model 3 and Model 4 respectively select the social capital of lag two as the independent variable, and it is found that the regression coefficients of structural social capital and cognitive social capital are greater than 0, and pass the significance test at 1% statistical level, indicating that the hypotheses of this paper have been more comprehensively supported by the theory and data verification.

Table 4 Robustness test results

IV	Dependent variable PGDP (column 1)	Dependent variable PGDP (column 2)	Dependent variable PGDP (column 3)	Dependent variable IN (column 4)	Dependent variable IN (column 5)
RD	0.355*** (0.000)	0.136*(0.051)	0.186***(0.002)	-	-
RDI	0.796*** (0.000)	0.573***(0.000)	0.285**(0.028)	-	-
DCI	-	-	-	1.085*** (0.000)	0.933*** (0.000)

CE	0.001	-0.429*** (0.000)	0.504*** (0.000)	0.134* (0.073)	-0.499*** (0.000)
GID	-0.038	-0.225*** (0.004)	0.061	-0.059	-0.145** (0.035)
PCS	-0.555***(0.000)	-0.276*** (0.002)	-0.473*** (0.000)	-0.274*** (0.000)	-0.034
N	166	168	155	152	152
A_{dj}-R^2	0.452	0.518	0.738	0.837	0.603

4.4 Heterogeneity analysis

In order to further explore the differences in the relationship between rural social capital, rural innovation capacity and rural economic growth under different conditions, a heterogeneity analysis was conducted, and the results of the heterogeneity test are shown in Table 5, with DV denoting the dependent variable. Considering that factors such as regional development level and industrial structure may have an impact on the research results, grouping is carried out. Regarding the level of rural economic development, the economic growth of rural areas with high economic development level (REDL-H) is affected by the rural digital trust index, with a regression coefficient of 0.895***, which is higher than that of 0.679*** for rural digital social platform participation. This means that in such areas with good infrastructure and easy information flow, the environment created by a high degree of trust among village people, and a good trust environment is more conducive to the dissemination and integration of knowledge, which in turn provides a greater impetus to economic growth and promotes industrial innovation. For example, in some rural areas that are close to cities and are better developed, trust attracts enterprises to move in and develop specialty industries, thus promoting economic growth. In rural areas with low economic development level (REDL-L), the coefficient of influence of rural digital social platform participation on PGDP is 0.399***, higher than the 0.825*** of the rural digital trust index, indicating that when resources are limited, the villagers' access to resources by expanding their social networks has a significant impact on economic growth, and the role of structural social capital is more critical in this scenario. Analyzing the degree of rural population mobility, the regression coefficients of rural digital trust index on economic growth and IN are 0.638*** and 0.499*** in rural villages with high population mobility (RPML-HM), which are higher than the rural digital social platform participation. Massive population mobility brings diversified ideas and technologies, and most of the village people, like those in some rural areas in labor exporting counties, return home to start their own businesses and promote economic growth. In rural areas with low population mobility (RPML-LM), the coefficient of influence of rural digital social

platform participation on economic growth is 0.322***, which is higher than the rural digital trust index, and the stabilizing demographic structure forms a close local network, further confirming the above hypothesis.

Table 5 Heterogeneity test results

DV	IV	REDL-H	REDL-L	RPML-HM	RPML-LM
EG	RD	0.283***(0.000)	0.399***(0.000)	0.260***(0.000)	0.322***(0.00)
	RDI	0.679*** (0.000)	0.825***(0.000)	0.638***(0.000)	0.780***(0.00)
	DCI	0.895*** (0.000)	1.050*** (0.000)	0.880*** (0.000)	0.950***(0.00)
	CE	0.038	-0.400*** (0.000)	0.010	-0.390*** (000)
	GID	-0.019	-0.210*** (0.000)	-0.025	-0.220**(0.000)
	PCS	-0.469*** (0.000)	-0.530*** (0.000)	-0.470*** (0.000)	-0.510**(0.000)
	N	166	168	155	152
	A_{dj}-R^2	0.445	0.470	0.410	0.450
Innovation ability	RD	0.140** (0.020)	0.185*** (0.000)	0.110** (0.035)	0.170***(0.00)
	RDI	0.500*** (0.000)	0.570*** (0.000)	0.499*** (0.000)	0.550***(0.00)
	DCI	-0.370*** (0.000)	-0.410*** (0.000)	-0.350*** (0.000)	-0.400**(0.000)
	CE	-0.205*** (0.000)	-0.220*** (0.000)	-0.210*** (0.000)	-0.225**(0.000)
	GID	-0.160** (0.025)	-0.180** (0.020)	-0.140** (0.040)	-0.175**(0.030)
	N	60	70	55	75
	Adj-R^2	0.795	0.820	0.770	0.810
	IN	0.895*** (0.000)	1.050***(0.000)	0.880***(0.000)	0.950***(0.00)
	LABOR	0.038	-0.400***(0.000)	0.010	0.390***(0.00)
	GOV	-0.019	-0.210***(0.000)	-0.025	0.220***(0.00)
	K	-0.469***(0.000)	-0.530***(0.000)	-0.470***(0.000)	-0.510**(0.000)
	N	166	168	155	152

5. Conclusion

This paper centers on the relationship between rural digital social capital and economic growth, social capital as a resource embedded in the social relationship network is a collection of actual or potential resources, in which resources are basically linked to institutionalized mutual acquiescence and enduring relationship networks. In analyzing the concept of social capital, it can be found that the core content includes network, trust, and norms, because the economics under the social capital theory includes institutional factors, value judgments, etc. Through theoretical analysis and empirical testing, the specific influence mechanism of different dimensions of rural digital social capital on economic growth and digital innovation capacity is clarified. It is found that structural

social capital and cognitive social capital are regressed on economic growth, and the regression coefficients are 0.366 and 0.7501 respectively, which both pass the significance test at 1% statistical level. The regression coefficients of structural social capital and cognitive social capital on economic growth are 0.366 and 0.7501 respectively, both passing the significance test at 1% statistical level, Model 5 is the innovation capacity regression coefficient of 0.933, passed the test of significance at the 1% statistical level, indicating that the innovation capacity has a positive impact on economic growth, this paper provides a theoretical basis and practical guidance for rural areas to develop a reasonable digital economy to develop the countryside digital economic development to provide data support and enhance the quality of economic growth.

References

[1] Ravi, S., & Rajasekaran, S. R. C. (2023). A perspective of digital marketing in rural areas: A literature review. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 8(4), 26.

[2] Zhang, Z., Sun, C., & Wang, J. (2023). How can the digital economy promote the integration of rural industries—Taking China as an example. *Agriculture*, 13(10), 2023.

[3] Luo, G., Yang, Y., & Wang, L. (2023). Driving rural industry revitalization in the digital economy era: Exploring strategies and pathways in China. *Plos one*, 18(9), e0292241.

[4] Yang, C., Zhou, D., Zou, M., Yang, X., Lai, Q., & Liu, F. (2024). The impact of social capital on rural residents' income and its mechanism analysis—Based on the intermediary effect test of non-agricultural employment. *Heliyon,* 10(14).

[5] Kurniati Bachtiar, N., Wahid Ibrahim, M., & Korpysa, J. (2024). Has the Innovation Process in Small Business Been Completely Explained? A Study Through Social Capital Theory. *Journal of technology management & innovation*, 19(4), 3-17.

[6] Sabet, N. S., & Khaksar, S. (2024). The performance of local government, social capital and participation of villagers in sustainable rural development. *The Social Science Journal*, 61(1), 1-29.

[7] Ouyang, H., Guan, C., & Yu, B. (2023). Green finance, natural resources, and economic growth: Theory analysis and empirical research. *Resources Policy*, 83, 103604.

[8] Moghfeli, Z., Ghorbani, M., Rezvani, M. R., Khorasani, M. A., Azadi, H., & Scheffran, J. (2023). Social capital and farmers' leadership in Iranian rural communities: Application of social network analysis. *Journal of Environmental Planning and Management*, 66(5), 977-1001.

[9] Wang, P., Li, C., & Huang, C. (2023). The impact of digital village construction on county-level economic growth and its driving mechanisms: evidence from China. *Agriculture*, 13(10), 1917.

[10] Rahayu, M. J., Mukaromah, H., & Mulyanto, M. (2024). Social capital-based strategy of sustainable village-owned enterprises (BUMDes) development. *International Journal of Social Economics*, 51(3), 297-312.

[11] Pylypenko, H. M., Pylypenko, Y. I., Dubiei, Y. V., Solianyk, L. G., Pazynich, Y. M., Buketov, V., ... & Magdziarczyk, M. (2023). Social capital as a factor of innovative development. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(3), 100118.

[12] Liu, Z., Wei, Y., Li, Q., & Lan, J. (2021). The mediating role of social capital in digital information technology poverty reduction an empirical study in urban and rural China. *Land*, 10(6), 634.

[13] Yang, F., Luo, C., & Pan, L. (2024). Do digitalization and intellectual capital drive sustainable open innovation of natural resources sector? Evidence from China. *Resources Policy*, 88, 104345.

[14] Cui, Y., He, Y., Xu, X., Zhou, L., & Nutakor, J. A. (2024). Can cultural capital, cognitive ability, and economic capacity help rural older adults bridge the digital divide? *Evidence from an empirical study. Frontiers in Public Health*, 12, 1393651.

[15] Pan, Y., Zhang, S., & Zhang, M. (2024). The impact of entrepreneurship of farmers on agriculture and rural economic growth: Innovation-driven perspective. *Innovation and Green Development*, 3(1), 100093.

[16] Wang, Y., Peng, Q., Jin, C., Ren, J., Fu, Y., & Yue, X. (2023). Whether the digital economy will successfully encourage the integration of urban and rural development: A case study in China. *Chinese Journal of Population, Resources and Environment*, 21(1), 13-25.

[17] Scuderi, R., Tesoriere, G., Fasone, V., & Pedrini, G. (2023). Social capital, poverty alleviation and complexity in Africa. Evidence from rural areas. *Journal of Economic Studies*, 50(4), 806-820.

[18] Serrano, J. J., & Esparcia, J. (2023). Diagnosis of rural development processes based on the stock of social capital and social networks: approach from EI index. *Land*, 12(4), 850.

[19] Marshall, A. (2024). A new rural digital divide? Taking stock of geographical digital inclusion in Australia. *Media International Australia*, 190(1), 68-84.

[20] Zhang, B., Dong, W., Yao, J., & Cheng, X. (2023). Digital economy, factor allocation efficiency of dual-economy and urban-rural income gap. *Sustainability*, 15(18), 13514.

[21] Wang, X., Huang, Y., Zhao, Y., & Feng, J. (2023). Digital revolution and employment choice of rural labor force: evidence from the perspective of digital skills. *Agriculture*, 13(6), 1260.

[22] Saruchera, F., & Mpunzi, S. (2023). Digital capital and food agricultural SMEs: Examining the effects on SME performance, inequalities and government role. *Cogent Business & Management*, *1*0(1), 2191304.