# Local Government Digital Rural Policy Innovation: Driving Factors and Configurational Paths —A Fuzzy-Set Qualitative Comparative Analysis (fsQCA) of 31 Provinces in China

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## Abstract

[Purpose/Significance] Analyzing the internal logic of local government digital rural policy innovation helps to grasp the development patterns of digital rural policies and provides optimization suggestions for comprehensively advancing digital rural construction, achieving digital governance, and facilitating rural revitalization. [Method/Process] This study decomposes policy innovation into two stages—agenda-setting and policy decision-making—integrates external pressures, internal demands, and resource support to construct a "pressure-demand-resource" theoretical framework for policy innovation, and employs fuzzy-set qualitative comparative analysis to examine the driving factors and differential effects of digital rural policy innovation across 31 provincial-level regions (autonomous regions and municipalities) in mainland China. [Results/Conclusions] Local government digital rural policy innovation is characterized by core drivers and multi-factor synergy; central policy orientation constitutes a necessary condition for high-level digital rural policy innovation by local governments. The interaction of multiple elements—pressure, demand, and resources—forms three driving mechanisms: superior administrative orientation, policy entrepreneur promotion, and pressure-demand integration. Significant differences exist in policy innovation driving paths among China' s eastern, central, and western regions, with the western region demonstrating weaker awareness of independent innovation. It is recommended that the central government adopt targeted measures to enhance local governments' enthusiasm for policy innovation, while local governments should explore appropriate action plans and policy instruments based on regional development and their own governance characteristics.

# Full Text

## Preamble

### The Driving Factors and Configurational Paths of Local Government Digital Rural Policy Innovation: A Fuzzy-Set Qualitative Comparative Analysis (fsQCA) of 31 Provinces in China

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**Abstract:**
[Objective/Significance] Analyzing the internal logic of local government digital rural policy innovation helps to grasp the developmental patterns of digital rural policies and provides optimization recommendations for comprehensively advancing digital rural construction, achieving digital governance, and facilitating rural revitalization. [Method/Process] This study decomposes policy innovation into two stages—agenda-setting and policy decision-making—and integrates external pressures, internal demands, and resource support to construct a "Pressure-Demand-Resource" theoretical framework for policy innovation. Using fuzzy-set qualitative comparative analysis, we examine the driving factors and differential effects on digital rural policy innovation across 31 provincial-level administrative regions in mainland China. [Result/Conclusion] Local government digital rural policy innovation exhibits characteristics of core-driven, multi-element mutual promotion, with central policy orientation constituting a necessary condition for high-level digital rural policy innovation. The interplay of pressure, demand, and resource factors forms three driving mechanisms: superior administrative orientation, policy entrepreneur promotion, and pressure-demand integration. Significant regional differences exist in policy innovation pathways across China' s eastern, central, and western regions, with weaker independent innovation awareness in western regions. We recommend that the central government adopt targeted measures to enhance local governments' enthusiasm for policy innovation, while local governments should explore appropriate action plans and policy instruments based on regional development characteristics and their own governance features.

**Keywords:** Digital village; Policy innovation; Driving factors; Fuzzy-set qualitative comparative analysis

**Classification Number:** G203

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## Introduction

The rapid development of information and intelligent technologies has propelled societal transformation toward digitalization, giving birth to a second space independent of the physical world—the digital world—which has expanded rapidly. Under this technological wave, initiatives such as "Internet Plus Public Services" and smart city construction have achieved remarkable success, gradually forming a new paradigm of digital social governance. With the transformation of government functions and the implementation of the rural revitalization strategy, digital governance continues to extend to the grassroots level. Exploring new models of rural governance using modern information technology and digital governance thinking has become a key focus and major project for governments. In September 2018, the "Rural Revitalization Strategic Plan (2018-2022)" issued by the CPC Central Committee and the State Council proposed strengthening digital agriculture construction and implementing the digital rural strategy. The "Digital Rural Development Strategy Outline" released in May 2019 explicitly stated that "digital villages are not only the strategic direction of rural revitalization but also an important component of building digital China." The "Digital Agriculture and Rural Development Plan (2019-2025)" issued in January 2020 outlined development goals and action paths for digital agriculture and rural areas, providing strong support for digitally-driven reform and innovation in agriculture and rural areas to achieve rural revitalization. Subsequently, the "Key Points of Digital Rural Development Work in 2022" identified key application areas and tasks for information technology empowerment in digital rural construction. Solidly promoting digital rural construction can accelerate the enabling role of information technology in rural revitalization and facilitate the modernization of agriculture, rural areas, and farmers.

Comprehensively advancing digital rural construction depends not only on the overall "blueprint" formulated by the central government but also requires active responses and localized adaptation from local governments at all levels. Based on local rural social conditions, policy innovation is needed to coordinate planning objectives, development directions, and priority areas to enhance digital rural policy effectiveness. Against the backdrop of rural revitalization and digital governance, local governments have successively launched digital rural practice explorations, with regional policy innovations gradually spreading nationwide. However, due to uneven development of information technology and rural construction levels, as well as significant localized differences in political structures and institutional histories, the degree and form of digital rural policy innovation vary considerably across regions. China' s eastern, central, and western regions exhibit a certain "gradient" difference in policy innovation capacity, generally showing a trend of eastern regions leading, central regions following, and western regions catching up. Additionally, some regions lack factual basis in policy adoption, resulting in superficial implementation, insufficient policy integration and systematicity, and difficulty in effectively playing a role in boosting rural revitalization.

Coordinating rural information infrastructure construction, developing the digital sharing economy, and optimizing digital services for people' s benefit all depend on guidance from a sound policy system. In practice, policy innovation is influenced by numerous factors from the political environment, policy attributes, and actor behaviors, with various factors intertwining and interacting to jointly shape policy diffusion patterns. Examining the degree and motivations of local government digital rural policy innovation contributes to advancing digital rural construction comprehensively and enhancing policy effectiveness. What are the key factors driving local government digital rural policy innovation? How do these elements combine to form synergistic paths that promote policy innovation? Do driving mechanisms differ across regions, and what elements need strengthening to support digital rural policy implementation? This paper attempts to address these key questions by focusing on the internal logic of policy innovation and grasping the developmental patterns of digital rural policies, aiming to provide optimization recommendations for accurately understanding and precisely implementing digital rural policies to promote rural revitalization through digital rural construction.

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## 2.1 Literature Review

"Innovation" signifies the process of implementing new reforms based on existing rational cognition and continuously advancing reform decisions. In China, policy innovation is an active behavior that relies on "government consciousness," encompassing stages such as policy concept formation, acceptance, and implementation. In terms of its connotation, policy innovation refers to a government' s first-time adoption of a new policy, regardless of whether the policy is entirely new or a combination of old and new elements. As long as it is adopted by a policy actor for the first time, it constitutes policy innovation. The process by which innovative policies spread among members of a political system through specific channels over time, from individual adoption to widespread implementation, is called policy diffusion. It is evident that policy innovation emphasizes gradual practical development patterns and governments' capacity to pursue change, while policy diffusion focuses on how one policy innovator' s choices influence another. The two perspectives are essentially different angles of analyzing the same policy process and are difficult to completely separate when examining the same policy. However, this study focuses on the agenda-setting and policy decision-making stages of policy formulation, primarily discussing the driving factors and formation mechanisms of local government policy innovation.

Current research on policy innovation mostly proceeds from the perspective of policy diffusion, summarizing influencing factors and mechanisms of policy innovation diffusion. Scholars generally agree that policy innovation diffusion is jointly influenced by multiple intertwined external and internal organizational factors. External factors typically include political institutions, public opinion,

intergovernmental linkages, and policy networks, among which directives, incentives, and attention allocation from higher-level governments can promote top-down diffusion, while public opinion and demand response may lead to bottom-up diffusion. Some scholars have focused on how policy entrepreneurs'behavioral motivations and action strategies drive policy innovation. Internal factors refer to the influence of local government officials' experience, economic levels, resource endowments, industrial structures, information technology embeddedness, and digital government capacity on policy innovation diffusion. Some scholars have pointed out that local governments' development preferences and resource support are key determinants of policy innovation diffusion.

The interaction of multiple influencing factors has led to diverse policy innovation diffusion mechanisms and models. Walker, a pioneer in policy diffusion theory, attributed the motivations for policy diffusion among American states to inter-regional learning, competition, and voter pressure. The learning mechanism is a process in which government officials and administrative personnel adopt policies by learning from successful experiences or public support, embodying a gradualist decision-making philosophy where later adopters improve policies based on lessons from early implementations. The competition mechanism arises from regional competition among policy actors in economic, political, and service aspects. Berry et al. consider the public pressure model as one of the primary modes promoting policy innovation, where governments prioritize public demand in policy selection and advance policy innovation to pursue public satisfaction or reduce negative media coverage pressure.

Although policy innovation diffusion has been systematically studied in terms of theoretical norms and empirical methods, most research focuses on how innovative policies diffuse among governments, lacking exploration of why local governments engage in policy innovation. Understanding the driving factors of policy change and the distribution of their influence is precisely the key to predicting policy outcomes. Second, research methods have been relatively singular, mostly consisting of qualitative studies of few cases or single-factor linear impact analyses based on extensive indicator data, lacking integrated rational interpretation of policy innovation mechanisms from the perspective of interactions among core factors and differentiated combinational paths. Therefore, based on the development and diffusion practices of digital rural policies, this paper employs fuzzy-set qualitative comparative analysis to conduct comparative analysis of digital rural policy innovation degrees across various localities, identifying influencing factors that facilitate high-level digital rural policy innovation, summarizing driving paths and mechanisms, and presenting the individuality and commonality of local governments in digital rural policy innovation processes. This provides a theoretical and practical analytical perspective for opening the black box of policy innovation agenda-setting and decision-making processes.

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## 2.2 Theoretical Framework Construction

The "Digital Rural Development Strategy Outline" points out that current digital rural construction faces issues such as missing top-level design, insufficient resource coordination, and significant regional differences. How to strengthen theoretical and policy engineering research on digital rural areas, improve supporting policy solutions for the digital economy, technology, and services, and fully mobilize the enthusiasm of various regions and departments in developing digital rural areas has become an urgent problem. First, we must clarify the process of local government policy innovation. Embedded within linear policy formulation, policy innovation refers to an issue entering the government' s agenda, with the government proposing solutions. The combination of issues and solutions may form varying degrees of policy innovation or be rejected, involving two conventional policy formulation stages: agenda-setting and policy decision-making. However, in actual operation, each stage of policy innovation may be influenced by policy environments, implementation actors, target groups, policy resources, and innovation capabilities. The nature and combinational distribution of these factors determine the direction of policy innovation. Therefore, rather than a linear theoretical conception, policy innovation is more like a policy transformation shaped by the interweaving and joint influence of multiple realistic factors.

Decomposing policy innovation into agenda-setting and policy decision-making stages, agenda-setting determines which social problems can enter decision-makers'视野 and be incorporated into government innovation action plans. Transforming social problems into policy issues requires certain triggering mechanisms. In the "pressure-response"agenda-setting model, pressure to form policy agendas mainly comes from multiple policy participants with diverse interests, such as administrative directives from higher-level governments, social group protests, mobilization by policy advocates, and media public opinion, all of which may become triggering mechanisms. If what problems the government "solves" is determined by pressure-type agenda-setting based on public opinion response, then "how to solve problems" depends more on decision-makers' value preferences and political orientations. Influenced by "attention bottlenecks," government organizations assign different importance rankings to multiple policy innovation target values, and this attention allocation and selection behavior is largely determined by organizational demands. Demand is the internal driving force for organizational self-realization, and the actual demand of government organizations at a certain period prompts them to focus on relevant issues in policy decision-making, match organizational strategic goals, and generate corresponding policy behaviors. Additionally, all stages of policy innovation require support from resources such as funding, technology, and management. Government organizations need administrative resources to implement policy concepts and implement policy changes, and the effective execution of innovative policies also requires continuous and stable resource investment. Based on existing theoretical research and policy formulation processes, this article selects vari-

ables from three dimensions—external organizational pressure, internal demand, and resource support—to examine their influence on policy innovation. The constructed theoretical framework is shown in Figure 1 [Figure 1: see original paper].

### 2.2.1 Organizational Pressure

**Central Policy Orientation.** In political systems, political authority is regarded as the initiator of policy concepts or the promoter of policy change. Increasingly, scholars have confirmed that directives, encouragement, and approval from higher-level governments are key influencing factors for lower-level governments to adopt certain policies. Government attention and policy concepts are often transmitted and embedded from top to bottom. When the central government begins to focus on a social problem and attempts to find solutions by seeking policy recommendations and formulating relevant policy measures, this attention transmits a signal downward, indicating the problem' s prominence and importance, thereby promoting local governments to digest and decompose overall policy goals and take innovative actions in response.

**Policy Entrepreneur Promotion.** Policy entrepreneurs refer to individuals who attempt to change resource allocation and influence government decisions through personal or organizational power. They often possess certain change-oriented traits and innovative concepts, serving as core figures who can bring social problems into decision-makers' 视野 and transform policy concepts and plans into concrete policies. In China, policy entrepreneurs generally include important leaders within government, industry representatives, and experts and scholars.

**Public Preferences.** In modern society with increasingly diverse public issues and prominent contradictions, local governments increasingly tend to respond to diversified and complex demand preferences through policy innovation. The public' s acceptance and use of information technology, especially their preferences for the application and empowerment of digital technology in agricultural and rural economy, governance, and services, form pressure and motivation for governments to develop digital rural areas. Data indicators gathered in cyberspace represent the concretization of social problem contexts and the visualization of public sentiment, exerting direct influence on policy agenda-setting.

### 2.2.2 Organizational Demand

**Development Demand.** In public choice theory, Buchanan incorporates market behavior and administrative behavior into the same analytical model, with the rational person assumption equally applicable to analyzing political processes. As the main builder of regional development, local governments also exhibit characteristics of rational economic actors pursuing self-interest and utility maximization. Their policy innovation behavior is driven to some extent by the pursuit of their own development and organizational interests. In reality,

digital rural implementation has brought significant economic and social benefits, with new digital economy forms such as rural e-commerce and intelligent rural tourism flourishing, driving rural economic growth and farmers' income. The considerable expected returns enhance local governments' tendency to build digital rural areas oriented toward economic performance.

**Competition Demand.** Due to China' s centralized administrative system and strong incentive-based government assessment system, a "promotion tournament"has formed among local government officials. While traditional promotion mechanisms are closely related to economic growth, as governance systems and assessment methods continuously improve, policy innovation is also regarded as an indicator of local government performance. Driven by this competitive system, local governments have begun to use digital policy innovation as a tool to demonstrate political achievements and develop rural digital economy fields as means to enhance regional competitiveness. Research has confirmed that policy innovation behaviors and successful experiences in adjacent regions or within the same scope prompt regions to adopt similar public policies, gradually expanding the influence of certain policies through competition mechanisms.

**Learning Demand.** Faced with constantly changing social environments and complex public issues, government organizations need continuous learning and adjustment to enhance environmental adaptability. The process of improving multi-value systems through learning exploration enhances policy effectiveness. The policy innovation process from individual to overall is also a process of information transmission, knowledge penetration, and mutual learning among various actors in the political system. Therefore, inter-organizational learning is a potential condition for policy innovation.

#### 2.2.3 Resource Support

The implementation of any government activity plan and the achievement of policy objectives cannot be separated from financial resource support. Local governments' willingness to carry out policy innovation is largely influenced by fiscal budgets. Some scholars believe that fiscal budgets positively incentivize policy innovation—the higher the fiscal budget in a certain field, the more evident the willingness to innovate and execute related policies. The costs or benefits generated by policy innovation cannot be predicted in the short term, and the complexity, dynamism, and uncertainty of the entire process entail certain policy risks. Avoiding risks and pursuing innovation success both require financial resource support.

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## 3.1 Research Methods

QCA is a method different from traditional quantitative and qualitative approaches. It views the causes of all social phenomena as complex combinations

of different influencing factors, where any result formation or function performance is influenced by multiple factors and diverse attributes. Among them, the mature fsQCA is a comprehensive evaluation analysis method combining categorical qualitative and membership quantitative approaches. Based on practical experience and in-depth theoretical analysis of target cases, it determines variable conditions, assigns values to variables more precisely, and explores the interactive influence of conditional variables and causal paths formed by different combinations. Through multi-case comparative analysis, fsQCA can holistically explore event causes, examine causal and interactive relationships among different factor combinations, and identify and refine diversified driving paths for regional policy innovation in China. Specific steps include variable setting, variable calibration, single-variable necessity analysis, and configuration analysis of antecedent conditions.

### 3.2.1 Outcome Variable

The selected cases in this paper are the innovation status of digital rural policies in 31 provinces, autonomous regions, and municipalities directly under the Central Government (excluding Taiwan, Hong Kong, and Macau) as of the end of 2021. In previous research, policy innovation has often been treated as a binary form of adoption or non-adoption, lacking in-depth analysis of different degrees and levels of policy innovation. Therefore, based on the visibility and factuality of digital rural policies, this paper provides a more detailed classification of policy innovation degrees, primarily based on whether provinces have issued relevant policy documents and the content of policy texts. Those that have issued both policy documents and specific action plans are considered high-level policy innovation; those that have issued policy documents but lack specific action plans are considered low-level innovation; and those that have not issued relevant policy documents are considered non-innovation. Policy document search sources mainly include portals of governments and relevant departments, news media reports, and the Peking University Law Database.

### 3.2.2 Condition Variables

**Pressure Conditions.** From the perspective of pressure on government agenda-setting, the main factors influencing digital rural policy innovation are central policy orientation, policy entrepreneur promotion, and policy preferences. Central policy orientation often uses formal documents as policy signals to convey directives to lower-level governments. This paper considers digital rural policy innovation by local governments after the issuance of central policy documents as being influenced by superior administrative pressure. The advocacy and mobilization of policy entrepreneurs can directly promote the digital rural agenda-setting. The policy entrepreneurs discussed in this paper mainly refer to representatives, committee members, experts, and scholars outside government departments who propose and publicize digital rural policies. Meeting public preferences is the goal pursuit of public policy, guiding

the legitimacy direction of policy innovation. The number of rural broadband access users can not only intuitively reflect the scale and capacity of internet usage in rural areas but also indirectly demonstrate the region' s demand for digital technology promotion and policy implementation, containing public value tendencies. Therefore, this paper uses "number of rural broadband access users" to represent public preferences.

**Demand Conditions.** From the perspective of policy decision-making demand, governments in digital rural policy innovation mainly focus on organizational self-development, learning and growth, and inter-governmental influence. Economic development is one of the most direct driving forces for regional policy innovation. This paper uses "digital economy scale" as an indicator to measure provinces' digital rural development demand. Local governments adopt different digital rural implementation strategies to gain competitive advantages while influencing other peer governments. This paper examines competitive influence by comparing the chronological order of policy innovation among provincial governments. The "pilot-promotion" model, as a typical policy implementation pattern, plays an important role in China' s policy practice. Policy pilots are not only manifestations of superior policy will and strategic control but also tools for lower-level governments to conduct independent innovation to meet learning demands. Therefore, this paper uses the digital rural pilot situation in each province as an indicator to measure learning demand intensity.

**Resource Conditions.** Digital rural areas involve information management and modern technology applications in agriculture, rural areas, forestry, water resources, and poverty alleviation. Therefore, this paper uses public budget expenditures on agriculture, forestry, and water resources by governments to represent the fiscal support situation for implementing digital rural policies in each province. Higher public budget expenditures indicate stronger policy innovation intentions.

### 3.3.3 Variable Calibration

In practical applications of fsQCA analysis, variables need to be calibrated. Using fuzzy mathematics methods, the degree to which each case belongs to a specific target set is calculated, i.e., fuzzy membership scores. Calibration is the process of converting case data into fuzzy set membership scores. Common calibration methods are divided into two types: indirect calibration, where researchers assign values between "0"and "1"to conditional variables based on case information and their own experience; and direct calibration, where researchers set anchor points based on theoretical common sense and practical analysis to represent complete membership, complete non-membership, and crossover relationships between variables and sets, then use algorithms provided by fsQCA software to convert raw data into membership values.

Based on existing theoretical assumptions and data types, membership scores are assigned to each variable. This paper adopts indirect calibration for the out-

come variable of policy innovation degree and four conditional variables: central policy orientation, policy entrepreneur promotion, development demand, and learning demand. Since the indicator data for public value preference, competition demand, and fiscal resources are continuous values, direct calibration is adopted. Three anchor points are determined based on the upper quartile, median, and lower quartile of sample data for indicator assignment. To avoid the impact of special extreme values and missing values in a single year, this paper uses the average values of data published in the "China Statistical Yearbook" from 2018 to 2020 as the final values for continuous variable indicators. Specific assignment details are shown in Table 1 .

**Table 1: Variable Setting and Assignment**

| Variable | Explanation and Assignment | Data Source |
|---|---|---|
| Central Policy Orientation | Assigned value 1 if digital rural development started after central policy document issuance; 0 if before | Central policy documents |
| Policy Entrepreneur Promotion | Assigned value 1 if policy entrepreneurs participated; 0 if not | Network media reports |
| Public Preference | Uses "number of rural broadband access users" as indicator, assigned via direct calibration | China Statistical Yearbook |
| Development Demand | Digital economy scale over 1 trillion yuan assigned 1; 500 billion to 1 trillion assigned 0.5; below 500 billion assigned 0 | China Digital Economy Development Report |
| Competition Demand | Uses "provinces that have adopted digital rural policy/all provinces" as indicator, assigned via direct calibration | Policy documents |
| Learning Demand | Provinces with 5 or more national digital rural pilots assigned 1; 4 pilots assigned 0.67; 3 pilots assigned 0.33; 2 or fewer assigned 0 | Pilot policy documents |
| Resource Support (Fiscal Resources) | Uses "public budget expenditure on agriculture, forestry, and water resources" as indicator, assigned via direct calibration | China Statistical Yearbook |
| Policy Innovation Degree | Assigned 1 for provinces with both policy documents and specific action plans; 0.5 for those with policy documents but lacking specific action plans; 0 for those without relevant policy documents | Policy documents |

## 4.1 Single-Variable Necessity Analysis

In qualitative comparative research, single-variable necessity analysis must first be conducted to explore the causal relationship between variables and outcomes. The explanatory power of individual variables on outcomes can be obtained by calculating the consistency and coverage of each variable. Researchers generally set the consistency threshold at 0.8. When consistency is greater than 0.8 but less than 0.9, the variable can be considered a sufficient condition for outcome generation; when consistency exceeds 0.9, it is a necessary condition for outcome generation. As shown in Table 2 , the consistency of central policy orientation reaches 0.95, which can be considered a necessary condition for digital rural policy innovation. This also means that local government policy innovation is largely influenced by pressure from central political authority. The consistency of other variables is below 0.8, indicating that these factors have weak individual effects on the outcome. Digital rural policy is not a result promoted by single factors but is jointly driven by multiple interacting factors. Therefore, further analysis of factor combinations is required.

**Table 2: Single-Variable Necessity Analysis**

| Variable | Consistency | Coverage |
|---|---|---|
| Central Policy Orientation | 0.95 | 0.78 |
| Policy Entrepreneur Promotion | 0.65 | 0.52 |

## 4.2 Antecedent Condition Configuration Analysis

Digital rural policy innovation is the result of interdependence and interaction among multiple variable combinations. To explore the 联动效应 of multiple variables in policy innovation, analysis of different condition configurations that produce outcomes is necessary. After operating the data through fsQCA3.0 software, three solution sets are obtained: complex solution, parsimonious solution, and intermediate solution. Variables appearing in both the parsimonious and intermediate solutions are core conditions, while those appearing only in the intermediate solution are peripheral conditions. Different combinations of conditional variables form multiple triggering paths for digital rural policy innovation. We use graphical methods to display antecedent condition configurations. The calculation results show that the paths generating high-level digital rural policy innovation are diversified. The configuration analysis results of digital rural policy innovation paths mainly present five configurations (see Table 3 ). The overall solution consistency reaches 0.91, higher than the generally acceptable threshold, indicating that the condition configurations obtained from this study'

s theoretical framework and empirical analysis have strong explanatory power for digital rural policy innovation outcomes. The total coverage reaches 0.53, meaning the five condition configurations can explain approximately 53% of cases.

**Table 3: Antecedent Condition Configurations for Digital Rural Policy Innovation**

| Configuration | Central Policy Orientation | Policy Entrepreneur Promotion | Public Preference | Development Demand | Competition Demand | Living Demand | Fiscal Resources | Raw Coverage | Unique Coverage | Solution Coverage | Solution Consistency |
|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | • | • | • | • | | • | | 0.36 | 0.08 | 0.53 | 0.91 |
| K2 | • | • | • | • | | | | 0.22 | 0.03 | | |
| K3 | • | | | | | | • | 0.18 | 0.02 | | |
| K4 | • | • | | • | | • | | 0.15 | 0.01 | | |
| K5 | • | • | | | | | • | 0.12 | 0.01 | | |

*Note: "•" indicates core condition present; " " indicates core condition absent; "•" indicates peripheral condition present; " " indicates peripheral condition absent; blank indicates condition is irrelevant.*

Overall, "Central Policy Orientation" and "Policy Entrepreneur Promotion" are the combination methods with the highest coverage among all configuration conditions. In single-variable necessity analysis, "Central Policy Orientation," as a necessary condition, is also a core condition in four configuration conditions. Although "Policy Entrepreneur Promotion" is not a necessary condition, it plays a significant role in promoting outcomes within configuration conditions. This indicates that local digital rural policy innovation largely depends on central government policy guidance and the advocacy mobilization of policy entrepreneurs. "Competition Demand" often appears as the opposite value of core conditions, proving its role in digital rural policy innovation is not significant and its effect requires assistance from other conditions. "Public Value Preference"is frequently absent in configuration distributions, indicating its smaller impact on outcomes, which may be closely related to the relatively lagging rural development and weak political participation and expression awareness among farmers.

Examining each condition combination path individually, all show consistency greater than 0.85, with four of the five paths having consistency above 0.9, indicating each combination path has strong explanatory power for digital rural policy innovation outcomes. Further analysis allows all condition combination paths to be summarized into four types:

**(1) Combination with "Policy Entrepreneur Promotion" as the core variable.** K1 represents this combination type, with a raw coverage of 36%,

making it the most explanatory configuration. "Policy Entrepreneur Promotion" has the most significant influence in this path, while "Central Policy Orientation" is not prominent, cooperating with multiple auxiliary conditions including "Public Preference," local governments' "Development Demand," and "Learning Demand" to jointly promote high-level policy innovation. This combination indicates that policy entrepreneurs, based on current rural social conditions and public demands, actively advocate policy recommendations for digital rural construction. Provinces with good digital economy development momentum and strong learning awareness are more inclined to adopt policy entrepreneurs' suggestions for high-level digital rural policy innovation. Taking Zhejiang Province as an example, as a leader in digital government and digital economy construction, Zhejiang closely follows modern development trends. Government departments have repeatedly held digital rural development forums, conducted digital rural practice research, and actively explored new models of intelligent rural governance. Government leaders, experts, scholars, and enterprise representatives have provided suggestions on achieving rural revitalization through agricultural industrial informatization, rural governance modernization, and rural service digitalization, combining farmers' demands. Through active learning of advanced theories and typical experiences, digital rural policy pilots have been created to drive digital rural policy innovation from point to surface.

**(2) Combination with "Central Policy Orientation," "Policy Entrepreneur Promotion," and "Competition Demand" as core variables.** Configuration K2 belongs to this type, with a raw coverage of approximately 22%, explaining about 22% of cases. In this combination path, both external pressure and internal demand play key promoting roles, with "Public Preference" and "Development Demand" as auxiliary conditions positively influencing the outcome. Path K2 demonstrates that clear central policy orientation and vigorous promotion by policy entrepreneurs provide favorable opportunities for local governments to adopt digital rural policies. Local governments with strong competitive awareness, driven by public preference pressure for digital rural construction and regional digital economy dividends, generate high-level policy innovation behaviors. A typical case reflecting this path is Guangdong Province. The province attaches great importance to digital rural policy design and institutional planning. Under the guidance of central policy direction, it has issued a series of relevant development action plans and implementation opinions, promoting "5G Smart Agriculture" into villages and households. To enhance competitiveness, Guangdong has introduced market mechanisms into digital rural governance, jointly forming a new agricultural development model led by government, operated by market, and participated by enterprises, in collaboration with internet technology companies and agricultural leading enterprises. This provides agricultural technology training guidance, outputs industry development solutions, and expands the depth and radiation scope of digital rural policies.

**(3) Combination with "Central Policy Orientation" as the core variable.** Configuration K3 indicates that "Central Policy Orientation" is the de-

cisive factor for high-level digital rural policy innovation. Local government policy innovation mainly considers superior policy intentions as the primary characteristic, and with the support of fiscal resources, jointly promotes digital rural policy implementation. This combination achieves the highest consistency level, indicating that satisfying this path's combination conditions will definitely cause high-level policy innovation. In this study' s cases, except for Yunnan Province, all other provinces carried out digital rural policy activities after the central government issued relevant policy documents, fully demonstrating that clear central policy signals generate strong policy pressure on local governments and strengthen their willingness to adopt policies. Taking Inner Mongolia as an example, under the new era environment of vigorously developing information technology and building a cyber power, Inner Mongolia' s network information infrastructure has been continuously optimized, government service levels have been further upgraded, and digital governance policies have been increasingly improved, laying a good institutional environment for digital rural policy adoption and implementation. Although this case lacks stimulation from internal demand, central policy guidance and resource incentives have generated strong motivation to pursue policy goals, directly shaping its digital rural policy implementation.

**(4) Combination with "Central Policy Orientation" and "Policy Entrepreneur Promotion" as core variables.** Configurations K4 and K5 both belong to this type. In this combination type, external pressure plays a key promoting role. The issuance of central relevant policies and promotion by local policy entrepreneurs are core elements for generating high-level policy innovation, with local governments'own development demand as an auxiliary condition, or jointly promoting policy innovation based on higher learning awareness and fiscal resource support.

Based on the configuration analysis, path combinations can be summarized into three driving mechanisms: First is the superior administrative orientation mechanism. The central government' s attention and policy inclination toward digital rural issues are transformed into pressure for local governments to conduct corresponding policy innovation. The central government' s issuance of normative documents on digital rural areas demonstrates clear policy intentions, providing development directions and institutional legitimacy for local governments. Central institutional pressure guides local governments to strive for goal achievement, promoting top-down vertical innovation diffusion of digital rural policies. Second is the policy entrepreneur promotion mechanism. Under this mechanism, local governments are not passive executors of central policies. Digital rural policy innovation originates more from the collective action of policy entrepreneurs, exploring new models of digital rural governance under pressure from central policies and public preferences, and creating highlights of rural digital services in the pursuit of self-development and learning demand. Policy entrepreneurs use "selling" and "persuasion" means to successfully combine publicly concerned digital rural issues with political demands for rural revitalization when the "policy window" opens, designing concrete policy solutions that

ultimately facilitate spontaneous policy innovation exploration in the region. Third is the pressure-demand integration mechanism. Central policy orientation serves as strong external pressure for local government policy adoption and is the decisive factor in forming top-down policy innovation models. However, under the pressure-demand integration mechanism, competition demand strengthens policy innovation information exchange among governments at the same level, especially among neighboring regions. Based on cognition of the current situation and problems of agricultural and rural digital development and farmers' growing preferences for informatization and convenient services, local government decision-makers carry out policy innovation successively to compete for policy resources and advantageous positions, forming a policy-following innovation diffusion model.

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## 4.3 Differentiated Path Analysis of Digital Rural Policy Innovation in China's Eastern, Central, and Western Regions

Due to significant differences in information technology development levels, institutional history, and policy value preferences across regions, external pressure, internal demand, and resource support may have different impacts on local government digital rural policy innovation. Based on regional divisions in the "China Statistical Yearbook," this paper conducts comparative analysis of digital rural policy innovation across provinces in China' s eastern, central, and western regions, revealing differentiated influencing factor combination paths that promote high-level policy innovation in different regions.

As shown in Table 4 , the driving paths for digital rural policy innovation differ significantly among China' s eastern, central, and western regions. The eastern region mainly has two configuration paths, both indicating that even without fiscal resource support, under obvious external pressure from public preferences, auxiliary conditions such as central policy orientation, policy entrepreneur promotion, development demand, learning demand, or competition demand jointly drive digital rural policy innovation in the eastern region. The influence of policy entrepreneurs is more prominent in the central region, appearing as a core condition together with public preference and development demand, with central policy orientation and learning demand as auxiliary conditions for facilitating high-level policy innovation. From the three configuration paths generated in the western region, central policy orientation, competition demand, and learning demand are core conditions, with fiscal resource support as an auxiliary condition. It can be seen that the western region is more obviously influenced by central policy orientation, with prominent horizontal inter-governmental competition and learning behaviors, and fiscal resources further provide support and guarantee for policy innovation. Compared with the western region, local governments in the eastern and central regions have relatively higher autonomous innovation awareness. Eastern region governments pay more attention to responding to public opinion when innovating policies

to enhance decision-making democracy and scientificity. Central region policy innovation is driven by the external pull of policy entrepreneurs with change-oriented traits, pressure generated by public preferences, and internal development demand. Western region digital rural policy innovation originates from the need to achieve superior political intentions and enhance inter-governmental influence, relying more on external 主体力量. Insufficient internal motivation can easily lead to superficial and formal policy innovation.

**Table 4: Antecedent Condition Configurations for Digital Rural Policy Innovation in Eastern, Central, and Western Regions**

| Region | Configuration | Central Policy Orientation | Policy Entrepreneur Promotion | Public Preference | Development Demand | Competition Demand | Transformation Demand | Fiscal Resources | Raw Coverage | Unique Coverage | Solution Coverage | Solution Consistency |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eastern | E1 | • | • | • | • | | • | | 0.28 | 0.05 | 0.45 | 0.93 |
| Eastern | E2 | • | | • | | • | • | | 0.21 | 0.03 | | |
| Central | C1 | • | • | • | • | | | | 0.31 | 0.04 | 0.38 | 0.89 |
| Western | W1 | • | | | | • | • | • | 0.25 | 0.03 | 0.42 | 0.87 |
| Western | W2 | • | | | | • | • | | 0.18 | 0.02 | | |
| Western | W3 | • | | | | • | | • | 0.15 | 0.01 | | |

*Note: "•" indicates core condition present; "" indicates core condition absent; "•" indicates peripheral condition present; "" indicates peripheral condition absent; blank indicates condition is irrelevant.*

## 5 Conclusions and Recommendations

This paper takes digital rural policy innovation by 31 provincial governments in China as an example, using the fsQCA method to analyze how external pressure, internal demand, and resource support drive local government digital rural policy innovation and their combinational paths, revealing the core conditions and complex logical paths that facilitate local government digital rural policy innovation. Research shows that digital rural policy innovation exhibits characteristics of core element dominance and multi-element collaborative drive, with central policy orientation being a necessary condition for digital rural policy innovation. The interaction of multiple elements including pressure, demand, and resource support forms three driving mechanisms: superior administrative orientation, policy entrepreneur promotion, and pressure-demand integration. Superior administrative orientation mainly highlights the central policy' s attention allocation and policy signal transmission functions. Policy entrepreneur promotion

emphasizes the role of policy entrepreneurs in concept design and policy innovation driving. In the pressure-demand integration mechanism, pressure and demand jointly influence outcomes. Central policy pressure is vertical radiation from superior to subordinate levels, while local governments at the same level, due to differences in socio-economic development and value preferences across regions, create certain potential energy differences or positional differences in policy competition. Innovative policies often transfer from high-policy-potential areas with good development levels to low-policy-potential areas with relatively backward development.

Through comparison, we find that the key driving elements and innovation paths of digital rural policy innovation differ significantly across China' s eastern, central, and western regions, showing notable heterogeneity and presenting an unbalanced phenomenon nationwide. Eastern and central regions have higher degrees of digital rural policy innovation. Policy innovation in more developed regions is more autonomous exploration of digital rural governance by local governments under sufficient policy resources and favorable policy environments—a responsive innovation to meet public demand and regional development. Western regions lack policy independent innovation capacity. Although central policy pressure can provide external drive for digital resource-deficient areas, insufficient internal motivation will lead local policy innovation to simply copy central policy templates, ignoring regional development and governance characteristics, potentially resulting in formalistic innovation lacking substantive action planning and effective policy tools.

To further advance and effectively implement digital rural policies, the following recommendations are proposed:

**First, establish and improve policy innovation incentive mechanisms, strengthening the central government' s role in overall planning and top-level design.** Top-down administrative pressure significantly influences local governments' policy choices and implementation preferences, effectively increasing the probability and depth of local government digital rural policy innovation. Therefore, the promotional effect of administrative pressure on policy innovation should be enhanced by establishing and improving policy innovation incentive mechanisms, increasing financial funds, investment fund, and social financing support to stimulate local governments' enthusiasm for policy innovation and expand the radiation scope of digital rural policies. Special attention should be paid to strengthening fiscal subsidies, tax reductions, and network communication infrastructure in western regions to create a favorable policy development environment and enhance their policy independent innovation awareness and capacity.

**Second, improve demand expression and value feedback channels, strengthening policy input legitimacy centered on multi-participation.** Fully leverage the central government' s "meta-governance" functions by constructing cooperative and collaborative rules, providing collective learning mechanisms, and effectively regulating and guiding local

government policy behaviors. Establish a policy decision-making platform with multi-subject collaborative participation to form a long-term preference expression mechanism that maximizes the sharing of public interests. By building an information platform for cross-level, cross-departmental, and cross-regional policy innovation interaction and policy implementation collaboration, give voice rights to multiple stakeholders, reduce information transaction costs, promote inter-governmental policy learning and competition, enhance equality of digital rural policy development opportunities across different regions, and promote synchronized policy advancement in eastern, central, and western regions to improve overall policy innovation and implementation effectiveness.

**Third, local governments should formulate personalized digital rural development plans under central programmatic policy guidance, aiming to meet public demand and realize public interests.** During policy innovation, regions should focus on localized adaptation, integrate local resources based on their own development, and build digital rural policy systems according to local conditions to enhance policy application flexibility and effectiveness. Mobilize local social organizations, leading enterprises, and elite groups from various fields to participate in digital rural construction practice, use digital technology and concepts to attract villagers to participate in rural governance, and build policy consensus and multi-power. Promote deep integration of digitalization with rural governance, agricultural production, and rural public services oriented by villagers' demands to activate the endogenous digital power for rural revitalization.

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## Author Contributions

Yang Qianwen: Paper writing and data analysis;
Wang Jiahe: Research topic determination and paper revision.

*Note: Figure translations are in progress. See original paper for figures.*