

# Analysis of the Integration Model of Rural Inclusive Finance and Digital Service Platform in the Context of the Gig Economy

Huixin Yu, Wenhong Cheng\*, Hongjuan Pan, Jiayi Ding, Xinyu Zheng

*Jiaxing University, Jiaxing, Zhejiang, China*

*\*Corresponding Author*

*Huixin Yu and Wenhong Cheng contributed equally to this study.*

**Abstract:** In the context of rural revitalization, the rural gig economy has become an important form of absorbing rural surplus labor and helping farmers increase their income. However, this group is structurally characterized by a lack of credit records, unstable incomes, and no effective collateral, making traditional rural financial services difficult to effectively meet their needs. The problems faced by the gig economy, such as difficulty in borrowing, slow arrival of funds, and lack of security, are in urgent need of solutions. At the same time, the wide application of digital technology provides technical conditions for inclusive financial services to the rural gig economy. This paper, from the perspective of the integration of inclusive finance and digital technology, summarizes the main characteristics and financial demands of the rural gig economy by reviewing existing research, and points out the shortcomings of current inclusive financial services. Based on international experience and theoretical analysis, three innovative mechanisms, namely "credit of behavioral data", "data-driven risk control", and "scenario-embedded services", are extracted, and how these mechanisms alleviate the shortage of financial services faced by the gig economy. This paper also offers suggestions from three levels - financial institutions, regulatory authorities and local department - to provide financial support for the development of the gig economy and to offer references for the in-depth application of digital inclusive finance in rural areas.

**Keywords:** Rural Gig Economy; Inclusive Finance; Behavior Data Creditization;

**Table 1. Comparison of Core Data on Financial supply and Demand Contradictions among Rural gig Workers**

Dimensions	Specific metrics	Problem definitions and impacts
Demand side	The proportion of gig workers with financing	Financing needs are widespread

**Scenario Embedded Services; Digital Platform**

## 1. Introduction

### 1.1 Question Raised: Focusing on the "Mismatch between Supply and Demand" of Rural Gig Financial Services

Driven by the wave of rural revitalization, the rural gig economy has seen explosive growth. As of now, there are over 120 million flexible workers in rural areas across the country, with a high proportion and wide coverage of rural gig workers. Their income has become an important economic support for rural households, which can directly relieve the economic pressure on some households and help improve their lives. But there is a serious structural mismatch between rural financial services and the demands of the gig workers, and a large number of reasonable financial demands are in a "quasi-supply gap". This mismatch can be reflected in the supply and demand contradiction of rural gig finance (see Table 1):

These mismatches highlight multiple flaws in the compatibility of the traditional rural financial service system: First, the credit evaluation system fails, and traditional risk control relies on "collateral + static flow", making it difficult to identify the "behavioral credit value" of gig workers; Second, the service efficiency is inadequate, with limited coverage of offline outlets and online services disconnected from specific scenarios, unable to meet the "immediacy" demand; Third, the product system is monotonous and cannot cover the complex needs of gig workers in terms of risk protection and flexible settlement with traditional deposit, loan and remittance services.

	needs	
	The financing amount is concentrated between 10,000 and 50,000 yuan	Demand is characterized by "small amounts", mainly for tool purchases and temporary turnover
	Expect to achieve a "daily settlement" or "immediate settlement" ratio	There is a high demand for the "immediacy" of capital turnover
	The proportion of those who have not purchased any occupational accident or health insurance	The risk tolerance is extremely weak, facing the risk of income interruption due to accidents
Supply side	Approval rates for loans from traditional financial institutions	The service threshold is high, and the vast majority of demands cannot be met
	The proportion of loan rejections due to "no collateral, no credit record"	The traditional credit evaluation system failed to identify the credit value of odd jobs
	The average number of bank branches per 10,000 people in a county	Undercoverage (only a third of that in cities), service reach is difficult
	The average arrival time of the traditional settlement model	It fails to meet the demand for "immediate" settlement

Data source: Sina Finance, China Financial News Network, China Economic News Network, China Institute for Inclusive Finance, Renmin University of China, Taylor & Francis Journal. In existing research, financial services for urban gig workers have become relatively mature. However, due to the scattered scenarios of rural gig workers (such as the reliance on offline venues for agricultural trusteeship) and fragmented data (lack of unified employment and income records), related studies still remain at the macro policy level and have not deeply analyzed the specific mechanism of the "platform model to solve the mismatch between supply and demand". Therefore, this paper aims to address the following question: How to build a rural financial service platform based on digital technology to solve the problems of "difficulty in borrowing, slow arrival of funds, and low guarantee" for gig workers through model innovation? What are the innovative mechanisms of the platform in terms of credit evaluation, risk prevention and control, and service efficiency? What are the actual effects and replicable experiences of typical cases?

### 1.2 Research Significance

a. Theoretical significance: Fill the research gap in the intersection of rural zero economy and financial innovation, build an integrated analytical framework of "digital technology - platform ecosystem - inclusive finance", broaden the application of platform economics in rural scenarios, provide a new perspective of "behavioral data creditization" for credit evaluation theory, and integrate relevant international research results to construct a theoretical system in line with the reality of rural China.

b Practical significance: Provide operational

platform construction solutions for county-level financial institutions such as rural commercial banks and rural credit cooperatives, summarize development paths in different regions by comparing typical cases, and help them precisely serve rural gig work; At the same time, it provides a reference for local governments to formulate policies to support the rural gig economy, promotes high-quality development of rural digital inclusive finance, and helps implement the rural revitalization strategy.

## 2. Literature Review

### 2.1 Characteristics and Financial Demands of Rural Gig Economy

Most scholars believe that the gig economy is a new type of economy formed by digital platforms, with the core characteristics being flexible work arrangements, loose employment relationships, and piece-rate remuneration [1]. In the context of rural areas, it encompasses both new types of gig jobs created by e-commerce platforms and live-streaming sales, as well as traditional gig jobs in suburban labor markets. Essentially, it is a form [2] of digital flexible employment without a fixed employer.

In terms of actual operational characteristics, the rural gig economy has three distinct features: First, the income is unstable and risky. Research shows that more than 80% of rural migrant workers who do gig work do not participate in the urban employee endowment insurance, and their income fluctuates significantly due to changes in the workload and market demand; Second, the operation process is highly dependent on digital technology. The entire process of gig work taking orders, attendance, and salary settlement is completed through the platform, and the resulting rich data records

provide a key foundation [3] for financial service innovation. Third, it has a wide range of application scenarios, from temporary service positions[4]driven by "village supermarkets" to flexible employment[5]in outsourced factories involving left-behind women in western Guangdong, and has permeated multiple fields such as cultural services and manufacturing.

In terms of international research, the International Labour Organization [6] points out that rural gig workers in developing countries generally face the problem of difficulty in accessing financial services, and the core reason is the mismatch between the traditional credit evaluation system and the characteristics of gig income. Banerjee & Duflo found in their study of rural India that behavioral data based on digital platforms can effectively replace traditional collateral, making it easier for the gig workers to obtain financing [7].

## 2.2 Development and Challenges of Inclusive Finance in Rural Areas

As an important supporting force for serving agriculture, rural areas and farmers and promoting rural revitalization, the core objective of rural inclusive finance is to achieve a balance [8] between inclusiveness and sustainability. But the traditional model fails to meet the demands of the gig economy. There are three prominent contradictions: First, the contradiction between inclusiveness and high costs. Rural gig workers are scattered, leading to an expansion of the service scope of financial institutions and an increase [9] in transaction costs; There is a contradiction between risk control and information asymmetry. Most rural gig workers do not have qualified collateral and have less [3] credit data. Third, there is a contradiction between the diversity of demand and the singularity of supply. Gig income is flexible and fluctuating, which is clearly incompatible with the traditional credit model of "fixed-period repayment".

In the field of international research, the Consultative Group [10] on Poverty Alleviation pointed out in the practice of inclusive finance in rural Africa that scenario-based financial services can increase the proportion of rural gig workers using financial services by more than 35 percent. Morduch & Ogden proposed the concept of "embedded inclusive finance", emphasizing that financial services should be embedded in [11] the employment process and

capital turnover of gig workers.

## 2.3 Application of Digital Technology in Financial Services

Digital platforms are an important way to address the aforementioned contradictions and connect the gig economy with rural inclusive finance. On the one hand, the platform can bring together the labor supply of gig workers and the service demands of financial institutions, reducing information asymmetry and creating economies of scale [12]; On the other hand, the platform can build a credit profile based on data such as the number of jobs, income stability, and service evaluations of gig workers, providing reliable decision-making basis [3] for inclusive credit. Empirical studies also show that for every unit increase in the Digital finance index, rural gig workers' wages increase by 2.3%.

In terms of international research, Rochet & Tirole built a pricing model for multilateral financial platforms, providing theoretical support [13] for the design of the platform's profit model. Evans & Schmalensee found in their study of rural financial platforms in Southeast Asia that the collaboration of the government, financial institutions and gig platforms could increase the operational efficiency of the platforms by [14]40 percent.

## 2.4 Review of the Study

Although the academic community has recognized the necessity of integrating the gig economy with inclusive finance in rural areas, there are still two key issues: First, the core divergence has not been resolved. When judging the role of the platform, scholars such as Zhang Xinhua recognize its inclusive value [15] in promoting the downward flow of financial resources, while scholars such as Wu Jing remind it that it controls the "overall absorption" risk of labor through algorithms. Second, there are obvious deficiencies in existing research. Empirical research on the synergy mechanism is relatively weak, financial product innovation suitable for the characteristics of gig work is insufficient, and systematic research on issues such as "order loans" and "flexible repayments" has not been carried out.

Based on the current research, it is necessary to build a financial service platform for rural gig workers that is centered on "inclusiveness and win-win" and jointly governed by the government, the market and social forces. Based

on this, this paper will further analyze the construction model and innovation path of the platform.

### 3. Innovative Models of Rural Financial Service Platforms: Theoretical Framework and Core Mechanisms

#### 3.1 Paradigm Differences between Traditional Models and Platform Models

Traditional rural finance is "centered on bank

branches" and is characterized by "passive service, single product, and collateral risk control". The service logic, product design and risk control methods are not suitable for the needs of the gig workers. There is an essential difference in the core logic between the platform, which is centered on the actual scenarios of gig workers and relies on digital technology to achieve the transformation of "active service, diversified products, and data risk control" (see Table 2).

**Table 2. Comparative Analysis of Traditional Rural Financial Model and Rural Financial Service Platform Model**

Comparison dimensions	Traditional rural finance		Rural financial services platform	
	Inherent patterns	Defects	Innovation mode	Advantages
Service logic	The customer finds the bank (Bank Passive)	Relying on offline outlets for reach, the service coverage is limited	Bank embedded scenarios (Proactive Service)	Embedded in gig employment and settlement scenarios, high reach efficiency
Core product	Deposit, loan, remittance (Universal)	Product design standardization, disconnected from gig demand	Gig loans, daily settlement cards, accident insurance (scenario-customized)	Adapt to the small and frequent needs of gig workers
Credit evaluation	Dependent on collateral	It is difficult to identify the value of behavioral credit	Credit behavior data (Orders, employer ratings, etc.)	Build a dynamic credit system
Risk prevention and control	Manual review and post-event recovery	Risk control is inefficient and costly	Data-driven (Pre-loan profiling, in-loan monitoring, post-loan alerts)	Dynamic risk control throughout the entire process
Service efficiency	Loan approval takes 3 to 7 days and settlement takes 1 to 3 working days	It cannot meet the immediate demand	Instant loan approval and immediate settlement	Adapt to the capital turnover needs of casual workers
Value creation	Earning spreads (One-way profit)	The profit model is monotonous and unsustainable	Service charges + data value + ecosystem benefits (Multilateral profit)	Diversified profit structure

Data source: Wang Xiaoya, Li Hongshu (2021)[9]; Zhang Yi, Ming Juan (2022)[3]; Zhang Chuanyong, CAI Qimeng (2021)[12]; Morduch J, Ogden E (2020)[11]; Evans D S, Schmalensee R (2021)[14]; CGAP (2023)

#### 3.2 Credit Evaluation Innovation: From "Collateral Dependency" to "Behavioral Data Creditification" Theory and Practice

For rural financial service platforms to meet the needs of the gig workers, the key lies in reconfiguring the credit assessment logic - no longer relying on traditional collateral such as real estate and land, but by analyzing the behavioral data of the gig workers to determine their credit level and repayment ability. This innovation is supported by both the theory of inclusive finance and the theory of platform

economy, as well as international practical experience.

From a theoretical perspective, the "credit construction theory" in the inclusive finance system provides the core logical framework for this innovation. The theory, systematically proposed by Morduch & Ogden, clearly states that the traditional credit system is centered on collateral and essentially excludes "credit white households" with no credit record at the institutional level, but the implicit behavioral data of such groups can be transformed into the basis for credit assessment - a view that has been verified in practice in the rural gig economy scenario. Although the gig workers have no traditional credit records, the data they generate on digital platforms, such as order intake frequency, employer evaluation, and settlement

stability, can effectively reflect their income capacity and willingness[11] to repay on time. At the same time, the concept of "data value" in the platform economy theory further refines this logical framework. Evans & Schmalensee confirmed in their study of rural finance in Southeast Asia that behavioral data during the gig labor process can be transformed into "data assets" recognized by financial institutions, increasing the probability of gig workers obtaining loans by 40[14] percent; This conclusion is consistent with the findings of Banerjee & Duflo in rural India, jointly indicating that behavioral data can effectively replace traditional collateral and provide both theoretical and empirical support for solving the financing difficulties of the gig population[7].

In terms of practical exploration, financial institutions at home and abroad have formed a variety of practical paths. Rural financial institutions in India have built a "three-dimensional credit assessment model" by integrating data such as the scale of farmland on agricultural trusteeship platforms and the distribution efficiency of logistics platforms to comprehensively measure the stability of gig employment and service quality; Fujian Longyan Rural Commercial Bank in China has deeply connected with the "Longlingong" platform, collecting six behavioral data such as order completion volume and employer feedback to build a "gig credit score" system - gig workers with a 30% weight of order frequency, a 25% customer satisfaction rate, and a credit score of 65 can directly apply for unsecured loans of 10,000 to 50,000 yuan. Successfully breaking the limitations of the traditional credit evaluation system.

It should be noted that such innovations still face practical problems in data collection and data quality. Liu Ping et al. pointed out that some county-level gig platforms are reluctant to open up core data resources due to data security or commercial interests, resulting in an incomplete credit assessment of gig workers. In addition, the subjectivity of employers' evaluations and the lack of standardized order records may lead to credit score deviations. As Zhang Chuanwen pointed out, the "fragmentation" of gig data is significant, and there is an urgent need to establish a unified data standard and sharing mechanism to ensure the accuracy [2] of credit evaluation.

### **3.3 Innovation in Risk Control: Theoretical Support and practical Logic Driven by Data throughout the Entire Process**

An important optimization of traditional "manual review + post-event recovery" risk control by rural financial service platforms, based on information asymmetry theory, collaborative governance theory and modern risk control theory, combined with international practice to form a feasible path.

The theory of information asymmetry is the core basis of this innovation. Akerlof's "lemon market" theory suggests that information asymmetry leads to adverse selection and moral hazard in financial markets, a problem that is particularly prominent in the gig economy scenario - where financial markets struggle to keep real-time track of gig employment, income fluctuations, and other information. To address this issue, the platform model Narrows the information gap through multi-faceted data integration: Shanxi Pingshun Rural Commercial Bank builds a "one-stop platform" that integrates three types of information: government employment data, employer salary records, and platform order status to construct a risk profile of gig workers; The African Rural Finance platform, in collaboration with gig platforms and insurance companies, acquires real-time service evaluation and claims data, reducing information asymmetry by more[10] than 60 percent. The idea of multi-source data synergy is in line with Stiglitz's information economics view that "sharing data among multiple entities is the key to reducing market risk."

The theory of co-governance further provides logical support for multi-agent participation. Ostrom's theory of public resource governance emphasizes that complex problems need to be solved through multi-party collaboration, which is reflected in gig risk control as a four-party linkage of "government - financial institutions - employers - platforms": the government opens up bad credit records and employment data, financial institutions build risk control models, employers provide feedback on gig work status, and platforms monitor changes in order taking in real time. The Southeast Asian rural finance platform has increased operational efficiency by 40 percent and reduced bad debt rates by 25 percent through this mechanism; The "Gig Station" of Shanxi Huguan Rural Commercial Bank in China also verified the effectiveness [14] of the synergy mechanism by working with

employers to suspend employment information matching for gig workers who failed to repay their debts on time, using "employment constraints" to correct default behavior.

From a practical perspective, full-process risk control has established an overall closed loop of "pre-loan - during-loan - post-loan", with the core being the quantitative measurement and dynamic control of default risk using a specific probability distribution model. In the pre-loan stage, the platform assumes that the default probability  $PD(t)$  of gig workers is a function of a series of behavioral data and follows a Logistic distribution, aggregating behavioral data through credit scores to achieve differentiated credit granting. In the loan process, to provide early warning of extreme shocks, a generalized extremum distribution (GEV) is introduced to model the default distance adjustment for capturing tail risks. In the post-loan phase, to deal with associated default risks, a joint default probability model based on Gaussian Copula is adopted and a coordinated recovery strategy is developed accordingly. At the same time, risk profiling can be improved by combining basic distribution ideas such as normal distribution. In recent years, machine learning algorithms such as XGBoost have been widely used to mine complex patterns in data and have been proven to optimize the calibration and prediction accuracy of models at each stage.

Notably, scholars such as Tang Kaikang also pointed out that some county-level financial institutions have insufficient technological investment, making it difficult to achieve real-time data processing and automatic early warning; In addition, the integration of diverse data may touch upon privacy protection issues. Therefore, it is necessary to establish data desensitization and permission control mechanisms to avoid violations of the Personal Information Protection Law and find a proper balance between efficiency and compliance.

### **3.4 Service Efficiency Innovation: Theoretical Logic and Practical Exploration of Scenario-based Embedded Services**

Improving service efficiency is the key for rural financial service platforms to gain recognition from gig workers, and the theoretical support mainly comes from embedded finance and scenario finance theories. The specific path of "deep integration of finance and scenarios" has been demonstrated in domestic and international

practices.

Embedded finance theory provides a core framework for service efficiency. Morduch & Ogden proposed that financial services should be embedded in everyday scenarios [11]. In terms of domestic practice, regional rural commercial banks have attempted to integrate finance with employment processes in gig business: Shanxi Huguan Rural Commercial Bank's "Daily settlement card" enables immediate payment arrival; Longyan Rural Commercial Bank's "gig Loan" has shortened the approval process to 10 minutes; Pingshun Rural Commercial Bank's "order-based accident Insurance" provides simultaneous protection for orders. The domestic rural commercial bank's business practice is consistent with CGAP's experience in Africa, showing that scenario-based services can increase the usage rate of gig finance by more [10] than 35%.

The theory of scenario finance can further refine the service logic. Scholtens emphasizes that financial products should be adapted to specific scenario requirements. Gig workers' "small amounts, high frequency, order" feature requires services to have immediate and fragmented response capabilities. Li Xiaoxin pointed out that its financing, settlement and security needs are generated by orders and need to be triggered on demand. Huguan Rural Commercial Bank's "gig Station" integrates employment and financial services through "offline + online", effectively reducing access costs.

However, efficiency improvement still faces challenges such as synergy costs and operational pressure. Liu Ping et al. pointed out that scenario embedding requires multi-party collaboration, and if employers or insurance institutions do not cooperate well, the service will be difficult to implement; Offline stations are difficult to promote in areas with insufficient subsidies due to high rent and labor costs. This also confirms the view of Xie Fusheng et al. That the "flexibility" of the gig economy requires shared costs between the government and the market to achieve service sustainability.

## **4. Case Analysis and Comparison: Validation of an Innovative Mechanism Based on a Unified Credit Scoring Model**

### **4.1 Rural Gig Credit Scoring Model: Theoretical Framework and Quantitative Methods**

To address the mismatch between the traditional credit evaluation system and the characteristics of the gig economy, a unified credit scoring model for rural gig workers can be constructed. Based on the "behavioral data creditification" theoretical framework, the multi-dimensional behavioral data of the gig workers will be transformed into quantifiable credit scores to provide a unified standard for subsequent case analysis.

The model covers five core dimensions of assessment metrics: the employment stability dimension (weight 30%) examines the sustainability and regularity of gig employment; The service quality dimension (25% weight) assesses service quality based on the employer evaluation system; The income stability dimension (20% weight) analyzes income fluctuations and repayment ability; The

$$S\_rating \begin{cases} 100 & R \geq 0.95 \\ 80 + (R - 0.9)/0.05 * 20 & 0.9 < R < 0.95 \\ 60 + (R - 0.8)/0.1 * 20 & 0.8 < R < 0.9 \\ R/0.8 * 60 & R < 0.8 \end{cases} \quad (2)$$

Here is the employer approval rate  $R$

$$S\_income \begin{cases} 100 & \sigma \leq 0.20 \\ 100 - (\sigma - 0.2)/0.15 * 40 & 0.2 < \sigma < 0.35 \\ 60 - (\sigma - 0.35)/0.15 * 30 & 0.35 < \sigma < 0.5 \\ 30 & \sigma > 0.5 \end{cases} \quad (3)$$

Here is the standard deviation of monthly income/mean monthly income  $\sigma$ .

(4) Residential stability scoring function:

$$S\_residence = \min(100, 60 + (T - 1)/4 * 40) \quad (4)$$

Where is the length of residence in the local area (years)  $T$

(5) Social Credit scoring function:

$$S\_social = \min(100, 50 + N * 25) \quad (5)$$

Where  $N$  is the number of neighborhood

$$t = (x1 - x2)/\text{sqrt}(((n1 - 1)s1^2 + (n2 - 1)s2^2)/(n1 + n2 - 2) * (1/n1 + 1/n2)) \quad (8)$$

Where  $x1$  and  $x2$  represent the average monthly income of the two groups over the last six months,  $n1$  and  $n2$  represent the sample size, and  $s1^2$  and  $s2^2$  represent the income variance and degrees of freedom  $df = n1 + n2 - 2$

#### 4.2 The Basis and Methodology for Setting Thresholds of Key Behavioral Indicators

Based on empirical data from three case banks,

residential stability dimension (15% weight) assesses the degree of social integration of gig workers in the local area; The social credit dimension (10 percent weight) integrates soft information such as community evaluations.

In the standardized scoring function system, the scoring functions of each dimension are defined as follows:

In the standardized scoring function system, the dimension scoring functions are defined as follows:

(1) Order intake scoring function:

$$S\_order \begin{cases} 100 & O \geq 40 \\ 70 + (O - 20)/20 * 30 & 20 < O < 40 \\ O/20 * 70 & O < 20 \end{cases} \quad (1)$$

Here is the average monthly order intake for the last three months  $O$

(2) Positive review rating function:

$$R \geq 0.95$$

(3) Income stability scoring function:

$$\sigma \leq 0.20$$

"recommendation" evaluations

(6) Credit total score calculation formula:

$$0.30 * S\_order + S\_rating + 0.20 * S\_income \quad (6)$$

(7) Based on the credit score results, divide the gig workers into:

$$\begin{cases} \text{Credit-eligible group} & \text{CreditScore} \geq 65 \\ \text{Credit-ineligible group} & \text{CreditScore} < 65 \end{cases} \quad (7)$$

(8) Verify the discriminant validity of the model using an independent sample t-test:

there was a significant difference in average monthly income between the credit-qualified group and the non-qualified group ( $t=4.32$ ,  $p<0.001$ ), verifying the effective ability of the credit scoring model to distinguish between gig income capacity and credit risk.

Based on the construction of the above scoring model, the threshold setting of key behavioral indicators became the core link that determined the model's discriminatory ability and the

accuracy of risk identification. The following text will systematically describe the basis and methodology for setting thresholds in each dimension.

This study calibrated the core thresholds based on descriptive statistics and percentile analysis of desensitized data from gig platforms in places such as Longyan, Fujian and Huguan, Shanxi, in combination with backtesting and industry practice. In terms of order intake, the data analysis showed that about 30 percent of the sample had a monthly order intake of less than 20, whose income level was significantly lower than the average and they were often regarded as "inactive" or "part-time" users, with a high degree of uncertainty in repayment ability; About 20 percent of the sample had a stable and significantly above-average income and could be classified as "full-time" or "highly active" gig workers with a lower credit risk. These two thresholds effectively divide the gig workers into three levels of activity - low, medium, and high - demonstrating a good ability to distinguish risks. In terms of income stability, the model sets volatility thresholds: when income volatility ( $\sigma$ ) is less than or equal to 20%, it indicates that gig income is very stable, and its risk characteristics are similar to those of the salaried class with a fixed income; Volatility between 20% and 50% is moderate to high volatility, which reflects typical characteristics of the gig economy; Volatility above 50% is considered extremely high volatility, corresponding to high-risk groups. This segment is based on the distribution characteristics of the income volatility of the sample data (such as quills) or the results of cluster analysis, and is verified by backtracking of the bank's historical bad debt data to ensure that the default performance of customers in each risk segment is statistically significant.

In addition, the threshold for the positive review rate was set by drawing on the mature practices of the platform economy and signal theory. In mature platforms such as e-commerce and mobility, a positive review rate below 80% typically indicates service quality not meeting market benchmarks, above 90% is considered good, and above 95% represents quality service providers. This widely accepted evaluation standard is introduced into the credit assessment framework of this model. In the dimension of social capital, based on social capital theory and embedded finance theory, the model uses "more than one year of residence" and "more than two

neighborhood recommendations" as effective indicators to measure social capital and default costs. This quantitative standard is derived from the front-line practice of "gig stations" in places like Huguan, indicating that gig stability and community binding force are significantly stronger [11] when these conditions are met. Ultimately, the combined setting of the credit threshold (65 points) was determined through backtesting of the model. After substituting historical data into the model and observing the actual default rates of different customer groups corresponding to different score lines (such as 60, 65, 70), it was found that 65 is the best advantage of keeping the default rate within the acceptable target range of the bank while ensuring sufficient customer coverage, achieving a balance between inclusiveness and commercial sustainability.

#### 4.3 Case Analysis: A Multi-Practice Approach to Three-Dimensional Innovation Mechanisms

Based on a unified credit scoring model, the three case regions developed a "tailored to local conditions" practice model. Although the same assessment dimensions were used, different regions chose different implementation paths and breakthroughs when the model was put into practice due to different regional resource conditions.

a. Fujian Longyan Rural Commercial Bank: Credit Reconstruction Empowered by Technology

Fujian Longyan Rural Commercial Bank automates the entire process of its model through digital technology and works deeply with the "Longlinggong" platform, focusing on strengthening the dimensions of employment stability and service quality. By using API interfaces to obtain real-time data such as the number of orders received and the positive review rate, the system automatically completes the score calculation and embeds the entire credit approval process. This model builds a new type of risk control standard centered on "labor credit". The system can automatically approve and implement differentiated credit granting, dynamically monitor risk signals such as abnormal odd jobs, compress approval time to the minute level, and precisely match the "small amount, high frequency, emergency" financing needs of the odd job group.

b. Shanxi Huguan Rural Commercial Bank:

Service ice-breaking in Scenario Embedding

In response to the weak digital infrastructure in the local area, Huguan Rural Commercial Bank has innovatively introduced dimensions of social credit and residential stability based on the "gig station" model. By collecting soft information such as neighborhood evaluations and length of residence offline, and focusing on measuring relevant indicator parameters, it compensates for the data sources that traditional finance neglects. Scenario integration forms differentiated risk control measures. As physical service nodes, the station effectively acquires soft information such as real income flow and job stability of gig workers, fills the deficiencies of traditional models, and lays the foundation for building a credit assessment system that is more in line with local realities.

c. Shanxi Pingshun Rural Commercial Bank: System Empowerment under Ecological integration

Pingshun Rural Commercial Bank solidifies the foundation of model implementation through government-bank collaboration mechanisms, focuses on ensuring data quality in the dimension of income stability, uses government data sharing to accurately obtain the range of income fluctuations, and comprehensively covers the five dimensions of the model to ensure score integrity. The platform is connected to the government's open county-level employment data resources, backed by government credit to build a "data + credit" dual guarantee system, effectively reducing risk costs and transaction costs in financial services and providing institutional support for the sustainable development of inclusive finance.

4.4 Theoretical Implications and Practical Significance

The study found that the success of all three

cases was based on the unified credit scoring model, and by emphasizing different dimensions of data application, it jointly confirmed the feasibility of "behavioral data creditization". The practice of moving from a "unified framework" to a "differential path" reveals the inherent law of platform model diversity.

The core of the success of these cases lies in the deep integration of credit innovation and regional conditions. The effectiveness of the model largely depends on the fit of data capabilities to regional characteristics: regions with a better digital foundation can achieve full-dimensional automatic scoring through technology empowerment; Scene embedding can effectively complement "soft information" in areas where offline gig workers are concentrated and familiar social features are prominent; In regions with strong government coordination capabilities, ecological integration can provide institutional guarantees for data quality.

Therefore, there is no single "optimal path", but there are unified evaluation criteria. Credit models provide a comparable basis for local practices, but the choice of specific paths should be based on a comprehensive judgment of regional digitalization levels, market activity, and government collaboration capabilities to achieve localized innovation.

4.5 Policy Recommendations

Based on the practice validation of the Unified credit scoring model, this study constructs a policy system that is coordinated by financial institutions, regulatory authorities and local governments. The system, while maintaining the consistency of the assessment framework, fully considers regional differences and provides institutional guarantees for the large-scale promotion of the innovation mechanism (as shown in Table 3).

**Table 3. Multi-Dimensional Policy Recommendations Framework for Promoting Rural Gig Finance Development**

Responsible entities	Core Policy Direction	Examples of Key initiatives
Financial institutions	Enhance the ability to apply behavioral data	Implement differentiated strategies. Digital advantage areas should focus on promoting full-process model automation, setting up real-time interfaces and dynamic monitoring. Gig agglomeration areas should increase physical service networks to supplement soft information such as social credit and residential stability. Government collaboration areas should make full use of government data sharing channels
	Build a full-process data risk control system	Integrate third-party data to establish a "pre-loan - during-loan - post-loan" risk control loop; Set up dynamic early warning indicators
	Promote scenario-based financial product innovation	Develop products that meet the full life cycle needs of gig workers, such as "daily settlement cards", "pay-per-view accident insurance", and "gig loans"
Regulatory	Establish a "pilot-evaluation"	Simplify the approval process, select pilot projects in different regions, and track

authorities	mechanism for innovative products	key indicators such as risk control bad debt rate and service coverage. At the same time, a classified pilot mechanism will be established to support full-dimensional automated assessment in technologically mature regions and recognize the credit value of soft information in traditional gig markets
	Accelerate the formulation of data security norms for gig workers	Define data rights and responsibilities, establish desensitization, permission control and security traceability mechanisms, and balance utilization and privacy protection
	Implement differentiated regulatory incentive policies	Set a lower risk weight for gig loans; Offer incentives such as targeted reserve requirement ratio cuts and fiscal interest subsidies
Local governments	Build regional gig data sharing platforms	Unify data standards and open standardized interfaces to financial institutions; Strengthen the supply of data in specific dimensions in line with local resource endowments, deepen the construction of platform interfaces in digital advantage regions, improve the soft information collection mechanism in gig agglomeration areas, and focus on opening up government data in government-coordinated advantage regions; The application results of the credit model are incorporated into the local development evaluation system to promote the formation of a virtuous cycle of data-driven credit
	Subsidize the operating costs of service platforms	Provide venue and operation subsidies for "gig work stations", etc. Provide subsidies for gig insurance premiums
	Improve the mechanism for safeguarding the rights and interests of gig workers	Formulate measures to protect rights and interests and regulate employment and payment; Explore flexible social security models on a per-bill basis

Data source: Zhang Xinhua (2024) [15]; Li Xiaoxin (2023); Pan Dan (2022); Rochet J C, Tirole J(2022)[13]; Scholtens B (2016); Li J,Wang H (2024)

After conducting a systematic study on rural gig financial services, this paper constructs a complete analytical framework of "problem diagnosis - mechanism refinement - case verification". The study confirmed that the three innovative mechanisms of "credit of behavioral data, data-driven risk control, and scenario-based embedded services" can effectively address the problems of financing barriers, inefficient settlement, and weak protection faced by the gig workers. The core logic lies in transforming gig behavior data into credit capital through digital technology, improving the risk control system based on multi-source data, enhancing service matching through scenario-based design, and ultimately achieving precise connection between financial resources and the gig economy.

Practice shows that for the three mechanisms to be successfully implemented, it is necessary to select the implementation methods based on the actual situation of the region and cannot do without the coordination of financial institutions, regulatory authorities and local governments. The product innovation of financial institutions is the fundamental guarantee, the institutional support of regulatory authorities is the key, and the data sharing and ecosystem construction of local governments are the important support. In the future, as the gig economy continues to develop, further exploration will be needed in areas such as data privacy protection, sustainable

platform operation, and regional differentiation adaptation. This demand-centered, technology-supported and collaborative service model not only provides a feasible solution to the problem of rural inclusive finance, but also the "mechanism-case" practical experience it forms provides a valuable Chinese practice sample for the development of rural inclusive finance facing similar challenges globally.

## 5. Conclusions

The research shows that the core reason for the "mismatch between supply and demand" in rural gig finance is that traditional financial service models are difficult to match the specific attributes of this group. The gig economy is characterized by large income fluctuations, digital technology-dependent work processes, and scattered employment scenarios, which have given rise to demands for small, frequent, time-sensitive financial services that are deeply integrated with work scenarios. The traditional inclusive finance system has long faced three inherent contradictions: the conflict between high service costs and inclusive goals, the contradiction between limited risk control capabilities and information asymmetry, and the imbalance between single product supply and diversified demand. The passive service model, excessive reliance on collateral assets and inefficient operational processes have led to the gig workers' predicament in terms of financing and borrowing, fund settlement and rights protection, which has become a major financial obstacle to the development of this group.

To address the shortage of financial services for the gig group, three innovative mechanisms - "credit of behavioral data", "data-driven risk control", and "scenario-based embedded services" - offer solutions. Behavioral data creditification collects data such as the frequency of orders received by gig platforms, employer feedback, and settlement patterns and quantifies them into credit assets, breaking away from the reliance of traditional credit on collateral; Data-driven risk control integrates government employment data, employer salary statements, and platform order status to build a full-process management system of pre-loan profiling, in-loan monitoring, and post-loan early warning to reduce credit risk; Scene-embedded services embed financial services into business scenarios such as gig work order settlement and rights protection to enhance service efficiency and fit. The three mechanisms work together to form the core system to solve the financial predicament of gig workers.

The actual implementation of the three innovative mechanisms requires differentiated execution paths based on regional resource endowments and relies on the collaboration of multiple entities. The case study shows that Longyan, Fujian Province (with a relatively solid digital foundation) takes "credit of behavioral data" as the core breakthrough point and completes the innovation of the credit assessment system and the upgrade of service efficiency through technology empowerment; Huguan, Shanxi (with a significant concentration of offline gig workers) is oriented towards "scene-embedded services", opening up service channels through the integration form of "offline service stations + online digital platforms", and simultaneously accumulating behavioral data to feed back to credit evaluation and risk control during the service process; In Pingshun, Shanxi (where market resources are relatively scarce), government collaboration is the supporting premise to create the necessary resource conditions for the implementation of the three mechanisms by promoting data openness and sharing, implementing fiscal subsidy policies and providing policy credit endorsements. The practices of the three regions jointly demonstrate that "data acquisition capacity, depth of scenario embedding, and level of multi-party collaboration" are key elements to ensure the effective operation of the mechanism, and the specific implementation needs to select the

appropriate path in combination with the progress of regional digital development, market activity and government coordination capacity.

### Acknowledgement

This thesis is funded by the National-level University Students' Innovation and Entrepreneurship Training Program, with the project number 202510354083X.

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