

Original Paper

Research on the Models and Pathways of Digital Inclusive Finance Empowering the Development of Enriching Industries in Chongqing's Districts and Counties

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Abstract

As a key component of the “five major articles” of finance, digital inclusive finance serves as a critical instrument for alleviating financing constraints in the mountainous counties of Chongqing and empowering the development of people-enriching industries at the district and county levels. Drawing on data concerning people-enriching industries and digital inclusive finance development across 37 districts and counties in Chongqing, this paper systematically examines the current state of both. It identifies the following problems in the process of digital inclusive finance empowering district- and county-level people-enriching industries: prominent agriculture-related data silos and inter-departmental barriers, the digital capability divide among rural households constraining the downward penetration of financial services, the mismatch between the inherent vulnerability of industries and risk-sharing mechanisms, and challenges confronting the commercial sustainability of digital finance. Four service models are proposed: “embedding in industrial chain platforms,” “credit reconstruction through multi-dimensional data,” “credit enhancement via e-commerce transaction data,” and “digital activation of rural property rights.” Optimization paths are further advanced along four dimensions: data infrastructure development, coordinated industrial organization, improvement of risk-sharing mechanisms, and differentiated regional strategies. The policy implication of this paper is that only by forging a closed-loop ecosystem characterized by the three-chain coupling of “data aggregation—credit transformation—industrial anchoring,” and by achieving the data-driven transformation of risk identification, the scenario-embedded transformation of financial supply, and the dynamic rebalancing of the government–market relationship, can the empowering effect of digital inclusive finance on district- and county-level people-enriching industries be genuinely unleashed.

Keywords

digital inclusive finance, people-enriching industries, rural revitalization, Chongqing

1. Introduction

As one of the “five major articles” of finance proposed at the Central Financial Work Conference, digital inclusive finance has in recent years received widespread attention for its role in serving county-level economies and rural revitalization. At a critical juncture of building a new development paradigm and solidly advancing common prosperity, digital inclusive finance—with its capabilities in big data-driven risk control, mobile outreach, and platform integration—is emerging as a core nexus connecting financial resources with county-level specialty industries. Compared with traditional financial services, digital inclusive finance reduces information asymmetry and transaction costs through technological means, enabling smallholder farmers, family farms, and rural micro and small enterprises that were formerly excluded from the formal financial system to gain access to credit and comprehensive financial services. This is of great significance for resolving rural financing difficulties, promoting county-level industrial upgrading, and increasing farmers’ incomes.

Chongqing is a municipality that integrates the characteristics of a large city, a large rural area, large mountainous regions, and a large reservoir area. Nearly half of its 37 districts and counties are located in the urban cluster of the Three Gorges Reservoir Area in northeastern Chongqing and the urban cluster of the Wuling Mountain Area in southeastern Chongqing, with mountains and hills accounting for 98% of the municipality’s total area. These distinctive geographical conditions determine that agriculture in Chongqing cannot pursue large-scale contiguous operations; instead, it must rely on local resource endowments to cultivate specialty people-enriching industries under the “one county, one product” and “one town, one industry” approach. According to Chongqing’s 15th Five-Year Plan for Agricultural and Rural Modernization, the municipality has laid out five specialty industry belts: the upper Yangtze River zhacai (pickled mustard tuber) belt, the middle-upper Yangtze River citrus belt, the premium Wushan crisp plum belt, the alpine ecological tea belt, and the Wuling Mountain traditional Chinese medicinal materials belt. The whole-industry-chain output values of Fengjie navel oranges, Fuling zhacai, and Wushan crisp plums have each exceeded ten billion yuan. Rooted in county-level areas and linking urban and rural sectors, these industries constitute an important source of both business income and wage income for Chongqing’s farmers.

However, the development of people-enriching industries has long faced structural mismatches between financial supply and industrial demand. Traditional rural credit relies on collateral and financial statements, whereas the operating entities of specialty crop cultivation and animal husbandry are predominantly smallholder farmers and family farms that lack eligible collateral, face long production cycles, high natural risks, and volatile returns. The problem of financial institutions “daring not lend, being unwilling to lend, and lacking the expertise to lend” has long persisted. The rise of digital inclusive finance offers new possibilities for breaking through this dilemma. In recent years, local corporate financial institutions in Chongqing, represented by Chongqing Rural Commercial Bank, have focused on specialty industries such as Wushan crisp plums, Wuxi traditional Chinese medicinal materials, and Xiushan e-commerce, exploring a variety of practices including digital comprehensive service platforms, “demonstration projects” for industrial chain finance, and village-wide credit extension, thereby accumulating rich practical experience. Against this backdrop, how to systematically summarize the models and mechanisms through which digital inclusive finance empowers district- and county-level people-enriching industries, identify practical bottlenecks, and propose optimization paths has become an important research topic that urgently demands in-depth investigation.

A review of the existing literature reveals a substantial body of research on the economic effects of digital inclusive finance, primarily organized around the following three strands. First, the economic growth effects of digital inclusive finance. Existing studies show that digital inclusive finance helps alleviate financing constraints for small and medium-sized enterprises (Zhong et al., 2022), improve enterprise production efficiency (Li & Zhou, 2018), stimulate enterprise technological innovation (Tang et al., 2020; Guo & Yin, 2022), and promote entrepreneurial activity (Xie et al., 2018), ultimately fostering economic growth. Second, the poverty reduction effects of digital inclusive finance. As an effective supplement to traditional financial provision such as banking and insurance, digital inclusive finance can effectively reach segmented populations excluded from formal financial channels, particularly the rural poor, and—through the employment and entrepreneurship enhancement effects (Allen et al., 2016; Zhang et al., 2019; Feng & Cai, 2021) and consumption promotion effects (Fu & Huang, 2018; Li & Zhou, 2021) of digital inclusive finance—thereby promote income growth and the convergence of the urban-rural income gap (Agnello et al., 2012; Huang et al., 2019; Xu & Feng, 2022). Third, the industrial structure upgrading effects of digital inclusive finance. Studies have found that digital inclusive finance has strengthened resource allocation efficiency in the process of capital accumulation, and can address social supply-demand imbalances and promote industrial structure upgrading (Bruhn, 2014; Li & Ran, 2021; Zhou & Zhang, 2022). Narrowing income gaps, capital accumulation, expanding consumer demand, and technological innovation constitute important mediating channels through which digital inclusive finance promotes the optimization and upgrading of industrial structure (Du et al., 2020; Lin & Chen, 2022). However, existing studies are predominantly based on econometric tests using provincial or county-level panel data, with insufficient process-oriented analysis of how digital inclusive finance empowers county-level specialty industries; in particular, there is a lack of systematic case studies focused on Chongqing—a region that combines the institutional advantages of a direct-controlled municipality with the territorial scale of a province and pronounced mountainous characteristics. Through an in-depth analysis of the current state of people-enriching industries and digital inclusive finance development across Chongqing’s districts and counties, this paper distills four service models, reveals the “three-chain coupling” empowerment mechanism, and proposes optimization paths along multiple dimensions, with a view to providing useful references for the development of digital inclusive finance in mountainous county-level areas of Chongqing and across the country.

2. Current State of People-Enriching Industries and Digital Inclusive Finance Development in Chongqing’s Districts and Counties

2.1 Current State of People-Enriching Industries in Chongqing’s Districts and Counties

Built upon mountainous ecological specialty agriculture, the people-enriching industries in Chongqing’s districts and counties have, in recent years and under the impetus of the “one county, one product” strategy, exhibited a sound trajectory of scale expansion, structural optimization, and brand upgrading, essentially forming a tiered development pattern characterized by “100-billion-yuan-level pillars leading, 50-billion-yuan-level competitive industries supporting, and specialty industry belts coordinating.”

First, the industrial layout has continued to optimize, and cluster effects are gradually emerging. According to Chongqing’s 15th Five-Year Plan for Agricultural and Rural Modernization, the municipality is advancing a “36316” modern agricultural industrial cluster system, comprising three

100-billion-yuan-level pillar industrial clusters (premium grain and oil, mountain fruits and vegetables, and ecological animal husbandry), six 50-billion-yuan-level competitive industrial clusters (including hotpot ingredients and Three Gorges citrus), three “golden name card” clusters of local specialties (Wushan crisp plums, Fuling zhacai, and Fengjie navel oranges), and sixteen growth-oriented specialty industrial clusters. Spatially, five specialty industry belts have taken shape: the upper Yangtze River zhacai industry belt centered on Fuling, Fengdu, and Wanzhou; the middle-upper Yangtze River citrus industry belt centered on Wanzhou, Kaizhou, and Yunyang; the premium Wushan crisp plum industry belt centered on Wushan, Wuxi, and Fengjie; the alpine ecological tea industry belt centered on Yongchuan, Jiangjin, and Xiushan; and the Wuling Mountain traditional Chinese medicinal materials industry belt centered on Fuling, Shizhu, and Youyang. By the end of 2025, the whole-industry-chain output value of Fuling zhacai had exceeded 16.5 billion yuan; the Three Gorges citrus industry belt, formed jointly by Fengjie navel oranges with major production areas including Yunyang, Wushan, and Kaizhou, generated an annual comprehensive output value surpassing ten billion yuan; and the regional public brand value of Wushan crisp plums exceeded 10.517 billion yuan. In Wanzhou, fruit cultivation area reached 680,000 mu in the first half of the year with an output of 320,000 tons, and the brand values of regional public brands such as “Three Gorges Tiancong” tea and “Tiansheng Yunyang” continued to rise.

Second, operating entities have continued to grow, and the degree of organization has steadily increased. The municipality has cumulatively cultivated thousands of municipal-level and above leading agricultural industrialization enterprises, model farmer cooperatives, and model family farms, forming a “leading enterprise + cooperative + farmer household” benefit linkage mechanism. Taking the Wushan crisp plum industry as an example, through the establishment of specialized cooperatives and industry associations, unified technical standards, unified brand sales, and unified procurement of agricultural inputs have been implemented, significantly raising the organizational degree of fruit growers. Overall, however, the people-enriching industries in Chongqing’s districts and counties remain based on smallholder farmers, linked by family farms and farmer cooperatives, and led by leading enterprises; the degree of organization varies considerably, and some remote districts and counties still suffer from being “scattered, small, and weak.”

Third, the industrial chain is insufficiently extended, and value-added leakage is relatively severe. Most district and county specialty industries still rely primarily on fresh fruit sales and primary processing, with inadequate deep processing and comprehensive by-product utilization. In the citrus industry, for example, there is a significant gap between annual processing capacity and fresh fruit output in Wanzhou, Kaizhou, and Yunyang, and the share of deep-processed products such as canned goods, juice, and pectin remains low. The traditional Chinese medicinal materials industry likewise faces the problems of underdeveloped primary processing at origin and weak links in extract and Chinese patent medicine manufacturing. The short industrial chain results in a substantial outflow of industrial gains, placing farmers at a disadvantage in value chain distribution; the phenomena of “high quality not commanding high prices” and “increased output without increased income” occur from time to time.

Fourth, brand building has achieved notable results, but market competitiveness still needs strengthening. Chongqing has cultivated a cohort of Bayu “local specialty” brands, including Fuling zhacai, Fengjie navel oranges, Wushan crisp plums, Rongchang pigs, Tongnan lemons, and Yongchuan Xiuya tea, several of which have obtained National Geographical Indication certification and the national title of Famous, Special, Excellent, and New Agricultural Products. The brand value of

Yunyang Country's "Tiansheng Yunyang" regional public agricultural brand has exceeded 5 billion yuan, with three products having obtained National Geographical Indication certification and six having received the Famous, Special, Excellent, and New Agricultural Products title. As of 2025, the brand value of Fengjie navel oranges reached 38.17 billion yuan, that of Fuling zhacai 37.924 billion yuan, that of Tongnan lemons 28.41 billion yuan, that of Wushan crisp plums 10.517 billion yuan, that of Rongchang pigs 5.595 billion yuan, and that of Yongchuan Xiuya tea 3.432 billion yuan. Nevertheless, compared with first-tier domestic agricultural brands, Chongqing's district and county specialty agricultural products still lag in brand premium capacity, channel control, and consumer loyalty. Brands in some districts and counties exhibit a "small, scattered, and disorganized" pattern—some industries face the dilemma of being "small and scattered, with high quality failing to command high prices"; similar products operate independently and compete internally, weakening overall competitiveness, and brand integration and standardization still need to be strengthened.

2.2 Current State of Digital Inclusive Finance Development in Chongqing

First, the financial aggregate has continued to expand, and inclusive coverage has steadily broadened. According to the White Paper on the Development of the Western Financial Center (Chongqing) (2026) released by the Financial Affairs Office of the CPC Chongqing Municipal Committee and data from the People's Bank of China Chongqing Branch, by the end of 2025 the municipality's total financial assets reached 9.6 trillion yuan, an increase of 44.4% compared with the beginning of the 14th Five-Year Plan period; local and foreign currency deposit balances reached 6.13 trillion yuan, and loan balances reached 6.42 trillion yuan. The balance of inclusive micro and small enterprise loans reached 651.13 billion yuan, a year-on-year increase of 6.8%; the balance of agriculture-related loans reached 809.25 billion yuan, a year-on-year increase of 8.2%. The municipality has launched over 250 inclusive micro and small credit loan products, established 36 first-loan and loan-renewal centers and 564 financial service harbors; its innovative finance index ranks sixth among mainland Chinese cities and first among central and western Chinese cities. As the main force in supporting agriculture and small businesses, Chongqing Rural Commercial Bank (CRCB) recorded an agriculture-related loan balance of 265.504 billion yuan, ranking first among Chongqing's banking institutions for consecutive years.

Second, the development of digital platforms has accelerated, and service efficiency has improved markedly. CRCB independently developed the Yukuai Zhiban platform, enabling online intelligent customer profiling, automated system credit rating, instant back-office approval, and cloud-based dynamic loan monitoring. The People's Bank of China Chongqing Branch has continuously iterated the Changjiang Yurongtong online service platform, integrating functions such as financing matchmaking and credit information inquiry, with cumulative loan disbursements exceeding 64 billion yuan. At the municipal level, the Chongqing Xinyidai platform was built to aggregate public credit information; building on this, Fengdu County aggregated over 9 million pieces of agriculture-related credit information across 43 domains, creating "digital profiles" for new farmers and enabling zero-document application, 5-minute approval, and same-day loan disbursement, with a maximum single credit line of up to 1.7 million yuan.

Third, financial innovation for specialty industries has deepened, and scenario-embedded capacity has strengthened. Financial institutions have introduced a range of exclusive products and service models centered on district and county specialty industries. CRCB established a "one county, one product, one laboratory, multiple leading enterprises" ecological specialty industry service system: in Wushan, it launched the "Wushan Crisp Plum Mall" on its mobile banking app, integrating credit, payment, and

e-commerce sales into full-chain services; in Wuxi, it took the lead in building a digital comprehensive service platform for traditional Chinese medicinal materials, breaking through data barriers with the county-level Agriculture and Rural Affairs Commission's industry brain, and extending financial services to planting management, production-sales matching, and quality traceability. Bank of China Chongqing Branch launched the "Zhacai Loan" for Fuling zhacai, supporting 17 vegetable processing enterprises with 60 million yuan; it launched the "Coptis Loan" for Shizhu Coptis, providing nearly 7 million yuan in credit to over 20 merchants and growers; and in collaboration with leading enterprises such as Dekon and CP Group, it innovated the "core enterprise + farmer" model, cumulatively supporting 74 pig farming entities with 147 million yuan in loans.

Fourth, new digital credit models have emerged, and breakthroughs have been made in property rights activation. Chongqing Supply and Marketing E-commerce Company's Cuncunwang platform partnered with ICBC to launch the "Merchant e-Loan," which, through direct data exchange between the e-commerce platform and the bank, turns merchants' transaction data on the platform into credit assets and provides online automatic credit assessment and rapid approval. Xiushan County has built a diversified financial service system covering credit support, insurance protection, and more, helping Xiushan leap from a node city on the New International Land-Sea Trade Corridor to an e-commerce powerhouse county. In August 2026, CRCB disbursed the municipality's first digital forestry management income rights pledge loan; leveraging the integration of the "Government Affairs Digital Intelligence Forest Rights" and "Changjiang Yurongtong" modules, it connected the Yukuaiban government service platform, the digital intelligence forest rights platform, and the bank's credit system, compressing the forest rights loan process—which originally required over ten days—into fully online collaborative processing.

2.3 Problems and Shortcomings in Digital Inclusive Finance's Empowerment of District- and County-Level People-Enriching Industries

Although Chongqing has achieved remarkable results in developing digital inclusive finance, measured against the demands of high-quality development of district- and county-level people-enriching industries and the requirements of the rural revitalization strategy, numerous bottleneck constraints remain to be resolved in the empowerment process, and the "two separate skins" disconnect between finance and industry has yet to be fundamentally eliminated.

First, agriculture-related data silos are prominent, and departmental barriers constrain credit assessment. The core competitiveness of digital inclusive finance lies in data-driven risk assessment, but the sharing of agriculture-related data at Chongqing's district and county level still faces significant departmental barriers. The data systems of agriculture, forestry, natural resources, taxation, market regulation, social security, and other departments operate independently, with non-unified data standards and inadequate sharing mechanisms—relevant documents of the People's Bank of China Chongqing Branch explicitly note that agriculture-related data have long suffered from being "scattered, lacking unified collection channels, uneven in quality, untimely in updating, and inaccurate in manual reporting." Financial institutions must coordinate with each department individually to obtain public data, incurring high time and communication costs. Some areas have achieved breakthroughs in data aggregation through an administrative promotion model led by the county-level Development and Reform Commission with multi-department coordination, but this model is difficult to replicate in districts and counties with weaker administrative coordination capacity. Meanwhile, compliance requirements for data security and privacy protection have also made some departments cautious about data sharing, and the

phenomena of “daring not share and being unwilling to share” are widespread. Data silos directly lead to incomplete dimensions and insufficient precision in credit assessment, constraining the improvement of digital inclusive finance’s risk control capabilities.

Second, the digital divide constrains service penetration, and farmers’ digital capabilities are inadequate. The mountainous rural areas of Chongqing have a relatively high degree of population aging; some elderly farmers and farmers with low education levels are unable to use smartphone applications, distrust online credit, and remain accustomed to conducting financial business through branches and personal connections. Although financial institutions have introduced large-font mobile banking and elderly-friendly services, the digital divide is not merely an interface issue but, more fundamentally, a cognitive and capability issue. Research indicates that the expansion of coverage breadth of digital inclusive finance is approaching a bottleneck, and that improvements in depth of use and degree of digitalization are the main sources of marginal contribution—the latter precisely depending on users’ digital literacy. If groups with insufficient digital capabilities are excluded from services, digital inclusive finance may instead exacerbate income stratification within rural areas, giving rise to a situation in which “digital dividends” and the “digital divide” coexist.

Third, the inherent vulnerability of industries is mismatched with risk-sharing mechanisms. People-enriching industries are predominantly crop cultivation and animal husbandry, which are heavily affected by natural disasters, market price fluctuations, and epidemics, with highly uncertain returns. Digital risk control can alleviate information asymmetry but cannot eliminate the natural and market risks inherent in the industries themselves. At present, agricultural insurance coverage in Chongqing’s districts and counties remains insufficiently broad. In October 2025, the Chongqing Municipal Finance Bureau and other departments specifically issued a document setting out ten measures, including “expanding coverage of major insurance products” and “developing competitive specialty insurance products.” The protection levels of specialty agricultural product insurance mostly remain at the materialized cost stage, and the promotion of innovative products such as price index insurance and revenue insurance is limited. In the event of large-scale natural disasters or price collapses, no matter how precise digital risk control models may be, mass defaults would be difficult to avoid. In the absence of effective risk-sharing mechanisms, banks remain cautious about the credit lines and terms of unsecured loans, which constrains the depth of digital inclusive finance’s empowerment. Furthermore, credit loans are mostly short-term working capital loans within one year, representing a maturity mismatch with the three-to-five-year return cycles of fruit tree cultivation and medicinal herb planting.

Fourth, the commercial sustainability of digital finance faces challenges. Digital inclusive finance confronts a fundamental challenge of commercial sustainability at the county level. On the one hand, farm household loans involve small individual amounts and high service costs; although digitalization has compressed marginal costs, fixed investments in platform development, system maintenance, and data procurement are enormous. On the other hand, the rate of return on financial business in rural areas is lower than in urban areas, and there is an inherent tension between financial institutions’ commercial objectives and their inclusion objectives. As a local corporate institution, CRCB deploys 80% of its branches, personnel, and equipment in county-level and rural areas and undertakes substantial policy-based agricultural support functions, but this model is highly dependent on the institution’s own positioning and governance structure. Although branches of major national banks in Chongqing enjoy low funding costs, they have limited grassroots branches and personnel and lack

sufficient motivation to provide in-depth services to county-level industries. Internet platforms tend to serve already-digitized customers and struggle to cover the most remote groups. In the absence of differentiated regulatory incentives and policy support such as fiscal interest subsidies and risk compensation, the commercial sustainability of digital inclusive finance in remote districts and counties will face a severe test.

3. Models and Mechanisms of Digital Inclusive Finance Serving District- and County-Level People-Enriching Industries

3.1 Main Models of Digital Inclusive Finance Serving District- and County-Level People-Enriching Industries

Based on a systematic review of practices across Chongqing's districts and counties, this paper distills four typical models through which digital inclusive finance empowers district- and county-level people-enriching industries. The four models are not mutually exclusive; in practice they are often combined in overlapping ways, yet they differ in their core logic, data sources, and applicable conditions.

3.1.1 The “Industrial Chain Platform Embedding” Model

This model targets specific industries: financial institutions, jointly with government departments and leading enterprises, build digital comprehensive service platforms that integrate functions such as credit, payment, insurance, e-commerce sales, and production management into a single platform, providing embedded services across every link of the industrial chain. Its core logic is as follows: the platform integrates industrial chain data, data drives credit assessment, credit services are embedded in industrial scenarios, and transactions within those scenarios feed data back into the system, forming a closed loop. The Wushan crisp plum case exemplifies this model. CRCB launched the “Wushan Crisp Plum Mall” on its mobile banking app, listing over 20 specialty products including fresh fruit and plum wine; since its launch in July 2025, it has facilitated sales of nearly 800,000 yuan. Fruit growers can obtain full-chain credit support from planting to sales, while the bank simultaneously acquires operational data for subsequent credit decisions. The Wuxi medicinal materials platform goes further by connecting its data with the county-level Agriculture and Rural Affairs Commission's industry brain, extending the boundary of financial services beyond traditional credit to include medicinal crop planting management, production-sales matching, and quality traceability. To date, CRCB has built six specialty industry “demonstration projects,” including Wushan crisp plums and Wuxi medicinal materials, launched 49 specialty products, and achieved a loan balance exceeding 2.3 billion yuan. This model is suited to districts and counties where the industry has attained a certain scale and brand recognition, where leading enterprises or cooperatives serve as organizational anchors, and where local governments are willing to open up industry data. Its strengths lie in the deep coupling of financial services with industrial scenarios and risk control based on real transaction data; its limitations lie in the heavy platform development investment and the high requirements for industrial scale and organizational degree.

3.1.2 The “Multi-Dimensional Data Credit Reconstruction” Model

This model does not rely on a specific industrial chain; instead, at the county level, it aggregates government public data and market data to establish digital credit files for farmers and new-type operating entities, on the basis of which it implements batch credit extension and online lending. Its core logic is to substitute multi-dimensional public data for collateral, batch rating for

household-by-household due diligence, and credit village and credit household development for individual customer risk control. Fengdu County's practice is a representative case: the county Development and Reform Commission coordinated over 50 departments and units, effectively aggregating over 9 million pieces of agriculture-related credit information across 43 domains, generating digital profiles for new farmers on the Chongqing Xinyidai platform. Banks extend credit based on these profiles, enabling zero-document application, 5-minute approval, and same-day disbursement, with a maximum single credit line of up to 2 million yuan. CRCB's "village-wide credit extension" operates on the basis of administrative villages and farmer household industry identification, extending batch pre-credit to all eligible households in each village. By the end of June 2026, village-wide credit extension had achieved full coverage of all administrative villages across the municipality, with pre-approved credit exceeding 27 billion yuan for over 1.5 million farm households. This model is suited to districts and counties with strong local government data coordination capacity and relatively stable county-level populations and industries. Its strengths lie in broad coverage and the ability to rapidly improve credit accessibility; its limitations lie in the fact that the adaptation of public data to financial risk control models requires time to validate, untimely data updates may lead to distorted credit profiles, and batch credit extension may accumulate systemic risk during economic downturns.

3.1.3 The "E-Commerce Transaction Data Credit Enhancement" Model

This model centers on rural e-commerce platforms, converting merchants' transaction records, review histories, logistics information, and other platform data into credit assets, on the basis of which financial institutions provide credit loans and supply chain finance services. Its core logic is to substitute e-commerce transaction data for financial statements, supplement legal enforcement constraints with platform reputation mechanisms, and reduce customer acquisition and risk control costs through online scenarios. Xiushan County is a typical example: the county has developed an integrated model of "platform + logistics + industry + talent," and local financial institutions, addressing the asset-light and collateral-deficient characteristics of e-commerce enterprises, provide financing based on transaction and logistics data, successively launching specialty credit products such as the "cross-border e-commerce loan" and the "private enterprise micro and small loan." The "Cuncunwang Merchant e-Loan," through direct data exchange between the supply and marketing e-commerce platform and ICBC, turns transaction data into credit assets, with online automatic credit assessment and rapid approval, generating personal pre-approved credit lines of up to 3 million yuan based on procurement data. This model is suited to districts and counties where the e-commerce industry has achieved scale, active trading platforms exist, and logistics and payment systems are relatively well developed. Its strengths lie in high data authenticity and rapid update frequency; its limitation is that its clients are primarily merchants already operating on e-commerce platforms, leaving farmers engaged in purely offline operations unreachable.

3.1.4 The "Digital Activation of Rural Property Rights" Model

This model focuses on revitalizing rural "dormant assets," using digital means to move the entire process—ownership confirmation, value assessment, pledge registration, and transfer and disposal—of rural property rights such as forest rights, land management rights, and collective asset equity online, thereby turning property rights that were previously difficult to collateralize into eligible security. Its core logic is to reduce the institutional costs of property rights transactions through digitalization, resolve the difficulty of collateral disposal through platformization, and expand the scope of collateral

through property rights confirmation and empowerment. In August 2026, CRCB disbursed the municipality's first digital forestry management income rights pledge loan. Leveraging the integration of the "Government Affairs Digital Intelligence Forest Rights" and "Changjiang Yurongtong" modules, it coordinated with forestry departments to break through data barriers, connecting the Yukuaiban government service platform, the digital intelligence forest rights platform, and the bank's credit system to establish a fully online collaborative processing system. Whereas enterprises previously had to submit materials through multiple offline windows, with the entire process taking over ten days, the full procedure of pledge filing, approval, and disbursement can now be completed in 3 working days, reducing overall loan processing time by over 70%. This model is suited to districts and counties where rural property rights confirmation and registration are basically complete and where a property rights transfer market or a government-led reserve mechanism exists. Its strength lies in revitalizing the largest stock assets in rural areas—land and forest rights—providing a collateral basis for medium- and long-term investment; its limitations lie in the difficulty of property rights value assessment, inactive transfer and disposal markets, and the current reliance on government risk compensation funds for backstopping.

3.2 Mechanisms through Which Digital Inclusive Finance Empowers District- and County-Level People-Enriching Industries

Although the four models differ in form, they share the same underlying logic. This paper proposes a three-chain coupling analytical framework of "data chain—credit chain—industrial chain" to reveal the internal mechanisms through which digital inclusive finance empowers district- and county-level people-enriching industries.

3.2.1 Aggregating Fragmented Information and Reconstructing Credit Infrastructure

In traditional rural finance, the production and operational information of farmers and new-type operating entities is highly dispersed: planting acreage is recorded in agriculture departments, forest rights information resides in forestry departments, transaction records are held by e-commerce platforms and purchasers, and subsidies are disbursed through finance departments—yet these data sets are isolated from one another. The primary function of digital inclusive finance is to aggregate fragmented data into analyzable data flows through platform integration, Internet of Things collection, and mobile payment accumulation. The more complete the data chain, the more multidimensional the profiles financial institutions can build of operating entities, and the more precise their risk pricing. Chongqing's practice confirms this logic: the People's Bank of China Chongqing Branch has comprehensively established a regularized data update mechanism, constructing a three-level (municipal, county, and village) linked data aggregation and governance system that effectively addresses the problems of scattered agriculture-related data, the absence of unified collection channels, and uneven data quality. Since 2024, the municipality has cumulatively aggregated over 140 million pieces of agriculture-related data and established credit files for over 3.6 million farm households.

3.2.2 Data-Driven Assessment Replacing Traditional Collateral and Guarantees

Data itself does not constitute credit; it must be transformed through cleaning, modeling, and rating into credit assessments acceptable to financial institutions. Digital credit employs technologies such as big data, artificial intelligence, and satellite remote sensing, integrating diverse data on production and operations, daily consumption, and rural governance to construct dynamic, multidimensional credit profiles, thereby allaying the risk concerns that underlie the reluctance to lend. The key to the credit chain lies in using data-driven credit assessment to replace or supplement traditional collateral and

guarantees, enabling operating entities that lack eligible collateral to gain credit access. Stiglitz and Weiss's credit rationing theory demonstrates that information asymmetry leads banks to prefer credit rationing over raising interest rates to clear the market, and digital credit mitigates this friction by improving information screening capacity. In Chongqing, the financial system has, relying on an independent and desensitized modeling environment, opened agriculture-related databases in an orderly manner under the principle of data being "usable but invisible," supporting partner banks in innovating and training loan product models. CRCB, through a service pathway of "offline information collection + online back-to-back evaluation + big data risk control model," transforms farmer households' credit into evaluable and usable financial assets.

3.2.3 Embedding in Industrial Scenarios to Achieve a Value Closed Loop

Credit can be transformed into productive forces only when embedded in specific industrial scenarios. Digital inclusive finance embeds services across the pre-production, in-production, and post-production links of the industrial chain: providing seedling and agricultural input procurement loans before production, supplying working capital and insurance protection during production, and connecting markets through e-commerce platforms and payment systems after production, while feeding sales data back into the data chain to serve as inputs for the next round of credit assessment. The more mature the industrial chain, the richer the transaction and production data it generates, which in turn enriches the data chain, forming a self-reinforcing closed loop of "data aggregation—credit transformation—industrial value addition—data re-aggregation." The "Wushan Crisp Plum Digital Service Platform" built by CRCB in Wushan is a case in point: the platform integrates functions such as industry information, supply-demand matching, farming services, and labor recruitment, connecting industrial chain participants including agricultural input service providers, growers, purchasers, processing enterprises, and distributors, and promoting coordinated linkage along the upstream and downstream of the chain; the "Wushan Crisp Plum Mall" on mobile banking lists over 20 products such as crisp plums and plum wine, integrating credit, payment, and e-commerce sales into full-chain services.

3.2.4 Theoretical Explanation of the Empowerment Mechanism

A coupling and reinforcing relationship exists among the three chains. The data chain is the foundation, solving the problem of "where information comes from"; the credit chain is the bridge, solving the problem of "how funds are disbursed"; the industrial chain is the carrier, solving the problem of "how funds generate returns." A break in any chain weakens the overall empowerment effect: data silos lead to inaccurate credit assessment, insufficient credit leads to industrial financing difficulties, and weak industries lead to sparse data. The differences among the four models are, in essence, differences in the manner of three-chain coupling: the industrial chain platform embedding model takes the industrial chain as its starting point and integrates the data and credit chains in reverse; the multi-dimensional data credit reconstruction model takes the data chain as its starting point and builds the credit chain and serves the industrial chain in a forward direction; the e-commerce transaction data credit enhancement model uses transaction data as the hub connecting all three chains; and the digital activation of rural property rights model takes the digitalization of property rights as a breakthrough point to expand the boundaries of the credit chain. This framework both explains the core features that distinguish digital inclusive finance from traditional rural finance—substituting data for collateral, platform integration for isolated point-to-point services, and closed-loop iteration for static assessment—and provides a unified perspective for analyzing the applicable conditions and bottleneck causes of different models.

4. Policy Recommendations for Promoting the Development of District- and County-Level People-Enriching Industries through Digital Inclusive Finance

4.1 Solidifying the Data Foundation and Building County-Level Agriculture-Related Data Sharing Platforms

Connecting the data chain is a prerequisite for three-chain coupling. It is recommended that a municipality-level agriculture-related data sharing and exchange platform be built under coordinated planning, with unified data standards and interface specifications, clearly defined data sharing catalogs and update frequencies for agriculture, forestry, natural resources, taxation, market regulation, social security, and other departments, and that agriculture-related data sharing be incorporated into the performance assessment of district and county governments. At the county level, drawing on the Fengdu experience, district and county governments should take the lead in establishing agriculture-related credit information databases that interface with the Chongqing Xinyidai platform and financial institutions' credit systems, achieving "collect once, use by multiple parties." At the same time, data authorization mechanisms should be established within the framework of the Data Security Law and the Personal Information Protection Law, employing privacy-preserving computation technologies under which "original data remain within their domain and data are usable but invisible," thereby enabling financial risk control modeling while protecting privacy. Data sharing platforms should not serve credit alone; they should also connect with agricultural industry brains and agricultural product quality traceability systems, enabling data to flow bidirectionally between industrial governance and financial services and maximizing the value of data as a factor of production.

4.2 Strengthening Organizational Coordination and Promoting Linkage between Digital Finance and Industrial Organization

The empowerment effect of digital inclusive finance is closely related to the degree of industrial organization. Scattered smallholder farmers generate sparse and difficult-to-verify data, whereas cooperatives, leading enterprises, and village collective economic organizations can play an intermediary role in data aggregation and credit enhancement. It is recommended that the promotion of digital finance be combined with the standardized improvement of farmer cooperatives, the cultivation of family farms, and the development of village collective economies: aggregating member production data at the cooperative level, providing order and transaction data centered on leading enterprises, and advancing village-wide credit extension and credit village development based on village collectives. The first Party secretary stationed in the village and the village Party branch and villagers' committee can play organizational and coordinating roles in this process, helping smallholder farmers effectively participate in inclusive finance through policy embedding, symbiotic network construction, and rural three-industry integration. Financial institutions should design tiered products for operating entities at different levels of organization: providing supply chain finance and M&A loans for leading enterprises, batch credit extension and collective guarantee loans for cooperatives, and microcredit loans for smallholder farmers. At the same time, farmer digital capability training should be strengthened, digital finance knowledge should be incorporated into the new-type professional farmer cultivation program, and digital finance facilitators should be stationed at village-level service sites to effectively lower the threshold of digital usage.

4.3 Improving Risk Sharing and Building a Multi-Party “Government-Bank-Insurance-Guarantee” Risk-Sharing Mechanism

Addressing the vulnerability of people-enriching industries requires the construction of a risk-sharing system with the participation of government, banks, insurance companies, and guarantee institutions. First, expand the coverage of specialty agricultural product insurance and raise protection levels, gradually upgrading from materialized cost insurance to price index insurance and revenue insurance, and encouraging the development of innovative products such as weather index insurance and pest and disease insurance to provide risk buffers for credit. Second, strengthen the capital of district and county agricultural credit guarantee institutions, reduce guarantee fee rates, implement guarantee fee subsidies for digital inclusive finance loans, and give full play to the credit enhancement role of government financing guarantee institutions. Third, establish risk compensation funds that provide a certain proportion of risk subrogation for agriculture-related digital credit loans extended by financial institutions, sharing the risks of first loans and credit loans. Fourth, explore “insurance + credit” linkages, using insurance policies as a credit enhancement factor so that insured farmers can obtain preferential interest rates and higher credit lines. Fifth, in light of the long cycles of agriculture, develop three-to-five-year medium- and long-term credit products and promote property rights pledge loans using forest rights and land management rights to resolve maturity mismatches. Xiushan’s four-in-one approach of “credit + insurance + cross-border + consumption assistance” merits summarization and promotion across the municipality.

4.4 Implementing Categorized Policies and Differentiated Digital Finance Strategies for Districts and Counties

The resource endowments, industrial foundations, and digital infrastructure of Chongqing’s 37 districts and counties differ significantly, and a uniform model is inappropriate. Districts and counties in the main city metropolitan area (such as Yongchuan, Jiangjin, Hechuan, and Fuling), with sound industrial foundations and high degrees of digitalization, can focus on developing the industrial chain platform embedding and e-commerce data credit enhancement models, promoting the integration of digital finance with deep processing of agricultural products, rural cultural tourism, and the hotspot ingredients industry, and exploring application scenarios for digital RMB in agricultural supply chains. Districts and counties in the Three Gorges Reservoir Area of northeastern Chongqing (such as Wushan, Wuxi, Fengjie, Wanzhou, and Kaizhou), with prominent specialty crop industries, can focus on the industrial chain platform embedding and rural property rights digital activation models, combining forest rights and land management rights pledges to address medium- and long-term investment needs in fruit tree cultivation and medicinal herb planting, while leveraging the ecological resources of the Three Gorges Reservoir Area to develop carbon sink finance and value realization mechanisms for ecological products. Districts and counties in the Wuling Mountain Area of southeastern Chongqing (such as Xiushan, Shizhu, Youyang, and Qianjiang), with foundations in e-commerce and ecological industries but relatively weak digital infrastructure and farmer digital capabilities, should, while advancing multi-dimensional data credit reconstruction, intensify digital training and elderly-friendly services, prioritize resolving basic credit coverage, and develop linked products connecting digital finance with rural tourism and the health and wellness industry based on Wuling Mountain’s cultural-tourism integration.

4.5 Optimizing Policy Incentives and Enhancing the Commercial Sustainability of Digital Finance

The commercial sustainability of digital inclusive finance in remote districts and counties requires policy guidance and incentives. First, implement differentiated regulatory policies, granting appropriate preferential treatment in terms of risk weights, non-performing loan tolerance, and performance evaluation for agriculture-related digital inclusive finance loans, so as to increase financial institutions' motivation to conduct such business. Second, strengthen fiscal interest subsidies and tax incentives, providing interest subsidies for agriculture-related digital inclusive finance loans extended by financial institutions and implementing tax reductions and exemptions for income from agriculture-related digital financial services. Third, establish an evaluation mechanism for digital inclusive finance development, periodically publishing district and county digital inclusive finance development indices to guide the allocation of financial resources toward weak links and key areas. Fourth, encourage cooperation between financial institutions and fintech companies, reducing the digital transformation costs of small and medium-sized banks through technology export and joint modeling, and avoiding redundant construction and resource waste. Fifth, strengthen financial consumer rights protection, establish sound complaint handling and dispute resolution mechanisms for agriculture-related digital finance, guard against the risks of over-borrowing, data abuse, and algorithmic discrimination in the digital finance domain, and ensure that digital inclusive finance develops healthily on the track of the rule of law.

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