

Research on the Synergistic Development of Big Data Credit Reporting and Open Banking Models

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Abstract: With the rapid advancement of information technology, digital transformation has become an inevitable path for bank transformation. Against this backdrop, the synergistic effect between big data credit reporting and open banking models has emerged as a core driving force for financial innovation. However, the current integration of big data credit reporting and open banking still faces several challenges, including insufficient consumer awareness, data privacy and security concerns, and fragmented technical standards. Through representative case studies, this paper analyzes the current development status of big data credit reporting and open banking models in China, explores the opportunities and challenges for their synergistic development, and proposes targeted countermeasures. The findings aim to provide valuable insights for promoting the synergistic development of big data credit reporting and open banking models in China.

Keywords: Big Data Credit Reporting; Open Banking Model; Synergy; Inclusive Finance.

1. Introduction

With the rapid development of information technology, big data has penetrated various sectors of society. The financial industry, as a data-intensive sector, has particularly prominent applications of big data. In recent years, big data credit reporting has rapidly developed in China as a novel credit assessment approach, becoming a crucial component of financial technology (FinTech). Meanwhile, the open banking model helps break down information barriers between banks and other financial institutions, improving financial service efficiency and reducing financial risks. The *FinTech Development Plan (2022-2025)* provides guidance for FinTech development in the new era, outlining the overall strategy, development goals, key tasks, and implementation safeguards for financial digital transformation. As two important branches of FinTech, the synergistic effects between big data credit reporting and open banking models are increasingly attracting industry attention. Therefore, researching their synergistic development and effects holds significant practical importance.

2. Overview of Big Data Credit Reporting and Open Banking Models

2.1. Overview of Big Data Credit Reporting

Big data credit reporting utilizes big data technologies to acquire and store massive information, while employing specific algorithmic models to comprehensively profile credit subjects. This enables the provision of inclusive credit products and credit activities tailored to diverse application scenarios.

The technical principles of big data credit reporting primarily involve multi-dimensional data collection, distributed computing, and machine learning modeling. Systems integrate structured and unstructured data—including central bank credit records, e-commerce consumption, and social behaviors—through API interfaces,

web crawlers, and other methods. Hadoop architecture enables distributed storage and processing of massive datasets. The Spark engine facilitates feature engineering to extract key indicators such as repayment willingness and fulfillment capability, while clustering algorithms identify anomalous data. Core processes employ algorithms like logistic regression and random forests to construct credit scoring models, with XGBoost enabling dynamic weight adjustment. Graph computing techniques analyze relationship networks for specific scenarios like multi-platform borrowing. The system outputs standardized credit scores and utilizes Flink for real-time stream processing, automatically triggering model iterations upon user data updates to ensure assessment timeliness.

From an ecosystem perspective, big data credit reporting applies various alternative data types—including personal consumption, social activities, and other non-financial attributes—throughout the entire credit transaction lifecycle. This encompasses credit decision-making, post-loan risk monitoring, portfolio management, and debt collection.

2.2. Overview of Open Banking Models

2.2.1. Definition of Open Banking

Open banking refers to the embedding of banking services and products directly into partner platforms through technologies like APIs (Application Programming Interfaces) and TSPs (Third-Party Service Providers). This enables data sharing and integration between banks and third parties, comprising three key components: APIs, data sharing, and platform collaboration.

Open banking consists of internal and external dimensions. Internally, it breaks down barriers between business lines, products, organizations, personnel, and data to facilitate the free flow and optimal allocation of production factors. Externally, through "outbound" and "inbound" strategies, it embeds financial and non-financial services into diverse life and production scenarios, ultimately achieving "banking everywhere" rather than "banks everywhere."

2.2.2. Core Elements of Open Banking Models

Data sharing is central to open banking. API interfaces

enable communication and data exchange between banking and non-banking systems, thereby enhancing existing banking services. The integration, sharing, and openness of financial data transform data into monetizable products.[1]

2.2.3. Industry Status and Policy Environment of Open Banking

As a major direction in FinTech development, open banking is driving a global banking revolution. According to the *China Open Banking Development White Paper* recently released by China Research Puhua, China's open banking market reached ¥28.5 billion in 2023, a 42.3% year-on-year increase. It is projected to exceed ¥100 billion by 2029, with a compound annual growth rate (CAGR) of 23.7%.

From a policy perspective, China's open banking development is currently in a policy dividend period. The People's Bank of China's (PBOC) *FinTech Development Plan (2022-2025)* explicitly advocates "prudently advancing open banking development," providing clear policy guidance. In 2023, the China Banking and Insurance Regulatory Commission (CBIRC) further refined regulatory requirements by issuing the *Interim Measures for the Management of Commercial Bank Open Banking Services*, marking the entry of China's open banking into a standardized development phase.

2.2.4. Practical Cases of Open Banking

With FinTech advancements, commercial banks are actively exploring open banking models to enhance service efficiency and customer experience. Major commercial banks such as China Construction Bank (CCB), China Minsheng Bank, and Industrial Bank have established financial ecosystems with third-party partners through self-built open platforms and API interfaces. For instance, CCB's "BOC Open Platform" integrates external resources to provide diversified financial services. Private banks like WeBank, Suning Bank, and Zhongbang Bank are also actively adopting open banking models, leveraging internet technologies to build open and flexible financial service systems.

Global open banking practices demonstrate four models: technology introduction ("inbound"), product integration, scenario embedding, and API aggregation ("outbound"). BBVA enhances customer acquisition, risk control, operations, and post-loan management by introducing external technologies, achieving cost reduction and efficiency gains. Raisin creates an open product marketplace by integrating high-quality offerings from third-party service providers, enriching customer choices. Citibank embeds its products and services into third-party ecosystems, generating revenue through customer acquisition or data output fees. U.S.-based Plaid leverages its technical expertise to build an API aggregation platform connecting upstream scenario providers with downstream commercial banks (especially small and medium-sized banks).

In open banking implementation, data protection and compliance are critical. A report by the Open Banking Working Group of China UnionPay's Technology Management Committee emphasizes that while open banking facilitates data sharing and integration with TSPs via APIs, strict adherence to data compliance requirements is essential to ensure user privacy and data security. Technically, China Huaxia Bank's implementation of a multi-platform SDK solution—featuring data encryption/decryption and cross-platform adaptation under the "Data Twenty Articles" framework—offers practical reference for data protection in open banking. Concurrently, the open banking model fosters

extensive ecosystem collaboration and business innovation. For example, WeBank, as a leading Chinese digital bank, provides loan services to micro and small enterprises (MSEs) through a "Data + Technology + IT" model, having supported 274 microcredit companies and trained over 1,900 professionals [2]. This approach not only enhances financial inclusion but also provides replicable experience for small and medium-sized banks.

3. Intrinsic Linkages and Synergistic Effects between Big Data Credit Reporting and Open Banking

3.1. Intrinsic Linkages

3.1.1. Data Sharing as the Core Nexus

Data sharing is central to open banking and a critical enabler for big data credit reporting to achieve precise credit assessment and risk control. Open banking reduces information asymmetry through technologies like APIs, allowing third parties to offer more accurate financial services based on shared data.[3] This mechanism provides big data credit reporting with rich data sources, enabling credit agencies to integrate multi-dimensional, multi-source data for comprehensive credit profiling.

3.1.2. Technology Facilitating Deep Integration

Both big data credit reporting and open banking rely on technologies such as big data analytics, artificial intelligence, and blockchain. Through open banking, banks can use APIs and SDKs to transmit data to third-party platforms in real-time, enabling efficient data flow and analysis. This technological empowerment enhances data usability and provides flexible access methods for big data credit reporting. McKinsey's *Global Practices and Outlook of Open Banking* indicates that open banking integrates customer tags across eight dimensions—including demographic attributes, asset characteristics, and social features—through data middle platforms, enriching data dimensions for big data credit reporting. Simultaneously, big data credit reporting platforms enhance intelligent data processing capabilities through data governance services and advanced analytics.

3.1.3. Open Banking Ecosystems Providing Application Scenarios

Open banking is fundamentally a financial data sharing mechanism and a transformative business model. Its ecosystem encompasses banks, third-party institutions, FinTech companies, and customers. This ecosystem provides extensive application scenarios for big data credit reporting. Under open banking, once authorized by customers, partner FinTech companies can aggregate financial information (e.g., deposits, loan history, investment transactions) across multiple banks and share it within the open banking system [4]. This enables deeper insights into customers' credit backgrounds for banks and financial institutions.

Research shows that information asymmetry severely constrains traditional banks [5], while open banking effectively addresses data silos. For example, by collaborating with third parties, open banking integrates customer behavioral data (e.g., consumption, social interactions) across scenarios, providing credit agencies with more holistic credit assessment foundations.

3.1.4. Regulatory Framework Ensuring Sustainable Synergy

The synergistic development of open banking and big data

credit reporting requires robust regulatory and legal frameworks. Globally, regions promoting open banking have strengthened data sharing regulations to ensure security and privacy. The EU's Payment Services Directive 2 (PSD2) mandates bank data openness with customer consent while stipulating data protection standards. China's *FinTech Development Plan (2019-2021)* clarified the direction for open banking and emphasized balancing data sharing with risk prevention. Furthermore, the PBOC promotes the opening and sharing of credit data through coordinated development between the national financial credit information database and market-oriented credit agencies. This framework ensures steady, lawful data sharing with credit agencies, enabling diversified credit information services for inclusive finance.

3.2. Synergistic Effects

3.2.1. Empowering Inclusive Finance

The integration of big data credit reporting and open banking reduces financial service barriers, effectively reaching long-tail customers. It facilitates multi-dimensional data exchange and sharing, promoting balanced financial service development. This innovative combination helps break information barriers between banks and enterprises. By digitally collecting and analyzing extensive enterprise data, it objectively profiles credit subjects, accurately assesses MSE creditworthiness, and addresses MSE financing difficulties [6]. This integration reduces operational costs, breaks traditional finance's spatiotemporal constraints, improves efficiency and convenience, and fosters healthy development of inclusive finance [7].

3.2.2. Enhancing Financial Inclusion

This synergy alleviates financing difficulties for credit-invisible populations. Private credit agencies collaborate not only with banks and internet finance institutions but also cross-sectorally with e-commerce, media, public security, and public service agencies to explore new credit models. Even without traditional banking records, credit assessments become feasible through enriched data sources.

3.2.3. Extending Financial Service Boundaries

Big data credit reporting provides service providers with richer credit data, while open banking offers greater access to banking data. This synergy drives innovation in cross-border financial services. For example, big data-based credit scoring models enable personalized cross-border products like international loans and credit insurance. Additionally, open banking embeds financial services into life scenarios (e.g., e-commerce, bill payments, food delivery) or outputs them to digital platforms (e.g., Google, Alibaba, Apple, Tencent) via APIs. This enables bidirectional "scenario-to-finance" and "finance-to-scenario" integration, enhancing customer experience and achieving "borderless finance" [8].

3.2.4. Strengthening Cross-Border Payment Security

Big data credit reporting analyzes multi-dimensional data (e.g., user behavior, transaction records, credit history) with AI algorithms to monitor transactions in real-time and identify potential fraud. Open banking ensures data security during transmission and storage via APIs, increasing transaction transparency. Yiwu Pay developed "credit product trade financing" based on cross-border RMB settlement data, addressing MSE financing difficulties while reducing bank credit risks. The PBOC-promoted "Pearl River Delta Credit Chain" enables cross-regional, cross-system, multi-

dimensional enterprise credit information sharing, providing a compliance foundation for cross-border payments. Furthermore, *Global Digital Economy Fiscal and Financial Dynamics* indicates that open banking enables better payment tracking and clearer visibility into applicable exchange rates and fees throughout transactions.

4. Challenges and Countermeasures for Synergistic Development

4.1. Challenges

4.1.1. Lack of Consumer Awareness and Trust

Currently, Chinese residents have limited credit awareness and knowledge, lacking sufficient understanding of credit reporting's importance and open banking's potential value [9]. An FCA survey revealed only 25% of respondents had heard of open banking, with many perceiving limited practical benefits. Over 80% of consumers worry about third-party data misuse or leakage, impeding data sharing. Consumers' lack of control over shared data exacerbates privacy risks, creating distrust that hinders open banking adoption. Additionally, deficiencies in implementing informed consent during data sharing prevent consumers from understanding data usage or deciding whether to share data. This lack of transparency fosters skepticism and reduces participation willingness.

4.1.2. Data Security and Privacy Risks

Bank customers' personal information is intrinsically linked to their rights. Data privacy protection is fundamental for gaining trust. Open banking's multi-party data exchanges extend risk management chains and increase transmission frequency, heightening privacy breach risks. While banks share data with third parties, they cannot entirely eliminate security threats. Moreover, increased data sharing may introduce systemic risks to banking. As data scales, dimensions, and processing technologies advance, previously secure standards may become vulnerable. De-identified data risks re-identification, creating security issues. Some credit agencies conduct "big data credit reporting" without genuine databases, harming consumer rights and threatening financial system security.

4.1.3. Fragmented Technical Standards

Data standards form the foundation of data governance and are closely tied to business operations. Currently, data and algorithms are two key determinants of big data model accuracy. However, varying data sources and algorithms across credit agencies impede standardization. This fragmentation complicates data governance in the credit industry. Additionally, China's API interface standards remain exploratory, with inconsistencies across banks and third parties causing technical incompatibility, uneven interface quality, redundant development, regulatory arbitrage, and security loopholes.

4.2. Countermeasures

4.2.1. Enhancing Public Awareness and Rights Protection

Governments and relevant authorities should strengthen educational campaigns to improve public understanding of credit assessment and open banking. Disseminating credit knowledge through various media channels can help the public recognize credit's relevance to daily life, reducing unintentional or deliberate defaults. Allowing individuals to upload supporting documents to enhance credit ratings can foster positive interactions between institutions and

individuals, supporting personal credit growth and social credit system development.

4.2.2. Strengthening Data Security and Privacy Protection

Regions like the EU and UK have mature data compliance systems. China UnionPay's *Open Banking Data Protection and Compliance Practice Case Report* compiles successful practices from commercial banks, including multi-platform SDK solutions, data encryption, and secure integration techniques. These offer reference models for China. China is also exploring secure data sharing through "data not leaving domain" multi-party secure computation for deep sharing and joint modeling. Regulatory sandboxes can mitigate systemic risks, providing viable pathways for future inter-institutional data sharing.

4.2.3. Promoting Unified Technical Standards

Developed economies have established comprehensive open banking standards. The EU's PSD2 and UK Open Banking Framework cover data standards, API specifications, security protocols, and governance models. Regions like Singapore and Hong Kong also have mature standards. China should learn from international best practices to rapidly develop tailored standards and technical guidelines, reducing technical barriers and enhancing interoperability to improve global financial competitiveness.

5. Conclusion

The digital economy's core lies in profound productivity transformation. As a hallmark of open "data and capability" sharing across institutions and sectors, open banking disrupts traditional closed bank-customer relationships. Currently, attention must focus on the development trajectories of big data credit reporting and open banking. Leveraging their synergy promotes inclusive finance and extends financial service breadth and depth. Continuous improvement in data sharing, privacy protection, and technical standardization is essential to address development challenges. This supports healthy growth of both models, bringing new opportunities to

finance. Looking ahead, big data credit reporting and open banking will form a "digital community" through open-win business models, deeply integrating finance with related industries. This customer-centric approach will advance high-quality inclusive finance and sustain long-term growth of the real economy.

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