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Mechanism Innovation and Path Choice of Artificial Intelligence Driving the High-Quality Development of Inclusive Finance

Zhaopeng Sun[1], Liyao Zhang[2*]

[1]*College of Mathematics and Statistics, Beijing Jiaotong University, Beijing, China*
[2]*School of Finance, Guangdong University of Foreign Studies, Guangzhou, China*
**Corresponding Author. Email: 3122835274@qq.com*

Abstract. In the context of global digital transformation, inclusive finance is facing systemic bottlenecks such as insufficient service coverage, low efficiency and lagging risk control, while artificial intelligence technology provides technological breakthroughs for cracking the 'impossible triangle' of traditional finance through the innovative application of machine learning and natural language processing. This paper analyses the role of artificial intelligence in driving the high-quality development of inclusive finance and its practical path from the dual perspective of 'technology empowerment and institutional innovation'. The study finds that artificial intelligence (AI) significantly strengthens the risk control ability through multi-dimensional data integration and algorithm optimisation; mobile service sinking and intelligent customer service technology promote the increase of financial service coverage in counties, but remote areas are still constrained by the lack of network infrastructure suitability; Robotic Process Automation (RPA) and intelligent investment advisor technology reduces the operating costs of financial institutions, and commercial banks and fintech companies present progressive optimisation and disruptive innovation paths respectively. Differentiated paths of innovation. This study provides policymakers with operational guidelines to balance the inclusiveness of technological innovation and risk control, and contributes to the paradigm of technology governance to achieve the goal of financial inclusive growth.

Keywords: Artificial Intelligence, Financial Inclusion, Technology Enablement

1. Introduction

According to the definition of the World Bank, inclusive finance refers to a financial system that enables all social classes and groups to enjoy financial services widely and without barriers [1]. And in the process of digital transformation of the global economy, inclusive finance, as a core mechanism to promote social equity and inclusive economic growth, faces systemic bottlenecks such as narrow service coverage, low operational efficiency, and lagging risk control, which are difficult to break through in the traditional financial system. According to World Bank data, 1.4

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billion adults worldwide will still lack access to basic financial services in 2022, and financial exclusion is particularly serious in rural areas of developing countries, small and micro-enterprises and women's groups. In order to solve this dilemma, the high-quality development of inclusive finance needs to build a four-in-one evaluation system of breadth of coverage, depth of service, controllability of risk and sustainability of innovation: breadth of coverage requires that the coverage rate of financial services in counties exceeds 95 per cent, and that the use rate of digital payment reaches 85 per cent; depth of service emphasises that the matching degree of supply and demand of credit should not be less than 70 per cent and that the ageing and transformation of financial products should be completed by 90 per cent; and that the control of risk requires that the non-performing loan Risk control needs to achieve a non-performing loan rate of less than 5% and a prediction accuracy rate of more than 85% for intelligent risk control models, while sustainability of innovation is promoted through an average annual growth rate of 15% in digital infrastructure investment and a three-year multiplication plan for regulatory technology to promote the synergistic evolution of technological research and development and institutional construction.

In the development of inclusive finance, digital technology has provided impetus for the transformation of financial services from a traditional supply-driven model to one that meets a wider range of inclusive financial needs [2]. The Bank for International Settlements (BIS) 2021 research report points out that machine learning technology can improve the prediction accuracy of credit assessment models by more than 30% through the integration of unstructured data, and this breakthrough progress has significantly alleviated the long-standing problem of 'information silos' in the field of financial inclusion [3]. An intelligent customer service system driven by natural language processing technology can improve the response efficiency of financial services by 4-6 times, and at the same time reduce the cost of manual service by 75%, which provides technical support for solving the 'last mile' reach problem of financial inclusion. It is worth noting that breakthroughs in generative artificial intelligence are giving rise to a new model of inclusive financial services, and a financial demand mining system based on a multimodal large model can increase the credit coverage rate of low-income groups to 2.3 times that of the traditional model. These technological advances have not only reconfigured the cost structure of traditional financial services, but have also achieved a leapfrog breakthrough in reducing the error rate of agricultural credit risk assessment from 35 per cent to 8 per cent through innovative applications such as satellite remote sensing assessment and blockchain smart contracts, opening up a new path to cracking the 'high-risk-high-cost-low-yield' dilemma of inclusive finance.

The purpose of this paper is to systematically reveal the mechanism and practice path of artificial intelligence (AI) technology driving the high-quality development of inclusive finance, and to crack the 'impossible triangle' of efficiency, cost and inclusiveness in the traditional financial model through the dual perspective of technological empowerment and institutional innovation. The paper firstly constructs a theoretical analysis framework from the three dimensions of strengthening risk control ability, improving financial service coverage and compression of operation cost to clarify the enabling mechanism of AI for financial inclusion; then verifies the practical effectiveness of technological empowerment through the empirical analyses of intelligent credit decision-making, rural financial innovation and cross-border payment scenarios; and finally puts forward the systematic solutions of synergy of technological standards, co-construction of diversified subjects and guarantee of ethical governance to provide a solution for the high-quality development of financial inclusion. Finally, the study proposes a systematic solution of technological standard synergy, co-construction of multiple subjects and ethical governance guarantee to provide a research

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paradigm with both theoretical value and practical guidance for the high-quality development of inclusive finance.

2. Mechanisms for the impact of artificial intelligence on the high-quality development of inclusive finance

2.1. Pathways to strengthen risk control capacity

In the field of inclusive finance, risk control is crucial. Artificial intelligence has demonstrated significant innovative applications in areas such as credit assessment, anti-fraud and dynamic monitoring.

In terms of credit assessment, the traditional risk control model relies mainly on the customer's financial statements and limited credit history, which suffers from incomplete information and inaccurate assessment. The process usually involves collecting customers' financial information, inquiring about credit reports, and then manually evaluating them in combination with experience, which is inefficient and highly subjective. In contrast, AI, through machine learning algorithms, is able to integrate big data and analyse multi-dimensional data of customers, such as daily transaction flow, assets, payment habits, historical borrowing and lending information, to assess the user's credit level. For example, Microfinance Bank has used information such as social data and consumption habits to build a more comprehensive credit assessment model, greatly improving the accuracy and efficiency of credit assessment. While achieving high business growth, it has kept its non-performing asset ratio at a low level. Taking the Internet inclusive financial products such as chanting and borrowing that have emerged in recent years as an example, according to data from Ant Gold's prospectus, the M1+ delinquency rate (the ratio of loan balances overdue for more than one month to the overall loan balance) of consumer credit balances facilitated by Ant Gold at the end of 2017-2019 was only 1.08%, 1.43%, and 1.56%,. The M3+ delinquency rate (the proportion of loan balances overdue for more than three months to the overall loan balance) was only 0.68%, 1.01% and 1.05% [4].

In the field of anti-fraud, artificial intelligence can monitor transaction data in real time and identify unusual transaction patterns. Through the learning of massive transaction data, machine learning algorithms can quickly discover potential fraudulent behaviour. For example, Ant Gold's anti-fraud system, using artificial intelligence technology, can assess the risk of a large number of transactions in a short period, effectively reducing fraud losses. Governor Li Nanqing said in an interview with Shenzhen Special Zone News that in the first half of 2019, the number of phishing and fraud incidents prevented by the bank through AI technology exceeded 20,000, and the prevention rate reached more than 95%, demonstrating the safety of digital inclusive finance [5].

In terms of dynamic monitoring, AI can track the credit status of customers in real time. Once a customer's behaviour becomes abnormal, the system is able to issue an early warning in a timely manner. Through the optimisation of machine learning algorithms, the efficiency of risk identification has been greatly improved, and potential risks can be detected in advance, providing sufficient time for financial institutions to take measures.

2.2. Financial services coverage enhancement mechanisms

Intelligent customer service, automated approvals and mobile service sinks play a key role in reaching the long tail of customers.

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In rural finance and microfinance scenarios, intelligent customer service can interact with customers in real time and answer their questions through natural language processing technology. This enables financial services to reach more customers in remote areas. For example, residents in some rural areas can communicate with intelligent customer service via mobile phones to learn about financial products and services. Automated approvals, on the other hand, have greatly reduced loan approval time. While the traditional loan approval process is cumbersome and requires manual review of a large amount of information, the automated approval system can quickly analyse a customer's credit status and make approval decisions. In microfinance, many micro and small business owners can obtain loans in a short period of time to meet their financial needs.

The sinking of mobile services has enabled financial services to be extended to rural and remote areas. According to relevant statistics, the coverage rate of financial services in rural areas in China has now risen from less than 50 per cent a few years ago to more than 70 per cent today. However, in areas with insufficient infrastructure, technology adaptability remains a problem. For example, unstable network signals in some remote mountainous areas affect the use of mobile services. Therefore, infrastructure needs to be further strengthened to improve technology adaptability.

2.3. Operating cost compression and benefit optimisation

Automation of Robotic Process Automation (RPA) processes, intelligent investment and precision marketing have brought about a change in the cost structure.

RPA process automation can replace manual labour to complete repetitive and regular tasks, such as data entry and report generation. Analysed through an input-output ratio model, financial institutions have seen significant reductions in operational costs and significant increases in efficiency after implementing the RPA process automation. Juniper Research estimates that global banks will save $7.3 billion in operational costs by 2023 through the use of chatbot applications [6]. Digital technology can reduce actual operational costs by optimising operational processes and reducing human inputs, which enables financial inclusion to provide more affordable and convenient services [7]. Intelligent investment advisors can provide customers with personalised investment advice based on their risk preferences and investment objectives. Compared with traditional investment advisors, smart investment advisors have lower costs and can serve more customers. Precision marketing, on the other hand, precisely pushes financial products to target customers through the analysis of customer data, improving marketing efficiency and reducing marketing costs. For example, Guiyang Central Branch built an application platform to integrate blockchain technology into the credit process of forest right mortgage loans, realising the sharing of resource information such as farmers' file information and forest right data, and successfully issued several forest right mortgage loans. Moreover, the review process of a single loan was shortened from about 15 days in the past to about 20 minutes, and the cost of a single loan for a farmer was saved about RMB 400, which effectively accelerated the review process and reduced the cost of the forest right mortgage credit granting process.

Commercial banks and fintech companies have differentiated paths in implementing these technologies. Commercial banks usually have a large customer base and rich financial resources, but they are relatively slow in technological innovation. They are more likely to introduce AI technologies into their existing business processes and gradually achieve digital transformation. Fintech companies, on the other hand, are technology-centred and focus more on innovation and rapid iteration. They can launch new financial products and services more quickly to meet the diverse needs of their customers.

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3. Practical case studies of typical application scenarios

3.1. Construction of an intelligent credit decision-making system

In the field of inclusive finance, intelligent credit decision-making systems are playing an important role in effectively reducing the risk of default, and the significant difference between them and the traditional credit approval process can be clearly seen in the case of Microfinance Bank and Ant Financial.

The traditional credit approval process is cumbersome, requiring manual collection and review of a large amount of information, including the customer's financial statements, asset certificates, credit reports, etc., with a long timeframe for approval, often taking days or even weeks. Moreover, due to the reliance on limited information and manual empirical judgment, the assessment of a customer's creditworthiness is not comprehensive and accurate, resulting in a relatively high bad debt rate.

Microcrowd Bank is the world's first rated digital bank, established in December 2014 in the context of the country's efforts to develop financial inclusion [8]. Microcosmos Bank has built an intelligent credit decision-making system using artificial intelligence and big data technology. The system can quickly integrate multi-dimensional data, such as social data and consumption data, to comprehensively assess customer credit. The approval timeframe has been significantly improved, and many loan applications can be approved within minutes. Among them, Micro Business Loan is a comprehensive online working capital loan product launched by MicroBank specifically for customer groups such as micro and small business owners and self-employed persons. To better meet the needs of these customers, the bank uses artificial intelligence technology to analyse and process the information of the applying enterprise, automatically audits the authenticity of the information provided by the customer, completes a credit assessment report while judging the enterprise's repayment ability, and the credit line is immediately visible to both the bank and the enterprise [8]. At the same time, through accurate risk assessment, the bad debt rate is effectively controlled.

Ant Gold's intelligent credit decision-making system also performs well. It is based on massive transaction data and advanced machine learning algorithms to achieve automated approval. In terms of approval timeliness, it can respond quickly to customer needs and provide timely financial support to many small and micro enterprises and individuals. In terms of bad debt rate, it effectively reduces the risk of default with its powerful data mining and analysis capabilities.

3.2. Operation of rural financial intelligence stations

The innovative model of rural financial intelligent service stations has improved the coverage of financial services and brought new vitality to the development of rural finance. Digital inclusive finance can accelerate the process of equalisation of basic public services through the convenient information supply function [9]. Satellite remote sensing assessment and Internet of Things (IoT) movable property pledges are typical representatives.

Satellite remote sensing assessment technology can be used for agricultural production monitoring and assessment. Satellite images provide real-time information on the growth status of crops, planting areas and other information. In the agricultural supply chain finance pilot project in Jilin Province, financial institutions are using satellite remote sensing assessment technology to accurately assess the production capacity and risk profile of farmers and to provide farmers with more reasonable loan amounts and interest rates.

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The IoT movable pledge model solves the problem of monitoring rural movable pledges. By installing Internet of Things sensors on movable assets such as agricultural products and agricultural equipment, financial institutions can monitor the status and location of movable assets in real time. In Jilin Province, several agricultural enterprises have obtained financing support through IoT chattel pledges, which has improved the efficiency of their capital turnover.

These innovative models have improved the availability and efficiency of rural financial services and contributed to the development of the rural economy. At the same time, they have provided rural financial institutions with more effective means of risk control and reduced financial risks.

3.3. Innovations in cross-border payment clearing efficiency

Blockchain and smart contract technology in the field of cross-border payment clearing to reduce costs and increase efficiency, the SWIFT GPI and Ripple as an example, can see the obvious technical differences.

Traditional cross-border payment clearing mainly relies on the SWIFT system, which is a complex process involving multiple intermediary banks, resulting in long payment times and high fees. Although SWIFT GPI has improved payment transparency and speed to a certain extent, there is still an efficiency bottleneck.

Ripple, on the other hand, realises real-time cross-border payments based on blockchain technology. The distributed ledger feature of blockchain enables real-time sharing of transaction information, reducing intermediate links and improving payment efficiency. Smart contract technology can automatically execute the terms of the transaction, ensuring the accuracy and security of the transaction.

In international remittances and trade finance, Ripple enables faster and cheaper payments. In contrast, SWIFT GPI still takes longer and costs more to process large-scale transactions.The emergence of Ripple brings new solutions for cross-border payment clearing and boosts the development of cross-border financial business.

4. Policy recommendations

The risk prevention and control system should establish a penetrating intelligent monitoring mechanism. Relying on the national unified intelligent risk control monitoring platform, real-time docking with the core system of financial institutions, through the real-time cleansing and feature extraction of the full volume of transaction data, a dynamic risk portrait library is constructed to provide data support for the algorithmic dynamic rating system. Based on the cross-institutional behavioral data deposited by the platform, the anti-fraud model can introduce migration learning technology to optimize the generalization ability of abnormal transaction pattern recognition, so that the model error rate can be controlled within 3%. Cross-institutional risk prevention requires the establishment of an all-channel financing monitoring system for borrowers to penetrate and identify the risk of multi-lending. In terms of ethical governance, there is a need to formulate AI ethical guidelines on financial inclusion based on the fairness, transparency and interpretability of technology application. Focusing on three aspects to build a governance framework: first, data privacy protection, requiring financial institutions to adopt techniques such as federated learning and differential privacy to ensure the desensitisation of sensitive information such as user biometrics and credit data in model training; second, algorithmic fairness review, mandating credit decision-making models to pass counterfactual fairness tests and eliminating implicit discrimination against rural residents, women, and other groups; and third, service transparency constraints, which stipulates that

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intelligent customer service is required to disclose dialogue record storage rules and manual review triggering mechanisms to users. To implement the guidelines, it is recommended that an algorithmic fairness review committee be set up, relying on the default rate discrepancy data in the cross-institutional risk portrait library, focusing on monitoring model bias in dimensions such as geography and gender, reserving the right to manual review for credit decisions above 200,000 yuan, and issuing regular social impact white papers through the Fintech Ethics Assessment Centre.

Infrastructure development requires the implementation of the 'New Digital Infrastructure Plus' project. It is planned to complete the construction of the fifth-generation rural financial infrastructure by 2025, achieving 90 per cent 5G network coverage in administrative villages and full coverage of smart financial service stations. A national special fund for inclusive financial technology has been set up to provide 50 per cent acquisition subsidies for digital payment terminals below county level, while lightweight financial apps adapted to low-bandwidth environments have been developed, and major financial institutions have been compelled to provide offline transaction functions. In order to stimulate innovation, it is proposed to implement a 150 per cent deduction policy for R&D investment in inclusive financial technology, set up an annual 1 billion yuan award fund for AI financial application innovation, build a dual-track incubation system of 'supervisory science and technology and application science and technology', focus on supporting the research and development of key technologies, such as federated learning and privacy computing, and cultivate high-quality innovative enterprises through the green channel of the Science and Technology Innovation Board.

In terms of capacity building, it is recommended to incorporate digital financial literacy into the national education system, develop age-appropriate and dialect-version teaching resources, and carry out the '100 counties and 1,000 villages' digital literacy action, so as to complete the training for 50 million people by 2025. General Secretary Xi Jinping has emphasised in the opening ceremony of the Belt and Road Forum and the Fifth National Financial Conference that it is necessary to encourage innovation in financial science and technology and vigorously develop inclusive finance [10]. Therefore, in the field of international cooperation, country should take the lead in formulating the 'Belt and Road' Digital Inclusive Finance Standard Mutual Recognition Framework, promote the construction of cross-border payment systems for digital currencies of multilateral central banks, establish the Asia-Pacific region's fintech regulatory information-sharing platform, and build an intelligent anti-money laundering monitoring network. Through a three-stage implementation path, it is planned to achieve 80% coverage of intelligent risk control in counties by 2025, increase the efficiency of cross-border payments by 70% by 2030, and ultimately build a globally leading paradigm of inclusive financial governance by 2035, achieving breakthroughs such as a 300% increase in the efficiency of credit resource allocation and a reduction in the marginal cost of services to 1/5 of the traditional model, so as to provide a replicable Chinese Programme.

5. Conclusions

This paper systematically researches the role mechanism and practice path of AI technology to drive the high-quality development of inclusive finance, and reveals the internal logic of AI in cracking the impossible triangle of inclusive finance from the perspective of the synergistic evolution of technological empowerment and institutional innovation. By constructing three major theoretical analysis frameworks of risk control capacity strengthening, financial service coverage improvement, and operation cost compression, and combining the empirical tests of intelligent credit decision-making, rural financial innovation and cross-border payment scenarios. This paper concludes that AI significantly improves the risk control efficacy of financial inclusion through multi-dimensional data

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integration and algorithm optimisation; in terms of coverage, mobile service sinking and intelligent customer service technology promote the increase of financial service coverage in counties, but remote areas are still constrained by the lack of network infrastructure suitability; in the level of cost optimisation, RPA and intelligent investment advisor technology reduces the operational costs of financial institutions, but the Commercial banks and fintech companies show differentiated paths of progressive optimisation and disruptive innovation.

Based on the above findings, this paper proposes a policy implementation path and systematic solutions, covering intelligent regulatory mechanisms, digital new infrastructure projects and international cooperation framework design. Future research could focus on exploring the ethical boundaries and inclusive value of generative AI, and deepening inclusive service programmes for the elderly and disabled in the context of the digital divide. In addition, cross-country comparative research will help to refine the common patterns of technology-driven inclusive financial development.

Authors contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

[1] F. Allen, A. Demirguc-Kunt, L. Klapper and M. S. Martinez Peria, 2016, 'The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts, ' Journal of Financial Intermediation, 27.
[2] Zonghui Shi, Junhua Han. Research on the Mechanism Analysis and Application of Digital Financial Inclusion by Fintech [J]. Science Management Research, 2022, 40(03): 150-157.DOI: 10.19445/j.cnki.15-1103/g3.2022.03.020.
[3] Bank for International Settlements (BIS), 2021, Big data and machine learning in central banking special report
[4] Li Quan, Fan Yiman. The construction of a strong financial country and the high-quality development of inclusive finance [J]. People's Forum, 2023, (22): 22-26.
[5] Liu Yingxin, Jia Xiaowei. Exploring the Shenzhen model of artificial intelligence integration for financial inclusion--Taking Weizhong Bank as an example [J]. International PR, 2023, (18): 43-45.DOI: 10.16645/j.cnki.cn11-5281/c.2023.18.037.
[6] J.H. Xu, L.Y. Zhang. Research on Artificial Intelligence Technology Enabling the Development of Inclusive Finance [J]. FinTech Times, 2022, 30(02): 89-92.
[7] Digital technology can reduce the actual operating costs by optimising the operation process and reducing human input, which enables inclusive finance to provide more affordable and convenient services.
[8] Report on the Development of Inclusive Finance in China [J]. Financial Electronic, 2019(02): 96.
[9] Liu Yanhua, Wu Yilian. Digital inclusive financial development and equalisation of basic public services: theoretical interpretation and empirical analysis [J]. Regional Financial Research, 2023(7): 5-16.
[10] YUAN Xiuwen, CAO Yuanfang. Exploration of financial technology to promote the development of inclusive finance [J]. Qinghai Finance, 2019, (05): 34-37.