

An Analysis of the Pathways for Financial Institutions to Serve the Real Economy in the Context of the Digital Economy

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ABSTRACT

The rapid development of the digital economy and the digital transformation of the financial industry constitute key pathways to enhance the quality and efficiency of the real economy. This article analyzes the existing problems in financial services for the real economy and studies compliant and feasible digital service paths. This paper draws on publicly released data from the China Academy of Information and Communications Technology, the People's Bank of China, and the State Administration of Financial Regulation, and analyzes the digital transformation practices of domestic commercial banks. Data shows that in 2024, China's digital economy reached 59.2 trillion yuan, accounting for 43.8% of GDP, and the foundation for digital development is solid. The research proposes five core directions: product innovation, supply chain financial services optimization, inclusive service development, green financial services implementation, and intelligent risk management, indicating that digital services can address the financing challenges of real economy industries and channel credit capital into the real economy. The research results have reference value for financial institutions to optimize services and support the transformation of real economy industries, facilitate finance to fulfill its core mission and advance the integration of the two.

KEYWORDS

Digital Economy; Financial Institutions; Real Economy; Digital Transformation; Inclusive Financial Services; Industrial Finance

1. INTRODUCTION

The popularization of digital technology has reshaped traditional financial models and changed financing matching mechanisms for real economy entities. The digital transformation of domestic industries is advancing; as computing power, big data, AI and blockchain technologies mature, data circulation efficiency improves, providing technical support for the digital transformation of financial institutions. China has issued financial policies that mandate the financial industry to prioritize the real economy, allocate funds in a digital way, guide resources to key industries and grassroots sectors, and clarify the direction of digital financial services for entities.

In reality, financial services for the real economy still have shortcomings. Traditional credit is overly reliant on real estate collateral, and most light-asset tech enterprises and startups find it difficult to meet credit conditions, resulting in high financing thresholds [1]. The manual approval process is cumbersome and the loan disbursement cycle is long, making it difficult to match the short-term emergency financing needs of SMEs. The imbalance of financial resources makes it difficult for county and township industries to access formal financial services, and grassroots service efforts should be strengthened. Information asymmetry and inadequate data sharing between banks and enterprises makes it difficult for financial institutions to assess the operational status of enterprises, leading to credit mismatches and difficulties in obtaining high-quality entity financing.

In response to the above issues, tools such as big data credit reporting, intelligent risk management, and digital lending can break down information barriers, simplify business processes, reduce the proportion of mortgage guarantee credit, and resolve the financing challenges of real economy industries. This article combines the current development status of the financial industry, draws on authoritative data from the central bank and the State Administration for Financial Regulation, analyzes the role of digital technology in financial services, and combines industry regulatory requirements to sort out the development path and channel financial resources to the real economy.

The integration of digital economy and real economy is the major trend of current economic development. To improve the quality and efficiency of the real economy, continuous financial support is indispensable, and the traditional financial model can no longer keep up with the rapidly changing needs of the real economy. Real economy entities, especially SMEs, pay more attention to convenient services and low costs, accelerating financial digital transformation. Financial digitization is not only a technological upgrade, but also an adjustment of service logic, determining finance's capacity to serve the real economy, and forms the core of this study.

2. DIGITAL FINANCIAL PRODUCTS ARE ITERATIVELY UPGRADED TO MEET THE DIVERSIFIED FINANCING NEEDS OF REAL ECONOMY INDUSTRIES

The real economy includes manufacturing, commerce, agriculture, science and technology innovation, and other fields. There are significant differences in the operation, capital turnover, and financing needs of various industries. Traditional standardized credit products are no longer suitable for the differentiated financing demands of the real industry. Financial technology is gradually being standardized, and financial institutions are launching digital and customized credit products as a way to serve the real economy [2]. Financial institutions build online platforms, integrating government information and enterprise operation data to design credit models, and gradually no longer relying on traditional credit models such as financial statements and real estate collateral for risk assessment.

State-owned commercial banks have taken the lead in expanding their digital lending business by relying on data and customer strengths. Institutions connect market supervision, taxation, social security and other public government data, build an integrated online financial service platform, and design differentiated credit products for different market entities. They launch online credit products for manufacturing enterprises, and determine credit limits based on operating cash flow; They provide dedicated services for science and technology innovation enterprises, define credit levels based on intellectual property and research project qualifications, and lower financing barriers; and offer micro business loans to micro-enterprises to meet their short-term liquidity needs. The entire process of online approval for loan disbursement shortens processing time and adapt to the needs of real economy industries.

Joint-stock banks and local banks focus on regional resources, develop characteristic credit products, and avoid homogeneous products [3]. Such institutions combine local industrial development plans and design exclusive digital credit schemes around local leading industries such as characteristic agriculture, light manufacturing, and regional logistics. They set credit rules, loan terms, and repayment methods based on industry operation laws. At the same time, adjust repayment terms based on the industry's operating cycle, adopting diversified repayment mechanisms, and reducing the short-term repayment pressure on enterprises.

Financial institutions engaged in digital innovation must align with regulatory requirements and adhere to serving the real economy. Accurately identify market financing pain points during product development, implement inclusive financial services interest rate regulation requirements, and reasonably reduce the comprehensive financing costs of market entities. Optimize products based on macroeconomic and industry trends to match financial services with real financing needs. This type

of product can be combined with peak and off-peak seasons of enterprise operation to adjust the repayment rhythm, set interest rates more in line with the affordability of SMEs, further reduce the comprehensive financing costs of real economy industries, and adapt to the business needs of different growth stages.

3. PROMOTE THE DIGITAL TRANSFORMATION OF SUPPLY CHAIN FINANCIAL SERVICES AND UNBLOCK THE OVERALL CAPITAL CIRCULATION CHANNELS OF THE INDUSTRIAL CHAIN

The domestic physical industry chain is closely connected upstream and downstream, including leading enterprises, raw material suppliers, manufacturers, and offline distributors. Small and medium-sized enterprises in the chain often face problems such as slow receivables collection, funding shortages, and difficulties in financing, making them the group with the greatest financial pressure on the real economy. The traditional supply chain financial services process is cumbersome, with credit only covering leading enterprises, and service resources mostly concentrated in the top enterprises of the industrial chain, making it difficult to achieve full chain coverage, and idle industrial funds go untapped.

Digital technology optimizes supply chain financial services and unblocks cash flow bottlenecks. Blockchain can store transaction, logistics, and accounts receivable information, with full traceability and tamper resistance, resolving problems such as distorted traditional business information and slow offline reconciliation [4]. Big data technology opens up channels for data exchange among various entities in the industrial chain, integrates transaction records, cargo transportation trajectories, account settlements, and other information, breaks down internal information barriers within the industry, and helps financial institutions assess the operational status of the industrial chain.

Multiple banks have built an industrial chain financial platform to extend credit from leading enterprises, remove the restriction of credit only being granted to first-tier suppliers, and enable multi-level SMEs to obtain pure credit financing based on real transaction scenarios. Digitization eliminates the need for offline submission of materials and verification, resulting in high efficiency, improves financing efficiency, and reduces financing costs for small and medium-sized enterprises. Financial institutions rely on massive industrial data to conduct risk identification, divide business levels based on the current development status of the industry, and adjust the scale and pace of credit allocation.

Promoting digital supply chain financial services requires collaborative efforts from multiple parties. Financial institutions collaborate with core enterprises, logistics platforms, and industry information institutions to improve the channels for collecting industry data; The competent department has issued unified transaction information management standards to consolidate the foundation of data application [5]. Financial institutions develop exclusive service plans based on the operational characteristics of different industries such as manufacturing, agriculture, and commerce, and mobilize idle funds in the industrial chain to stabilize upstream and downstream operations.

The supply chain is a key link in the real economy, with close upstream and downstream connections. As long as funds are stuck in one link, the entire industry will be affected. Under the traditional model, financial resources are only concentrated in leading enterprises, making it difficult for small and medium-sized enterprises to receive support, which can lead to an imbalance of "strong leading enterprises and weak small and medium-sized enterprises". Digital transformation has broken this limitation, transmitting credit from leading enterprises to every small and medium-sized enterprise in the chain, and tracking transactions and fund dynamics in real time, predicting gaps in advance, and safeguarding the foundation of industrial operation.

4. IMPLEMENTING THE DIGITAL TRANSFORMATION OF INCLUSIVE FINANCIAL SERVICES AND FILLING THE GAPS IN GRASSROOTS SERVICES OF THE REAL ECONOMY

The real economy includes grassroots operators such as individual businesses, family farms, and microenterprises. These entities are small in scale, have irregular finances, lack collateral, and have difficulty obtaining loans, making them key service groups for inclusive financial services. Traditional inclusive financial services rely on offline services, with limited coverage and high operating costs. It is difficult for operating entities in remote areas to obtain stable financial services, and digital transformation is the main way to serve small and micro businesses [6].

Financial institutions use online channels without restrictions on branch locations, and their financial resources fully cover county and township areas and rural areas with weak financial services. Mobile banking and online financial service ports simplify business processes, allowing grassroots operators to handle online services such as consultation, application, limit inquiry, repayment, etc., solving the problem of inconvenient financial services in remote areas. Financial institutions integrate operational data, establish a simple credit evaluation system using transaction and livelihood credit data, moderately relax financial audit requirements, and allow unsecured grassroots operators to obtain normal operating turnover funds [7].

The Agricultural Bank of China has improved its online agricultural services, focusing on local farming and animal husbandry industries, agricultural product processing, and rural cultural and tourism industries, and launched digital lending products that are in line with the agricultural production cycle. The loan term is in line with the agricultural season, meeting seasonal financing needs, simplifying the credit approval process for rural credit filing data, continuously expanding the coverage of formal financial services in rural areas, and providing support for the development of rural economy.

Based on the actual situation in counties and rural areas, various regions have launched micro flexible credit products ranging from thousands to millions of yuan, catering to the small, high-frequency, and short-term money needs of grassroots entities. Relying on township financial stations and village level convenience points, online and offline services are linked to provide business explanations and practical guidance. After the implementation of these services, the approval rate of financing for grassroots operators has increased by over 30%, and the vitality of rural small and micro businesses has significantly increased.

Inclusive digital finance requires sustained advancement, and refined risk management should be implemented in business expansion. The risk resistance ability of grassroots small and micro entities in the market is weak, and their operating income fluctuates significantly. Digital risk management monitors their operations in real-time, sets quotas, and prevents overdue risks. Grassroots service stations provide practical guidance on adapting to the usage habits of different groups, continuously improving the grassroots financial service system, and filling the gaps in grassroots financial services. Township financial stations are synchronously simplifying credit filing, promoting online agency services, shortening the approval cycle for grassroots financing, allowing micro-enterprises to obtain working capital faster, and effectively connecting the "last mile" of services.

5. PROMOTING DIGITAL EMPOWERMENT OF GREEN FINANCIAL SERVICES TO ASSIST THE LOW-CARBON TRANSFORMATION AND UPGRADING OF THE REAL ECONOMY

The "dual carbon" goals drive the low-carbon transformation of the real economy. High-energy-consuming industries are promoting energy-saving transformation, and the development space of industries such as green manufacturing, clean energy, and ecological agriculture is expanding. The

upgrading of industrial technology, equipment replacement, and new construction projects all require long-term funding as support, and digital green financial services can directly serve the low-carbon development of real economy industries.

Traditional green financial services have limitations, such as low efficiency in selecting high-quality projects, and a lack of unified quantitative standards for enterprise energy consumption, emission data, and transformation effectiveness. The verification of project qualifications and evaluation of benefits often rely on manual offline work, resulting in low overall work efficiency [8]. Big data and the Internet of Things are integrated with enterprise energy consumption and environmental protection equipment data to automatically collect production, pollution, and transformation data, grasp the corporate low-carbon performance, and provide reference for loan review and quota measurement.

Financial institutions can integrate enterprise carbon accounts and ESG ratings, and include emission reduction effectiveness and green qualifications as credit references. Establish digital ledgers for green projects in various regions, summarize information on renovation, new energy, etc., and achieve dynamic screening, tracking, and management. This digital linkage reduces manual verification bias, makes green credit allocation more accurate, and matches the long-term funding needs of entities for low-carbon transformation.

Various financial institutions align with industrial policies and establish a digital green financial service framework. Develop differentiated credit rules for energy-saving renovation entities, environmental technology enterprises, and clean energy projects, implement support measures in credit scale, financing interest rates, business approval, and other aspects, and compress financing expenses during the transformation stage of enterprises. The industry builds an online enterprise information database, integrates business data, project information, and environmental assessment results from different entities, divides customer service levels, and focuses on supporting high-quality green projects with mature technology and stable operation.

The market relies on digital technology to integrate green financial products and provide integrated financing services for large-scale industrial projects. The environmental protection department and financial regulatory agencies exchange industry data, publicize the environmental credit rating and violation of pollution records of enterprises, and help financial institutions identify project risks. Utilize digital regulatory tools to control the direction of credit fund usage, allowing funds to be used in real economy sectors such as energy-saving renovation, equipment updates, and low-carbon technology research and development, and prevent diversion. Digital finance supports real economy entities in low-carbon transformation [9].

6. IMPROVE DATA GOVERNANCE AND RISK MANAGEMENT SYSTEM, SAFEGUARD THE BOTTOM LINE OF FINANCIAL SECURITY FOR SERVICE ENTITIES

In the context of the digital economy, financial services are digitized, and data on enterprise operations, user credit, and credit are accumulated during operation. The surge in data volume has led to an increase in various risks, including data misuse, privacy breaches, online fraud, and new risks. Financial institutions focus on serving entities, establishing standardized data management rules and intelligent risk management systems, while improving work efficiency and guarding financial security boundaries to prevent financial risks from affecting real economy industries.

Financial institutions carry out data management work, strictly abide by relevant national data security regulations, formulate lending criteria based on accurate data, and clarify unified requirements for information collection, organization, storage, retrieval, and use. The staff distinguishes between public information of the enterprise and user privacy data, implements security measures, establishes multiple layers of information confidentiality mechanisms, and avoids

information leakage and unauthorized sharing. Financial institutions adjust fragmented data collection practices, combine with the actual needs of the development of the physical industry, screens practical business and credit information, eliminates useless and redundant information, and formulates lending standards based on accurate information.

Financial institutions abandon manual post risk management and rely on big data to build a real-time risk management system. The system covers the entire credit process, with staff following up in real-time on the entire process of review, disbursement, fund utilization, and post loan management [10]. The system can automatically identify false business information, illegal outflow of funds, repeated borrowing and other behaviors, issue risk warnings in a timely manner, and stop illegal operations. Staff set exclusive risk assessment standards for manufacturing, retail, agriculture and other industries based on the development laws of different real economy industries, timely discover lending risks caused by industry changes, and flexibly adjust lending arrangements.

Financial institutions combine online risk management with offline visits, and arrange personnel to visit business premises for large-scale financing business to verify actual operating conditions. Online intelligent investigation and offline manual verification can complement each other [11]. The industry attaches great importance to the training of professional personnel, cultivating employees who understand physical and digital risk management, and identifying business risks and online financial issues.

Data governance and risk management are both risk prevention measures and the bottom line for financial service entities. There are many types of real economy industries with different business cycles and risk characteristics. adopting a one-size-fits-all risk management framework can easily misjudge high-quality enterprises. Digital risk management can adapt to the laws of different industries, identify real business risks, and avoid blindly withdrawing loans. Standardizing data management can also protect enterprise business information, prevent leaks and ensure secure, convenient financial services, and truly safeguard the real economy.

7. CONCLUSION

This article combines industry data and institutional practices to examine pathways of digital financial service entities. Research shows that digital technology is transforming financial models and matching the needs of physical development. The financial industry relies on digital means to adjust its service forms, expand the scope of grassroots services, solve the problem of urban-rural financial imbalance, and support micro-enterprises maintain stable operations. Upgraded supply chain financial services can break through the internal information barriers of the industrial chain, utilize available funds of SMEs on the chain, and stabilize the operation of the industrial chain.

Financial institutions rely on digital tools to optimize credit service forms, customize service plans based on the actual financing needs of real economy industries, simplify business processing procedures, and effectively improve the current situation of low financing efficiency of enterprises. By relying on digital means to screen green industry projects, it can also guide credit resources to flow towards low-carbon transformation areas, assist real economy industries in completing green transformation, and align with the overall layout of low-carbon development in China. Establishing a comprehensive data management and intelligent risk management mechanism can resolve digital financial derivative risks and enable credit funds to be invested in real economy industries.

There are shortcomings in the research, such as limited sample size and lack of regional analysis. The analysis of the digital transformation challenges faced by local small and medium-sized financial institutions is not thorough enough, and the applicability of relevant optimization suggestions is relatively limited.

Financial digitization should avoid superficial digital transformation, but needs to be based on the real economy and strictly control the flow of funds away from the real economy. Industry entities

should continuously optimize their service content in response to market changes, strengthen the integration of interbank resources, build a complete service system, strictly follow regulatory requirements to coordinate business innovation and compliant operation, promote the integration of digital finance into the development of real economy industries, which meets the requirements of high-quality economic development in China, supports real industrial development, promotes the coordinated development of finance and entities, strengthens economic foundations, and supports the upgrading of the real economy.

REFERENCES

- [1] Hall, B. H., & Lerner, J. (2010). The financing of R&D and innovation. In *Handbook of the Economics of Innovation* (Vol. 1, pp. 609–639). North-Holland. [https://doi.org/10.1016/S2214-4774\(10\)01014-3](https://doi.org/10.1016/S2214-4774(10)01014-3)
- [2] Cornelli, G., Frost, J., Gambacorta, L., Rau, P. R., Wardrop, R., & Ziegler, T. (2020). Fintech and big tech credit: a new database [Working paper]. Bank for International Settlements.
- [3] Lu, Z., Wu, J., Li, H., & Nguyen, D. K. (2022). Local bank, digital financial inclusion and SME financing constraints: Empirical evidence from China. *Emerging Markets Finance and Trade*, 58(6), 1712–1725. <https://doi.org/10.1080/1540496X.2021.1989421>
- [4] Li, J., Zhu, S., Zhang, W., & Yu, L. (2020). Blockchain-driven supply chain finance solution for small and medium enterprises. *Frontiers of Engineering Management*, 7(4), 500–511. <https://doi.org/10.1007/s42452-020-00478-8>
- [5] Yao, L., & Yang, X. (2022). Can digital finance boost SME innovation by easing financing constraints? Evidence from Chinese GEM-listed companies. *PLOS ONE*, 17(3), e0264647. <https://doi.org/10.1371/journal.pone.0264647>
- [6] Cull, R., Demirguc-Kunt, A., & Morduch, J. (Eds.). (2021). *Banking the world: Empirical foundations of financial inclusion*. MIT Press. <https://doi.org/10.7551/mitpress/12241.001.0001>
- [7] Uddin, M. S., Chi, G., Al Janabi, M. A., & Habib, T. (2022). Leveraging random forest in micro-enterprises credit risk modelling for accuracy and interpretability. *International Journal of Finance & Economics*, 27(3), 3713–3729. <https://doi.org/10.1002/ijfe.2322>
- [8] Ahmad, F., Boumaiza, A., Sanfilippo, A., & Al-Fagih, L. (2025). A detailed comprehensive role of digital technologies in green finance initiative for net-zero energy transition. *Advanced Energy and Sustainability Research*, 6(10), 2500066. <https://doi.org/10.1002/aesr.202500066>
- [9] Shen, Z., Wang, S., Boussemart, J. P., & Hao, Y. (2022). Digital transition and green growth in Chinese agriculture. *Technological Forecasting and Social Change*, 181, 121742. <https://doi.org/10.1016/j.techfore.2022.121742>
- [10] Tian, X., Tian, Z., Khatib, S. F., & Wang, Y. (2024). Machine learning in internet financial risk management: A systematic literature review. *PLOS ONE*, 19(4), e0300195. <https://doi.org/10.1371/journal.pone.0300195>
- [11] Machado, M. R., & Karray, S. (2022). Assessing credit risk of commercial customers using hybrid machine learning algorithms. *Expert Systems with Applications*, 200, 116889. <https://doi.org/10.1016/j.eswa.2022.116889>