

# *Research on the Path of Green Finance to Support the Digital Transformation of the Banking Industry*

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**Abstract:** With the goal of developing "carbon peaks" and "carbon neutrality", the development of green finance in China faces new opportunities. With the gradual application of digital technology in green finance, digital transformation can be used to promote the reform of green finance products, business and risk control, which can improve the quality and efficiency of green finance development and accelerate the realization of "double carbon". Currently, domestic banks are actively combining digital technology with green finance to effectively promote the digital transformation of green finance through digital products, operations, risk control and infrastructure. Based on domestic practices and results, it can be seen that strengthening data management and utilizing core technologies will be the way to achieve the digital transformation of green finance in banks. The article provides a more detailed analysis and discussion on the realization of the digital transformation of banks.

## 1. Introduction

For the banking industry, green finance promotes the digital transformation of the banking industry, and the use of digital means to explore new products, new models and new scenarios can bring effective improvement of cost, efficiency and security for banks, which is also a breakthrough point for banks to enhance the development of green finance. To this end, it is necessary to systematically study the digital reform of green finance in China's banking industry from the perspectives of value dimension, practical exploration, implementation path and policy promotion, and further explore its innovative potential in the integration of digital technology and green finance on this basis, which can provide strong support for the realization of "double carbon".

## 2. The Emergence and Development of "Green Finance" in China

The concept of "green finance" has been popular worldwide for many years. It means that the financial sector takes environmental protection as a fundamental policy, takes into account the possible environmental problems, takes into account the possible environmental problems, and integrates the potential benefits, risks and costs related to the environmental situation into the bank's business, putting ecological protection and control of the environment in the first place, and putting

the concern for economic development in the first place[1]. The issue of sustainable development of the financial industry itself, that is, not to cause excessive speculative nature due to the pursuit of short-sighted interests, so that the financial industry can develop sustainably. The green financial system is shown in Figure 1.

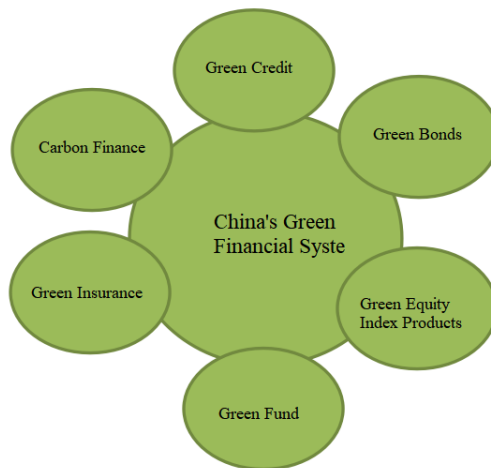


Figure 1: Green Financial System.

The emergence of "green finance" has both environmental and sustainable development reasons. Since the 1970s, a number of countries around the world have issued policies on "green finance" and made corresponding proposals based on them. China was one of the first countries to start paying attention to the environmental effects of credit. However, starting from 2007, the General Administration of Environmental Protection of the People's Republic of China (now the Ministry of Ecology and Environment), together with the Banking and Insurance Regulatory Commission and the Securities Regulatory Commission, launched the "green credit", "green securities", and "green insurance". Green Finance" system, mainly "Green Credit", "Green Securities" and "Green Insurance", has been widely emphasized. From the perspective of the current development of green finance, since the latter two models have just started, and their scale and function are small, the green finance model is still dominated by green credit from banks[2].

### 3. The Inevitability of Developing Green Finance in China

After the reform and opening up, China's economic development has achieved remarkable results, but fundamentally, China's economic development is still a "rough and loose" development mode characterized by high capital consumption and low operating income. The "green economy" is a new economic form that is market-oriented, based on the traditional industrial economy, and pursues the coordinated development of economy and ecology. Finance is the backbone of national economic development and plays an important role in guiding and optimizing the allocation of resources. We need to vigorously develop a green economy based on resource conservation and environmental protection, which of course needs the support of finance, and the green operation of finance is the best support for this way of economic development [3].

A portion of the huge economic benefits brought by the low carbon industry will also be returned to the financial institutions, thus achieving a win-win situation for both enterprises and financial institutions. In the financial industry, because it is a special kind of industry, the financial industry must consider the risks and benefits of its operations. As our government established sustainable development as a basic national policy in 1994, the financial industry has become increasingly concerned about environmental risks, so the development of green finance has become a necessary path to achieve sustainable development in our financial industry. The "Equator Principles"

developed by some important international organizations aim to judge and evaluate the environmental and social risks, and this principle has great reference value for our research. Under the guidance of the theory and practice of green finance, domestic financial organizations should provide support for the economic restructuring of the country from a deeper and broader perspective. This is important not only for the development of new economy, but also for the development of new finance [4].

## **4. The Significance of Banks' Development of Green Finance**

### **4.1. To Better Enjoy the Fruits of Economic System Reform**

As China increases its supply-side structural reform and the government continues to increase its investment, the green economy, led by energy-saving and low-carbon industries, has gradually stepped into a stage of rapid development. In the coming period, there will be an increasing demand for green finance in China, mainly due to the increasing constraints on the environment and the need for various industries to meet the demands of the green economy in the future, which creates greater opportunities for us to promote and develop green finance in the future.

### **4.2. Improve the Business Performance of Banks**

The benefits brought by the green finance business of our banks are mainly in two aspects: first, it can improve the profit efficiency of banks, thus increasing their market share in the bank; second, the vigorous development of green finance can improve the brand awareness of banks and increase their potential customers, thus promoting their healthy development. Standard & Poor's, one of the three most powerful ratings in the world, has also made an announcement to add an environmental index to the hierarchy of companies. Therefore, in the banking industry, the vigorous implementation of green finance can greatly enhance its own effectiveness.

### **4.3. Promote Banks to Expand Abroad**

With the "One Belt, One Road" strategy, it has become inevitable for banks around the world to develop cross-border financing business. Many countries and regions around the world have begun to take environmental factors into account as an important assessment indicator. For those banks that want to grow worldwide, it becomes even more essential to actively pursue and implement green finance. In China, the implementation of green finance is conducive to improving the international competitiveness of our banking industry [5].

## **5. Different Dimensions of Bank Digitalization**

With the concept of "customer centricity" as the core, the digitalization of banks is divided into: internal ecology, customer ecology and external ecology. These three dimensions start from inside the bank and extend outward in order to form the panorama of bank digitalization. First and foremost is the bank's internal ecology. At present, most of the banks have paid attention to and highlighted the core idea of "customer centricity", while introducing various cutting-edge technologies and even some strategic partners to assist them in the transformation. Therefore, in order to truly transform digitally, based on good risk management and security, it is necessary to establish an organizational structure and talent system that can support digitization, and cultivate and stimulate an inherent culture of innovation. On this basis, we build a business architecture and a technical architecture for the enterprise, and use this structure as the basis to realize the "dual track"

drive. The business architecture is a combination of business processes, products, and experiences, and the technical architecture is platformized, loosely coupled, and service-oriented from a technical perspective, and combined into a large number of independent microservices. At the same time, the centralized storage and management of the data lake is used to establish a mechanism for data sharing, which lays a solid foundation for cross-department and cross-team innovation. The second level is the bank's digital customer ecology. In this circle, the bank's products and services should bring more value to customers with better user experience, so as to achieve the purpose of improving efficiency and reducing cost. Therefore, banks must fully explore the potential of customers to meet their needs with new services. The third level is the external ecology of digitalization in the banking industry. Its use of fintech to efficiently improve efficiency, linking scenarios and industry partners, aggregating them, and ultimately forming an organic ecological whole to jointly provide highly customized and diverse financial solutions for customers. At the same time, it can also maximize the capabilities of its own advantageous business, so as to achieve the optimal balance of cost, benefit and risk.

## **6. Green Finance Supports the Digital Transformation Path of the Banking Industry**

### **6.1. Strengthen the Construction of the Middle Desk**

Banks should divide the projects into different modules and build business middle office, data middle office and technology middle office respectively, for example, in the process of building each project, it will involve payment and settlement, data model, underlying technology and so on, which can be carried out independently and in a unified manner. When building a new project, the technical packaging of the project can be realized through the local development of some personal requirements of partners based on this combination of standardized interfaces, which will greatly accelerate the project schedule, save money and improve the comprehensive business level. The business middle office is the foundation for achieving a high degree of integration of technology, data and business, and realizing closed-loop operation of business across the industry, and is a must-have for banks in several types of pillars. First, the overall operation is achieved by establishing a merchant-, user- and equity-centered middle desk to realize effective docking of cross-draws between human retail businesses. The data middle office needs to organically connect data from different public domains and different business areas to achieve data normalization, diversity, visibility, availability and operability. Banks should enhance the vitality of data to make it have the ability of insight and data flow analysis suitable for business development needs, proactively discover to opportunities, and export data efficiently. The first task of the technology middle office is to establish a long-term and profound technology logic. For example, on the basis of merchant and settlement infrastructures, this will provide a product and data middle office for each department. Currently, many scenarios built by banks cannot be separated from the underlying logic of merchant and settlement, so it is important to build a technology middle office that achieves technology sharing and flexibility with wide applicability and fast delivery [6].

### **6.2. Improve Data Management Capabilities**

Data is an important foundation for the development of the digital economy and an important factor in improving productivity. At the Fourth Plenary Session of the 19th Central Committee, "data" was included in the category of factors of production for the first time. "The 14th Five-Year Plan was released in March 2021, and the National Development Strategy clearly states that "we will embrace the digital era in an open manner and stimulate the potential of data factors. Since 2021, Beijing, Shanghai, Shenzhen, and Guangzhou have all established their own data exchanges

or have formulated corresponding policies and plans. The government has frequently issued policies related to data elements at different levels, reflecting the high level of concern for data development in China. In the digital era, there is a need for in-depth application of data in the marketing, operation, credit and risk control of banks' financial products, therefore, data management will be an important entry point for banks' digital transformation. On the one hand, a clear business strategy needs to be developed for data sources. Banks should take the initiative to change their mindset, improve their systems, develop a management strategy for data assets, and strengthen the process of data assetization to promote the conversion of massive amounts of data into knowledge, thereby empowering green finance and enhancing the role of data assets in the efficiency of bank operations. On the other hand, promote the purchase and sale of digital property. Relying solely on information within banks is no longer sufficient to meet the needs of digital transformation. Many banks and financial institutions are therefore resorting to acquiring it from outside. According to data published by Purchasing.com, banks became the main force in the purchase of databases in the financial sector in FY 2021, with about 80% of the corresponding winning bids. With the lack of data related to green finance, the trading of data assets and the pledge of data assets will be the new focus of banks in providing green financial services.

### **6.3. Enhance Business Opportunity Integration Capabilities**

Generic data can be entered manually or generated automatically from the system and liaised and communicated with account managers who have access to it. Business opportunity is the integration of business opportunities across different businesses across departments, and it aims to improve customer experience, increase accuracy, etc. At the head office level, the bank should build out a business opportunity marketing mechanism that is consistent with the commonality of the whole bank, while branches should combine with their own specific conditions to build out business opportunities with specialization, and finally achieve the effect of not overlapping and not missing on the business opportunity coordination mechanism. The coordinating mechanism should review in detail the business opportunity application in terms of distribution channels and content strategy to prevent too many business opportunities among different business sectors. And the coordination mechanism should establish a professional work team for business opportunity management and multi-channel reach of business opportunities in the process of business development. In addition, the establishment of business opportunity coordination mechanism should also be considered in accordance with the provisions of the Civil Code on the right to tranquility. In addition, in the change of coordinating business opportunities, banks should break through the traditional departmental thinking and integrate customer resources, which includes the following two levels: firstly, integrate the resources of asset business customers and asset customers, and transform asset business customers into asset customers of banks, so as to achieve the purpose of asset appreciation and management; secondly, combine corporate customers and individual business activities. For example, we target high-quality industrial credit customers to carry out commercial activities such as high-volume payroll, credit cards, and personal consumer loans.

### **6.4. Accelerated Technical Support**

From the perspective of big data technology, in terms of service, marketing, and customer mining, the premise of in-depth research on customers' professional identity and transaction records, etc., so as to provide customers with personalized services. At the same time, it also drives banks to constantly update their financial products and service channels. For example, banks can analyze the financial needs of their customers based on their housing loans and asset status, which are likely to result in renovation installments within 1-2 years, and then develop customized service solutions for

their customers. In response to AI technology, banks should increase the application of channel construction. Although online business has led to a rapid increase in the number of users, traditional offline branches have not been completely replaced, and customer demand for bank branches has not disappeared. Using blockchain technology can make the bank's information traceable, thus providing a good information base for the bank's business activities. On this basis, it can effectively reduce the bank's work efficiency, realize efficient docking among the three links and departments in the front, middle and back, and achieve precise matching of products, resources and services, thus building a set of application system that is compatible with the development of the bank's business.

### 6.5. Sound Market System for Data Elements

Starting from the perspective of internal value mining of data, it is possible to improve the availability of data and test the results of its application, which is an important step towards the digital transformation of banks. At the Fourth Plenary Session in 2019, "factors of production" were officially defined as "data". Since then, various countries have issued development plans, including "accelerating the marketization process of development data factors" and "strengthening the supply of high-quality data factors," among others. The essence of its digital transformation is shown in Figure 2. In China, based on the environment of big data, multiple parties such as government, enterprises, financial institutions and the public participate in the environmental governance of China. The first is to construct a property right system for data, promote the authorized use of public and private data in separate categories, and strengthen the definition of rights of data elements. Second, build an effective mechanism for the flow and transaction of data elements, and improve the laws and regulations for the flow and transaction of data elements from the perspectives of technical guarantee, testing and certification, information disclosure, etc., and to regulate them. Third, improve the market-oriented allocation mechanism of data elements, study the mechanism of "common ticket" revenue distribution related to data, maximize the value to users through the continuous sharing of original users, and promote the openness and sharing of data resources.

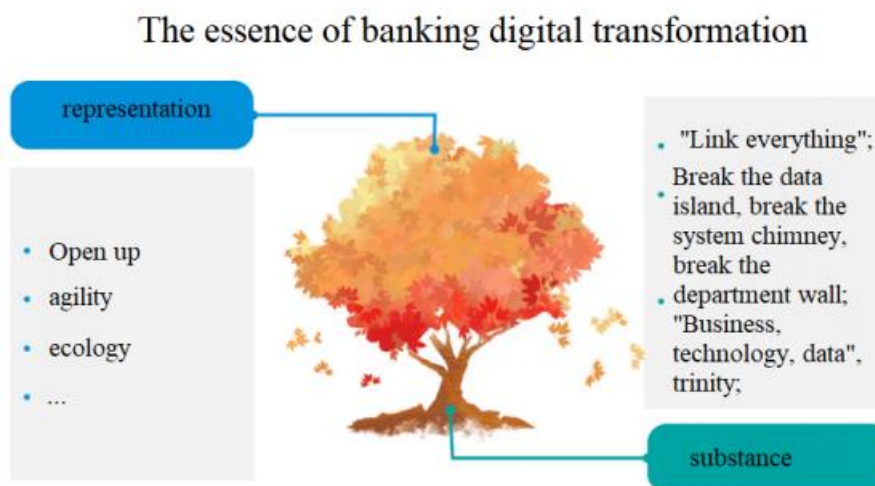


Figure 2: The essence of its digital transformation.

### 6.6. Strengthen the Construction of Green Financial Incentive Mechanism

Around the "double carbon" goal, the state and local governments have launched a set of incentives in the form of refinancing, guarantee mechanisms, loan subsidies and incremental

incentives to bring new vitality to the development of China's banking industry. In order to quantify them and improve them, China's central bank issued the Green Financial Evaluation Program for Banking Financial Institutions in July 2021. However, the aforementioned incentive policies are still deficient in terms of the degree of preference and coverage, and lack financial support for low and zero carbon projects, thus limiting the development of green finance by banks. Therefore, China must increase the support for green finance and further improve China's green financial system on this basis. First, strengthen the financial policies of risk compensation, interest discount and incentive to reduce the cost of environmental protection production, and take measures such as tax concessions and preferential measures for carbon emission, which can provide more low-interest loan support for enterprises and make them gain more revenue. Second, increase the weight of green elements in the evaluation of bank supervision, and incentivize banks to use green financial products for investment and financing by including green assets with lower risk characteristics as eligible collateral for central bank refinancing. Third, strengthen the market-oriented incentive system to optimize the investment structure of green industries and encourage financial products represented by green asset securitization to improve the development of green industries.

### **6.7. Promote the Transformation of Technological Achievements in the Field of Green Finance**

In the process of realizing the "digital economy" of Chinese banks, "technological innovation" is of great significance to the development of the "digital economy" of Chinese banks. In the 2022 government work report, it is proposed to "further implement the innovation-driven development strategy" and "continuously promote the breakthrough of important core technologies". In this process, China's science and technology achievement transformation system will gain positive development. In the actual operation, although some banks have accumulated a large number of green finance digital application results, due to the lack of systematic promotion and the different policies in different places, many banks still have some problems that need to rely on their own research and development to solve, which increases the difficulty of their scientific and technological innovation. On this basis, we promote the transformation of scientific and technological achievements in green finance through active guidance to universities, financial technology companies and financial institutions. Firstly, we will strengthen the financial fund guidance, formulate and publish the guidance of science and technology projects for the common and key technology issues in the digital transformation of green finance, and give special subsidies to the projects that have obtained the expected technology results, so as to realize the collaborative innovation in many aspects. The second is to explore the standardization of scientific and technological achievements, transform the digital application results of green finance technology into technical standards, build a service platform for the transformation of technical achievements, and realize the effective docking of information such as results, reports and standards. Third, we encourage financial institutions to establish scientific and technological research institutions with colleges and universities and research institutes to undertake green finance digital application projects and promote the promotion of scientific and technological achievements and the formulation of common standards; at the same time, we support colleges and universities to increase the professional courses of digital green finance and cultivate the "finance", "technology", etc. At the same time, support institutions of higher education to increase the professional courses of digital green finance and cultivate "green finance" talents with cross-fertilization of "finance" and "technology". Fourth, focus on the application and research of the digital scenario of green finance, and create a more relaxed regulatory environment for it, so that it can be fully verified and

promoted in the market, thus achieving the "win-win" of enterprise innovation and development and risk control[7].

## 6.8. Strengthen the Construction of Digital Infrastructure for Green Finance

In practice, a series of problems are still faced, for example, there is no unified plan for local construction, and each service organization needs to repeatedly interface with each platform; it is difficult to source continuous funding and the digital transformation is difficult. At present, there are still deficiencies in information systems in China, and there is a need to further improve the operation and supervision mechanism of information systems. Local governments should take a variety of measures to strengthen the digital infrastructure of green finance. First, the progress of the project is planned scientifically. Based on the local green finance development needs, a distributed and centralized platform technology system should be built to support both innovative sensitive state business and traditional steady state business, and gradually promote the centralization of management, standardization of process and standardization of development of the service platform. Second, mobilize multiple parties to participate and create together. To give full play to the role of state funds in the initial construction of the guarantee, we should promote effective market investment in it through various forms of capital investment, such as fostering industrial funds, guarantee funds, trust funds, social capital cooperation, etc.

## 7. Conclusion

In conclusion, as a major force in green finance, banks' deep commitment to green finance is not only a reflection of practicing the concept of green development, but also a need to promote their own sustainable development. The digital transformation and upgrading of the banking industry must follow the basic laws of the digital economy, be guided by appropriate strategies, use new technologies and new thinking, strengthen the core competitive advantages of enterprises, and innovate and optimize new products and capabilities, so as to lay a solid foundation for the digital transformation of banks.

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