Analysis of Innovation Driven by Data in Commercial Banks

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Abstract. Taking the relevant core literature at home and abroad as the research object, this paper determines the literature retrieval and screening criteria, sorts out the research progress, main methods, general understanding and focus of controversy of the four core transformation directions, analyzes the problems existing in the current research, such as scattered, the lack of comprehensive results, the lack of special reviews and disconnection from reality, and points out the shortcomings of the research. On this basis, combined with the development trend of the digital economy, it proposes to strengthen the overall integration of the four directions, improve the level of review research, strengthen special reviews and focus on practical future research directions. This study makes up for the deficiencies of the special literature review in this field, and constructs a relatively complete analytical framework, which has a certain guiding significance for future research, and also has a certain reference value for the data-driven innovation transformation of commercial banks.

Keywords: Commercial Bank, Financial Innovation, Financial Technology.

1 Introduction

In the rapid development of the digital economy, the financial enabling role of data as a new factor of production has become increasingly prominent. The development of financial technologies such as big data and artificial intelligence has brought huge challenges to commercial banks: financial disintermediation has deepened, horizontal competition has become increasingly fierce, the traditional way of profit is difficult to maintain, and customers' needs have become more and more diversified, situational and convenient [1]. Therefore, in such an environment, the combination of data and financial technology is the key to the transformation, and the four major directions of retail business digitization are important means for commercial banks' data-driven transformation and enhancing their competitiveness.

Around the innovation transformation of commercial banks driven by data, a large number of relevant researches have been carried out at home and abroad from different angles and levels. In terms of a specific innovation, some scholars have studied the digital path selection of retail business, the application of intelligent technology in industrial finance, the establishment of intelligent risk control model

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and the construction of scene financial ecology [2-4], and have a certain understanding of the technology landing path, innovation effect evaluation, risk prevention, etc., which plays a guiding role in the development of the industry. However, there are still obvious deficiencies in the current research: first, the research is characterized by "fragmentation", which often only focuses on one innovation direction, and lacks a summary of the links and differences between the four main innovation directions, so it cannot form a complete data-driven transformation research system [5,6]. Second, at present, most of the review articles only briefly introduce the current situation of the industry, but lack a systematic review and comparison of important academic issues such as research methods, empirical results and academic disputes in all directions [7,8]. Third, there are few research reviews on the four main innovation directions, which can not well summarize the existing research, point out the lack of research, and point out the direction for future research.

This paper takes the important literature at home and abroad related to the innovation and transformation of commercial banks under the data-driven background as the research object, and systematically combs and comments based on determining the retrieval, screening and inclusion criteria. This paper reviews the development and trends of retail business digitization, industrial finance intelligence, intelligent risk control system construction, and scenario financial ecology construction, summarizes the main views and academic consensus, points out the existing problems, such as single research perspective, insufficient empirical analysis, and less links between different directions, points out the research gaps and academic disputes, and proposes future research directions according to the industry development, forming a relatively complete research system. The marginal contribution of this paper is large: fill the blank of special review in the field, and systematically summarize the four core directions for the first time. Strengthen the connection and integrity of research, and clarify the research consensus and gap. Connecting theory with practice has certain guiding significance for the innovation and transformation of commercial banks, and plays a role in combining academic and practical.

2 Analyze Commercial Bank Innovation from Four Core Directions

2.1 Research on Digitalization of Retail Business

The digitalization of retail business is an important starting point for the data-driven transformation of commercial banks. Relevant research is mainly focused on three aspects: channel optimization, product innovation and customer experience improvement [9]. In terms of research methods, scholars focus on empirical analysis, supplemented by case studies, combined with model analysis, and explore the mechanism and effect of digital transformation by modeling a large amount of data, selecting typical examples for analysis, and formulating a transformation index

Academic circles generally believe that in the era of digital economy, customers' financial needs are becoming more and more diversified, situational and convenient,

and the traditional offline retail service model can no longer meet the needs of the market, facing problems such as high customer acquisition costs and reduced customer stickiness [10,11]. Therefore, digital transformation is the only way for the high-quality development of retail business, and also the inevitable choice for commercial banks to deal with financial disintermediation and intensified horizontal competition.

On the path of transformation, some scholars have pointed out that it is necessary to build an online and offline integrated omnichannel service system, and further improve the digital channels such as mobile banking and online banking on this basis, so that all major retail businesses can be handled online and improve convenience. Secondly, people should accelerate the intelligent transformation of offline outlets, use intelligent devices to handle simple businesses, and invest more manpower in high-end customers, wealth management and other high-value-added services. Finally, using big data analysis technology to accurately portray customers, carry out hierarchical and classified management, and launch personalized financial services to solve the problem of homogenization of traditional retail services. From the perspective of performance, digital transformation can greatly save costs, improve customer acquisition ability and profitability, but there are also problems such as unreasonable input-output ratio and incomplete data governance, which need to be solved by increasing investment in technology research and development, improving data governance system, and cultivating more digital talents.

The main focus of debate in this field is the heterogeneity of transformation performance, that is, whether the digital transformation effect of retail business of commercial banks in different sizes and regions is different, and whether there is a "Matthew effect" between small and medium-sized banks and large banks. At present, there is no consensus.

2.2 Research on Industrial Financial Intelligence

Industrial financial intelligence is an important expansion of data-driven transformation in corporate business, mainly focusing on three aspects: the precise delivery of industrial credit, the optimization of supply chain finance and the coordination of industrial ecology. The research method adopts a method widely used in the academic community. On this basis, it conducts empirical research to investigate the impact of data-driven transformation on the effect of credit supply and the financing situation of small and medium-sized enterprises. It selects specific cases such as the supply chain of core enterprises and industrial parks to explore the application effect of financial technology, such as big data and blockchain, and establishes models such as credit evaluation and supply chain coordination to guide practical work [12,13].

Scholars generally believe that the combination of data and financial technology is the main force to promote the development of intelligent industrial finance, which can well solve the problems of information asymmetry and low efficiency of credit approval in traditional industrial finance [14]. The intelligent transformation of industrial finance is also one of the important aspects of the data-driven transformation of commercial banks. In the process of intelligent transformation of

industrial finance, people should always adhere to the principle of serving the real economy, pay attention to risk management, improve efficiency, and achieve high-quality development.

As for the main problems existing in traditional industrial finance, some scholars believe that people can use big data to conduct a comprehensive credit evaluation, and analyze it in combination with the business situation, transaction situation, credit situation and the overall situation of the industry, to accurately judge the credit status and repayment ability of enterprises, reduce excessive dependence on mortgage guarantee, and improve the accuracy and efficiency of industrial credit supply. The use of blockchain technology, which is decentralized, tamper-proof and traceable, can improve the supply chain financial process, solve the trust problem between upstream and downstream enterprises, and improve the flow speed and security of supply chain finance. In addition, it is also necessary to establish the integrated development mode of "Finance+industry+science and technology", combine industrial parks, core enterprises and science and technology enterprises to build an industrial finance digital platform and expand the service scope.

The debate point of this issue is consistent with the research on the digitalization of the retail industry, which is discussed around the differences in the effects of different types of commercial banks' industrial financial intelligent transformation, but there is no consistent point of view at present.

2.3 Research on the Construction of an Intelligent Risk Control System

Intelligent risk control is the basis for the compliance operation and steady development of commercial banks, and it is also an important aspect of data-driven transformation. Relevant research is mainly carried out from two aspects: risk control model development and technology application. The research method focuses on model development and empirical analysis, and uses internal and external data of commercial banks to establish an intelligent risk control model based on machine learning and in-depth learning, evaluate the effect of the model on risk identification, early warning and disposal, and summarize and reflect on the actual case of risk control transformation of commercial banks [15].

The academic community has reached an agreement that the traditional manual risk control method mainly relies on human experience for judgment, which has the problems of lagging, strong subjectivity and low work efficiency. In the era of data-driven transformation, it can no longer meet the increasingly complex financial risk environment [15,16]. Therefore, the only way for commercial banks to carry out accurate risk control is to use scientific and technological means to digitally and intelligently transform the risk control system, and at the same time, it should be combined with other aspects of their reform to form a comprehensive reform situation.

In terms of the construction of an intelligent risk control model, some scholars have pointed out that it is necessary to combine customer credit, transaction behavior, industry risk and macroeconomic factors to form a unified risk control data standard and provide rich data resources for model training and improvement. Artificial intelligence technology is used to build a comprehensive risk control model covering

credit risk, operational risk, market risk, etc., to realize the automation of the whole process of risk identification, early warning and processing, and improve the efficiency, accuracy and effectiveness of risk prevention and control [16]. At the same time, while enhancing the risk control ability, people should also pay attention to the user experience, simplify the business operation process by improving the model design, reduce the proportion of manual audit, realize the risk control linkage between different businesses and different channels, gather various risk control resources, build a comprehensive intelligent risk control system, and prevent systemic financial risks. In addition, some scholars believe that it is necessary to improve the data security management mechanism, improve the interpretability of the model, cultivate compound risk control talents, and promote the continuous improvement and development of intelligent risk control for the challenges faced by the application of intelligent risk control, such as data security problems, model black boxes, and the lack of digital talents [17].

The focus of debate on this issue is the application scope of intelligent risk control, whether intelligent risk control can completely replace the traditional manual risk control, or how to divide the work and cooperate between the two. The academic community has different views on this and has not reached a consensus.

2.4 Scenario Research on the Construction of Financial Ecology

The construction of scenario financial ecology is an effective way for commercial banks to break through the traditional business model and enhance their competitiveness. The essence of scenario financial ecology is the organic combination of data fusion, scenario embedding and service collaboration. The relevant literature mainly focuses on the research of scenario discovery, ecological construction and collaborative optimization. The research method is mainly case study and empirical research. Based on the selection of typical scenarios such as living consumption, government affairs and industry, this paper discusses the process and effect of scenario financial ecological construction of commercial banks, and calculates the degree of integration of scenario resources and the value of transformation [18].

Scholars generally believe that scenario finance is one of the four focuses of data-driven transformation of commercial banks, and other transformation directions associated with it also promote and complement each other. The combination of data and financial technology can effectively break the barriers of scene resources, make financial services better meet the needs of the scene [14], and form a good interaction of "Scene-triggered finance and financial service scene".

In terms of the construction of scene financial ecology, some scholars have pointed out that commercial banks should break their own internal data islands and external cooperation barriers, actively cooperate with scene partners such as Internet technology companies, government agencies, industrial parks, leading enterprises, and realize the full sharing and effective utilization of scene, data, technology and other resources. With the help of big data, artificial intelligence and other financial technology means, people will build a scene financial digital platform, fully integrate financial services into various scenes, and improve customers' stickiness and recognition of services. However, it is also faced with difficulties in integrating scene

resources, an unclear profit model, prominent problems in data security and customer privacy protection. In this context, it is necessary to strengthen policy support, improve data security-related laws and regulations, and try a variety of profit methods to promote the healthy development of scene financial ecology.

The main controversy in this field is the priority of the construction of scenario financial ecology, that is, how to coordinate and prioritize the integration of scenario resources, data security and customer privacy protection. At present, the academic community has not reached an agreement.

3 Common Problems and Research Gaps in Existing Research

Combining the existing literature, people can find that there are still three problems in the research on the innovation and transformation of commercial banks under the data-driven background, and there are obvious deficiencies. First of all, the research is relatively scattered, and most of the research is focused on one aspect. It lacks the overall grasp of the four core transformation directions and the relationship between them, and can not form a complete research framework, nor can it well reflect the overall idea of data-driven transformation. Secondly, there are also problems in the research of the overview, many of which are simple introductions to the industry. The research methods, empirical results, academic disputes, and other important issues in various research directions are not fully summarized and compared, which cannot play the role of a research overview [8]. Finally, there are a few special literature reviews on the four core transformation directions, which can not integrate the research results of all aspects, and can not clarify the research gaps and academic frontiers in all aspects. At the same time, some studies are not closely linked with the actual transformation of commercial banks, and the transformation scheme is not specific and feasible enough to serve the needs of industry development.

4 Conclusion

In the era of a booming digital economy, data-driven is the inevitable choice for the innovation and transformation of commercial banks. Scholars at home and abroad have discussed four aspects: Digital retail business, intelligent industrial finance, intelligent risk control system construction and scenario financial ecology construction. They have studied these four aspects from different angles and levels and achieved certain results, which play a guiding role in the transformation of commercial banks. However, at present, there are still many deficiencies in the relevant research. On the one hand, the research is relatively scattered; on the other hand, there is a lack of overall grasp of the above four aspects. Summary articles are mostly simply listed, lacking a summary of research methods and empirical results. There are a few special literature reviews, and some research is out of touch with reality, lacking pertinence and operability. This paper summarizes the research progress, main viewpoints and debates in this field, points out the existing problems and future research directions, makes up for the lack of special reviews in this field,

strengthens the connection and integrity between academic research, combines theoretical research with practical application, lays the foundation for future research, and provides a useful reference for the data-driven innovation transformation of commercial banks.

Combined with the development of the digital economy and financial technology, based on the lack of existing research, future research in this field can be expanded into three aspects. First of all, people should strengthen the connection between the four core transformation directions, analyze their internal synergy, form a complete system, and solve the problem of "fragmentation" of current research. Secondly, people should strengthen the research on the review research, summarize the research methods, empirical results and differences in all directions, and point out the common points and gaps of the research, which plays a guiding role in the review research. Finally, strengthen the special review and practical application, put forward practical transformation suggestions around research hotspots and industry difficulties, pay attention to data security and compliance supervision, improve risk prevention measures, and promote the combination of theoretical research and industry practice.

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