A Study on the Application of Data Scores in Financial Engineering

Jiacheng Li

School of Business and Economic, The Australian National University, Canberra, 2601, Australia

Abstract: The smooth implementation of financial statistical analysis plays an important role in promoting the improvement of market service management. At the same time, it can also provide a guarantee for the sustainable and healthy development of the financial market. In the era of big data, the application of big data technology to financial statistical analysis can improve the efficiency and quality of statistical work, which is of great significance to optimize the management of financial market services. In this paper, we discuss the application of big data technology in financial statistics, firstly, we briefly introduce the concepts of financial statistics and big data technology, and analyze the current situation of the application and the strategy of effective application, hoping to promote the enhancement of the effect of the application of big data technology in financial statistics.

1. Introduction

With the continuous development of information technology, big data has penetrated into all walks of life. As a data-intensive industry, the financial industry has a large volume of data sources and a rapid growth rate, and the continuously growing volume of data has an impact on the future development of the financial industry, which puts forward higher requirements for data statistics, analysis and application. Financial statistics is an important foundation for the People's Bank of China to formulate monetary policy, analyze the economic and financial situation, and identify financial risks. With the arrival of big data, the problems in the work of financial statistics have become more and more prominent, the ability of financial statistics collection, data processing and data analysis is increasingly unable to meet the needs of the actual work, and the increasing value of the unstructured data is also beyond the scope of data collection, processing and analysis [1]. At the same time, there is also a growing disease of dirt on financial statistics in society at large. This is due to the fact that statistics need to be reported at all levels and then summarised and processed by the People's Bank of China. This process greatly increases the time of data collection, reduces the timeliness of the data, and also raises the possibility of data errors, the possibility of error, which is not conducive to the real-time detection requirements of the financial market in the era of big data. Therefore, strengthening the application of big data technology in financial data analysis can effectively improve the service capacity and level of financial statistics and provide comprehensive and reliable information support for macro decision-making and trend research and judgment.

2. Overview of big data technologies and finance statistics

2.1 Big Data Technology

Big data technology is one of the emerging technology programs in recent years, and the application of this technology can collect different kinds of data and information, and carry out in-depth exploration and basic processing of information. For example, big data technology can be used to mine the effective information in the huge amount of data information in an industry, and feedback in the industry application, so as to improve the level of competition and application value of the industry. Now most enterprises in China have correctly recognized the effective value of big data technology, so the application of big data technology for internal optimization and management, thereby improving economic returns. Specifically, big data technology has strong diversified characteristics and complex structure, big data technology can obtain information data source has diversity, and contains data types have diverse characteristics, specifically can be divided into structured data, unstructured data, semi-structured data, etc. [2]. In addition, data technology in the application process also has a larger capacity and faster speed, big data technology has high-tech characteristics, the collection and processing of information is relatively fast. At the same time, big data technology in the application of the process of information and data has a high application value and authenticity, big data technology compared to the previous manual information processing mode compared to the information and data quality is higher, and can be completed in a shorter period of time information data in-depth excavation, with a shorter period of time and cost to obtain the advantages of higher value data.

2.2 Financial statistics

In a certain economic statistics, financial statistics is one of the more critical modules, at the same time, financial statistics is one of the types of social currency exchange and circulation, specifically, financial statistics can contain a relatively large number of modules, such as bank cash receipts and expenditures statistics, financial market statistics and so on. Through effective financial statistics, the current development of the financial industry can be controlled to promote the overall level of financial policy or the formulation of related systems, which is conducive to the improvement of China's economic development rate [3]. It can be seen that in the current financial market development process, the quality of financial statistics and socio-economic development trend has a high correlation, and in the context of the application of big data, the current financial statistics are facing reform and innovation, the application of effective big data technology to improve the quality and efficiency of financial statistics. The basic composition of the financial statistics monitoring and management information system is shown in Figure 1.
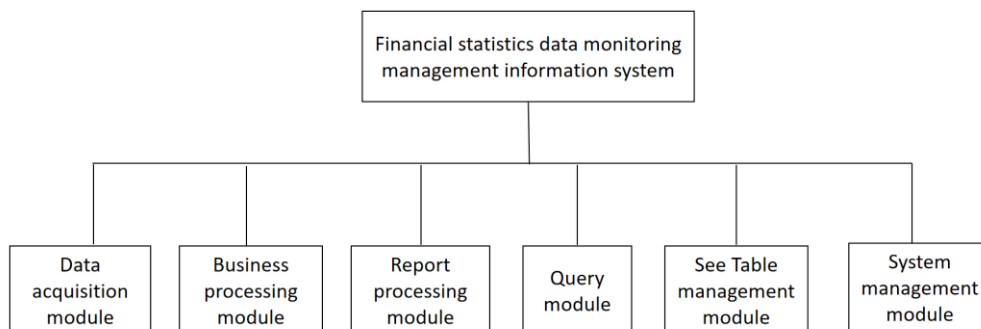

Figure 1: Financial statistics data monitoring management information system

3. Application strategy of big data technology in financial statistics

The financial industry is a typical information-intensive industry, which records, manages and circulates a large amount of information in the form of various data. Since big data has the advantage of collecting, analyzing and storing massive information, the financial industry needs to build a more standardized and scientific financial data statistics model and improve infrastructure construction. Infrastructure generally includes management software and operation and maintenance, computer storage hardware, networks, data centers and so on. At present, China's financial sector is carrying out the collection of financial information, which is a difficult task that requires the use of big data methods for financial statistics. Innovative methods of data extraction and application. The sources of big data in Bank of China include semi-structured and unstructured data, such as text and images, and it is important to keep exploring how to extract and use data, such as converting traditional bankers' data to collect bankers' emotions, and using DATA methods to anticipate the work of banking institutions. We should strengthen the ability to apply data extraction and analysis, explore solutions for internal data extraction and secure integration of data using external resources [4]. We need to enhance the application of search technologies, e.g., improve the ability to forecast economic and financial trends by facilitating the development of basic technologies such as web search technologies, knowledge computing (search) technologies. And we need to improve our ability to forecast economic and financial trends and strengthen the standardisation of financial statistics. Uniform data standards are a basic prerequisite for data processing, and data that are not similar cannot be merged and compared. Currently, statistical indicators vary among different financial institutions, and significant efforts should be made to implement the standardization of financial statistics and to harmonize rules concerning the definition of basic statistical elements such as financial infrastructure, standards, classifications, financial institution codes, financial instruments and financial transactions. We should strengthen privacy protection and information leakage risk protection in big data applications. Protecting information security is a prerequisite for the development of financial data infrastructure and the use of big data technologies. It has established a system to protect big data privacy and information security. There is a need to develop a data security framework that covers all stages of data collection, data transfer, data storage, and data destruction. And it needed to strengthen information security protection capabilities, and closely protect information data [5].

4. Specific applications of big data technology in the practice of financial statistics

4.1 Application in financial data collection

Financial data collection is the preliminary work of financial statistics, but also fundamental work. Financial statistics can only ensure the progress and effect of the later data analysis and processing work by obtaining the corresponding financial data [6]. The application of big data technology in financial data collection is mainly reflected in the collection of financial data. In the work of financial statistics, statisticians can connect the financial data collection work to the Internet database, business depository database and third-party database, so as to achieve the purpose of collecting relevant data information from these databases. In this way, statisticians can collect relevant data and information from these databases. Among them, statisticians mainly use news, forums, microblogs, blogs, and WeChat public numbers to collect data and information such as information on court defaults and enterprise credit information from Internet databases; data and information such as financial institutions' operation data, contract deposit data, and data on reporting and disclosure of institutions from business depository databases; and data and information such as data on banks, industry and commerce, and offline reporting data from

third-party databases. In the third-party database, it mainly collects data and information such as bank data, industrial and commercial data and offline report data.

4.2 Application in financial data storage

Data storage is the centralized storage of financial data collected by statisticians through various means to ensure the centralization and security of data management. In financial data storage, big data technology mainly provides safe and reliable technical support for data storage, i.e., financial subjects can independently develop and construct big data architecture system with the help of big data technology, store the collected financial data, and then guarantee the realization of the later data processing function. It should be noted that big data technology has diverse characteristics in terms of data processing types, which makes itself applicable to data storage in standard formats as well as other formats, which provides strong technical support for third-party database access and data docking analysis, and also solves the problem of diverse data types and incompatibility faced by data processing subjects.

4.3 Application in Financial Data Processing

In the practice of financial statistics, the processing of financial data actually includes two steps: preprocessing and reprocessing. Among them, financial data preprocessing is to process the standard of data after financial data collection and before entering the storage center to eliminate those invalid data; financial data reprocessing is to calculate and process the financial data stored in the data center according to the set algorithms and rules [7]. The use of big data technology in financial data pre-processing is mainly reflected in the fact that the big data system will analyze the heterogeneity of the data collected at the front-end, i.e., it will carry out unified data cleansing, data intelligent weight lifting, data intelligent identification, data correlation and comparison and other pre-processing for the collected data, so as to make the rest of the data format relatively uniform on the basis of eliminating the invalid data and to make the originally complex data get Pre-unified processing. The use of big data technology in financial data processing is mainly reflected in the fact that the big data system will carry out refined data processing according to the data processing rules and algorithms set by the system administrator, and store the processing results in the corresponding database to form a correlation database.

4.4 Applications in financial data analysis

Although there is a certain correlation between financial data analysis and financial data processing, the two are not completely equivalent. Data analysis is an analysis based on the results of data processing, which is the subsequent process and link of data processing. In the past practice of financial statistics, data analysis is mainly a multi-dimensional analysis of the data processing results obtained by the data analysts of financial institutions, and the corresponding correlation relationship is mined from the results, so as to enrich the relevant information for financial decision-making. Under the technical support of big data, data analysis is mainly embodied in system analysis and manual analysis, in which system analysis is the model analysis of big data system on the results of processed data, and then predict the hidden financial laws behind the financial data, which provides relatively complete and effective reference for financial subjects to understand the situation of financial development; manual analysis is based on the correlation between the financial data of the financial data analysts to make corresponding analysis of the resultant data. Human analysis is the financial data analysts based on their own thinking about the correlation between financial data, the results of the data for the corresponding depth of analysis, to

master the financial database cannot produce financial information [8]. In the current technological context, artificial analysis is not just a simple manual calculation, but artificial with the help of computer technology, Internet technology and other auxiliary tools for efficient and accurate calculation and analysis.

5. Policies to enhance financial statistics in the age of big data

5.1 Improve the construction of the financial statistics system

We use big data thinking to construct a comprehensive statistical system for the financial industry that integrates the banking, securities and insurance industries, etc., to provide comprehensive and integrated statistics for the entire financial industry. Its basic conception is shown in Figure 2.
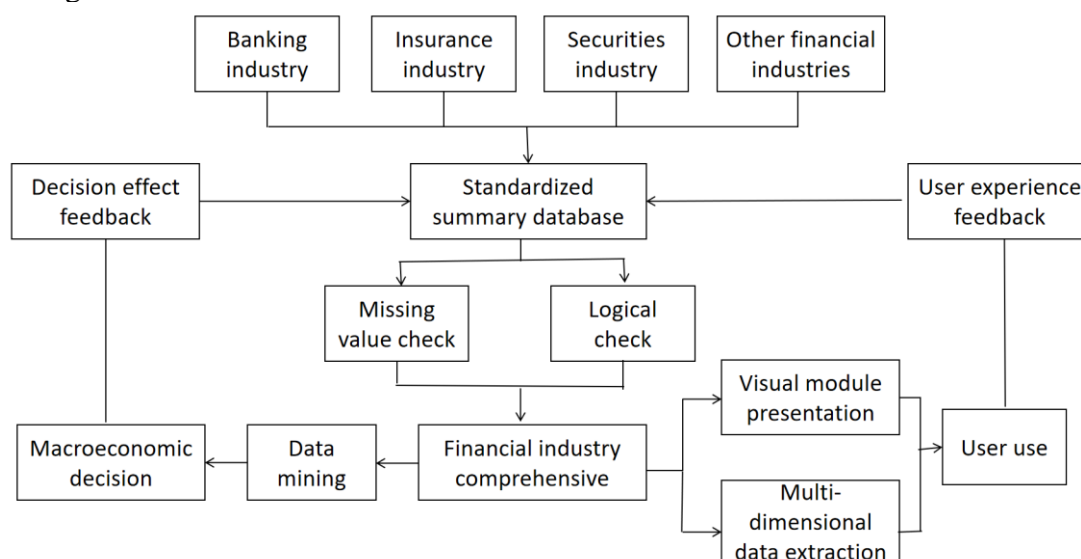

Figure 2: Financial industry integrated statistical system conceptual map

In the process of constructing a comprehensive statistical system for the financial industry, it is necessary to firstly ensure the comprehensive collection of data from the banking industry, insurance industry, securities industry and other financial industries, and ensure the diversification of the data structure, including both traditional structured data and unstructured data, and at the same time, it is necessary to combine with the modernized data collection tools and computer systems to realize the collection of real-time dynamics of the data, especially for the monitoring and controlling of the financial industry's stock and flow, and to control the flow of the financial industry's funds. At the same time, it should be combined with modern data collection tools and computer systems to realize real-time dynamic collection of data, especially for monitoring the stock and flow of the financial industry, controlling the flow of funds in the financial industry and the scale of the flow of funds, and setting corresponding indicator codes for the data, which will finally be summarized into a standardized database that includes the total volume and structure of the financial industry, the volume and price of funds, the stock of financial resources, and financial flows. Finally, the data are aggregated into a standardized database that includes the total volume and structure of the financial industry, the volume and price of funds, the financial stock and financial flows.

5.2 Enhance data mining and analysis capabilities based on big data technology

Utilizing big data technology to transform massive unstructured data into decision-support information. On the basis of data collection and integration, it has established correlation models for micro-fund circulation, currency supply and demand, capital market transactions, etc. It dynamically monitors the relationship between the financial system and the real economy, and strengthens the interpretation and application of the conclusions of big data analysis. It has made full use of big data analysis technology to improve the accuracy of economic and financial development indicator forecasts, discover the first signs of financial risks in a timely manner, and do a good job of financial risk identification and early warning.

5.3 Change the traditional thinking of financial statistics and strengthen the construction of statistical teams

To deeply understand the shortcomings of traditional statistics in the comprehensiveness and relevance of financial data, and to understand the deep integration of big data technology and statistical theory is the long-term development trend of financial statistics, only the full use of big data technology in financial data statistics, analysis and forecasting, in order to enhance the effectiveness of the service of statistical work. At the same time, the era of big data has brought great challenges to the knowledge structure of financial statisticians, and only by strengthening the introduction of talents and training, and improving the quality of financial statistics practitioners, can we play the important role of financial statistical analysis in decision-making information support. On the one hand, the introduction of professionals in the field of big data, especially the employees of Tencent, Baidu and other big data application enterprises can be introduced as a key target; on the other hand, experts in the field of big data are invited to carry out lectures and training and academic discussions on the People's Bank of China's statisticians, to explain the basic ideas and practice of the use of big data.

6. Conclusion

The development speed of the financial industry is closely related to the financial statistics model, and at the same time, it will profoundly affect the development speed of the social economy. Under the big data environment, the financial statistics model has changed, and the new financial statistics model takes big data as the basis and uses advanced concepts, technologies and means to promote the optimization and upgrading of financial statistics. By analyzing big data, it is possible to obtain useful information from big information, determine the forward direction of the financial industry, obtain key information, provide accurate data and information for the development of the financial industry, and give full play to the role of big data analysis in financial statistics. The analysis of financial statistics has a certain degree of specialization and systematicity, and it is necessary to continuously improve the professional ability of applying big data technology, and to carry out financial statistics more effectively through big data technology in the process of practice. Therefore, in order to better develop financial statistics in the context of the intelligent era, it is necessary to better analyze big data technology on the basis of continuously improving the ability of financial statistics, and to provide the necessary support and guarantee for the effective development of financial statistics. After entering the era of big data, the popularization and application of big data technology has changed the mode of financial statistics to a large extent, therefore, if the financial industry wants to keep pace with the times and promote social and economic development, it needs to change its mindset and conception, utilize new technology and new methods to innovate the work of financial statistics and ensure that the advantageous role of

big data technology can be fully exploited in the work of financial statistical analysis, and to promote the work of financial statistical analysis. The rapid development of financial statistical analysis can be realized.

References

[1] Wei Yu, Qin Anliu, Yang Chaozu, et al. The era of big data: a preliminary study on constructing comprehensive statistics of the central bank's financial industry. Regional Financial Research, 2014(10) 61-64.

[2] Ren Jie. Research on financial statistics reform based on big data technology [J]. Investment and Cooperation, 2020(10):28-30.

[3] Guo Zhidong. Exploration on the development strategy of financial statistics under the background of big data [J]. China Market, 2021(16):64-66.

[4] Zhang Xu. A preliminary study on the application of big data technology in financial statistical analysis [J]. Contemporary Economy, 2021(7):26-29.

[5] Sun Linan, Shen Qi, Zhao Liyan. The construction of applied talent cultivation mode of statistics major based on big data technology [J]. Journal of Jilin Institute of Chemical Technology, 2017, 34(6): 35-40.

[6] Gao Mingjun. Research on the impact of big data on financial statistics [J]. Mall modernization, 2020(11):131-133.

[7] Wu Fang. Exploration of innovation path of financial statistics in the era of big data [J]. Small and medium-sized enterprise management and technology, 2020(5):80-81.

[8] Mi Xiaowen. Study on the application of big data technology in financial statistics of the People's Bank of China [J]. Finance and Finance, 2019(5):64-67.