

Construction of financial data management and analysis system based on big data

Liqin Dai*

The University of HongKong, China

*Corresponding author: 1204840501@qq.com

Abstract. To solve financial data management, the author proposes research on the framework of big data analysis system. In the activities of various enterprises, massive high-frequency data will be generated, and these data are often characterized by infinity, suddenness, disorder, and volatility. Due to the above characteristics of the financial data related to the production activities of the enterprise, the financial data of the enterprise is often different from the actual situation, and the access is not standardized. To solve the above problems, it is necessary to improve the efficiency of enterprise financial management. With the application of big data in the enterprise industry as the background, the author builds a big data-based enterprise financial data analysis system, the construction of the financial data analysis system of electric enterprises is described from three aspects: big data storage, big data preprocessing and financial sharing center construction, to help enterprises improve the accuracy of financial data and the efficiency of financial management.

Keywords: big data; financial data; management analysis.

1. Introduction

The role of big data technology in corporate financial management has gradually become prominent, its powerful financial data storage capabilities, visual financial data display functions, and automated data collection and calculation functions greatly improve the quality and efficiency of enterprise financial analysis and management. When building a big data financial analysis and management model, enterprises should build a platform, cultivate compound financial management talents, and enhance the standardization and security of data, to ensure the healthy operation and stable development of the enterprise.

2. Literature review

With the advancement of information technology and the arrival of the era of big data, the range of data that enterprises need to process in the process of financial management is becoming more and more extensive, at the same time, it is faced with increasingly complex and redundant data, too much garbage data, repeated data entry, and lack of consistency in information exchange. In addition, converting data formats while maintaining data integrity, it is an important challenge faced by enterprises in financial data processing [1-2]. Because the relevant financial data of enterprises is huge and complex, and more than one hundred parameters are often involved in financial processing, it is difficult to measure them by traditional methods, therefore, it is necessary to establish a unified and highly integrated information data processing system.

3. Financial data management analysis of big data

3.1 The application value of big data technology in enterprise financial analysis

Big data technology stores financial data in a virtual and digital way, these data need to be displayed to managers at all levels of the enterprise in a suitable way, only in this way can the value of financial data be reflected [3-4]. In fact, big data covers two functional modules of back-end data storage and front-end data display. The front-end display function is mainly based on web pages and

uses mature front-end legends to present corporate financial data, the advantages of this data presentation method are reflected in the following two aspects:

1. It is convenient for the integrated display of financial data. Enterprise financial data covers a series of contents such as assets and liabilities, cash flow, income statement, taxation, etc., and there are differences between branches and departments within the enterprise, operators need internal financial data from multiple aspects, multiple perspectives, and multiple levels. Financial data based on big data technology has the characteristics of integrated display, managers click on the navigation button or a specific number on the data dashboard, the system will jump to the lower-level page, and the aggregated data can be further expanded, with time, department, branch, etc. as the dimension of data statistics, a more detailed analysis report is formed.

2. Convenient access to financial data. Due to the high level of digitization and visualization of financial data under big data technology, business managers can use mobile phones or personal computers to access financial statements and data dashboards in various occasions, the restrictions on time and place are greatly reduced, which improves the convenience of use [5].

3.2 Promote in-depth mining and analysis of financial data

In modern enterprise management, the connection between financial data, business and products is getting closer and closer the financial management department of the enterprise should also participate in a series of work such as business management, cost management, risk control, etc. The traditional financial analysis is relatively fixed in the direction of work, mainly focusing on assets, liabilities, taxation, cash flow, etc. However, in the context of the new era, the scenarios in which the financial department participates in enterprise management and decision-making have greatly expanded, so the perspective of financial analysis is also constantly innovating and changing, data mining technology based on financial big data is bound to play an important role in this process [6-7].

Data mining means that the logical relationship and problems between data are in a relatively ambiguous state, using data as the material, explore the inherent laws hidden in the data through statistics, analysis, reasoning, and other methods. Data mining has high application value in financial analysis, and can explore new financial analysis angles for enterprises, more fully excavate the application value of financial basic data [8-9]. As shown in Table 1:

Table 1. Financial Statement Analysis System (Learned through a questionnaire)

assets and liabilities	Profit and profit distribution	cash flow	Compare assets
common assets	common profit	Compare profits	compare cash
common than cash	financial ratio	Financial ratio analysis	cost of sales

3.3 Challenges facing the application of big data technology in corporate financial analysis

The financial management and analysis system based on big data technology requires relevant personnel to have both professional financial knowledge and computer software knowledge. First of all, the enterprise must establish a networked business management system for its own financial characteristics, and the financial management personnel of the enterprise need to form software thinking, help the technical department to develop and design workflows and front-end interfaces that meet the needs of corporate financial management; Secondly, the financial big data system has the function of developing and utilizing financial basic data, financial managers must master the skills of using software tools to analyze and mine financial big data, because only financial tools with professional financial knowledge and the ability to explore other utilization values of financial data with experience can find a new degree of data analysis. Big data tools reduce the difficulty of financial data analysis, and at the same time, create possibilities [10-11]. An enterprise's main business, asset and liability structure, scale, and financial system will all affect the construction of a financial information platform, different enterprises have great differences in financial management and analysis.

Although some companies have introduced software-based financial management tools, they do not meet the characteristics of financial big data platforms. Enterprises are self-contained in financial data collection, data storage, data display, data analysis, and data mining, require enterprises to independently develop financial data with the help of computer technology, therefore, it is imperative for enterprises to establish an information platform that conforms to the characteristics of big data management. In terms of management mode, the functions and roles of the corporate finance department need to be changed, and the focus of work should be in-depth participation in corporate business optimization, cost control, foreign investment, strategic decision-making, value chain management, etc., rather than traditional basic accounting work. Other departments within the enterprise should also recognize their responsibilities in financial management, implement the standardized entry of basic data. From a practical point of view, many companies have not yet made effective changes in their financial management models, it cannot adapt to the application characteristics of big data technology. The accuracy and reliability of enterprise financial analysis are deeply affected by financial basic data, under the financial big data management model, a large amount of basic financial data is reported by grassroots departments through the information platform, until stored in the system.

However, there are many types of financial-related data of enterprises, and some data can form a unified structure, but there are still a large number of data that are difficult to unify in structure, it is more difficult in later application, computer systems are good at processing data with a unified structure, using related algorithms can achieve fast processing, however, if the data structure cannot be unified, the algorithm operation will be hindered [12]. Therefore, the quality of financial information is affected by the non-uniform data structure, which also restricts the application of big data technology. In addition, when enterprises comprehensively apply big data systems to manage their financial data, data security protection will become the focus of work, financial data is the secret of enterprises, at the same time, it is also an intangible asset, and big data technology is based on computer network systems, there are risks such as hacker intrusion, virus infection, system failure, etc., the security protection of enterprise financial big data will become a difficult problem [13].

3.4 Hierarchical structure of enterprise financial data analysis system based on big data

According to the order of data processing, the financial institution's data analysis can be divided into 3 levels, which are data storage, preliminary data, and the creation of a dynamic financial sharing data analysis site. Among them, data storage to complete data storage, data processing to increase the time of data, and data analysis systems to make full use of data the price. The combination of these three can make the value of the data larger and more appropriate. Big data from big data centers and external data, and the structure of financial analysis data is analyzed by data level, data storage, data level advance paper, and grade analysis data. In the process of analyzing financial data, mainly based on NoSQL and Hadoop to do big data processing and analysis of data, change the financial data always complete the information, make an interactive analysis, and finally complete the information. analysis... large financial data. A typical example is shown in Figure 1.

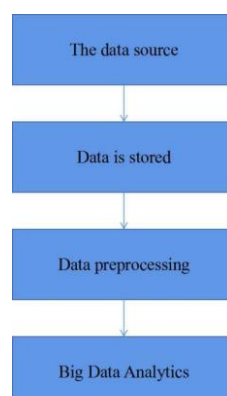


Fig 1. Technical framework of financial data analysis system(self-painted)

4. Construction steps of enterprise financial data analysis system

4.1 Big data storage management based on NoSQL.

In the face of a lot of financial data, NoSQL storage systems can achieve business financial data storage and easy management [14-15]. Regarding data storage, there are three main storage methods: NoSQL databases, relational databases, and HDFS distributed databases. When it comes to storage type, NoSQL stores a lot of data in a non-interruptible, distributed data storage, and can be stored in graphic data, key value, and data. -point information, provide more flexibility. Data scalability with high-speed read and write performance and better query performance.

NoSQL data storage includes Master-Slave and P2P ring models. Among them, Master-Slave has good control, simple design, and usually do data distribution according to horizontal partitions. Separation of work between the Master node and the Slave node can reduce the work of the nodes, and the Master node controls and manages the slave nodes. The downside is that host hub nodes can become physically inactive. The P2P ring model system has no central point, so everyone is equal, and based on Hash data distribution, it has the advantage of good collaboration and expansion. P2P ring architecture provides a better balance, but the structure has many paths, is not suitable for frame detection, and control is not very good. The two architectures above are very different and each has certain performance limitations. Therefore, it is necessary to combine the advantages of the distributed model of P2P and the centralized model of Master-Slave to create a consistent data storage [16-17]. The combination is Master-Slave and Chord connection or Content-Addressable Network connection, which allows data to be stored both globally and locally.

4.2 Financial data preprocessing based on Hadoop

Hadoop is an open-source large-scale distributed computing framework, which is reliable, efficient, and scalable, so it is widely used in the field of big data processing. Technicians can build on Hadoop and the existing grid financial system, establish a new financial big data preprocessing system model, and combine Hadoop, HBase and Hive to clean, integrate and reduce data in the financial data preprocessing platform. The preprocessing of financial data is accomplished by noise processing, filling in missing data and simplifying the relationship between data attributes and dimensions. This method takes advantage of the characteristics of the Hadoop platform, add monitoring and control nodes to tasks that need to be preprocessed, each node corresponds to a task or task list that needs to be preprocessed, for this task, start the corresponding handler and related rules. The specific processing procedure is shown in Figure 2.

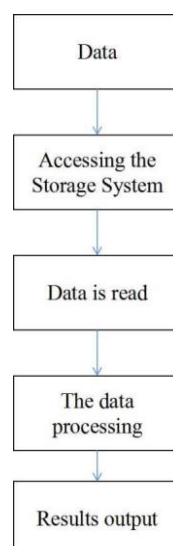


Fig 2. Flow chart of financial big data preprocessing system(self-painted)

4.3 Establish an analysis cluster based on Hadoop to analyze financial big data

After the introduction of financial data based on Hadoop, the limitations of the existing financial analysis will be improved, and the financial data will be analyzed to create financial analysis suitable for current financial needs. The main purpose of big data analysis is to follow the analysis of relevant financial indicators, such as financial management, financial analysis, analysis of the cost, and risk. To better understand the results of financial analysis, first, management can study the current financial situation of the business and identify problems in financial management, such as income and management size ^[18]. Second, at the technical level, financial management is integrated with the quality of traditional information and new business information. According to the concept of big data, the existing data can be stored and analyzed effectively depending on the economic and financial characteristics of the company, and at the same time, the relationship integrated algorithms are used to extract data characteristics and data values. -20]. A specific process for analyzing large financial data is shown in Figure 3 [19-20].

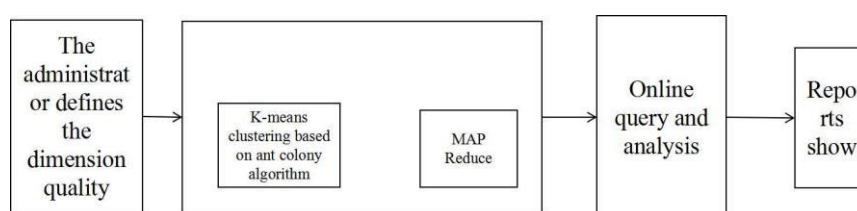


Fig 3. Flow chart of financial big data analysis based on Hadoop(self-painted)

5. Conclusion

With the advancement of information technology and the era of big data, the data of enterprise business systems and data centers has become more and more complex, scientific analysis capabilities and fast computing speed affect the efficiency of financial management of enterprises. Financial big data is the core asset of an enterprise and a secret related to the operation of the enterprise, which requires very high data security. Strengthen the financial data analysis system of the construction enterprise, it can not only screen out effective and useful information from the complex data, but also help enterprises to improve their financial management level and effectively avoid financial risks. Financial big data is the core asset of an enterprise and a secret related to the operation of the enterprise, which requires very high data security.

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