

# Enterprise Financial Report under the Background of Big Data

Zufang Tan<sup>a</sup>, Furong Cao<sup>b</sup>, Jiaoling Lu<sup>c</sup>, Yuxin He<sup>d</sup>, Xinyi Liu<sup>e</sup>, Chu Zhang<sup>f,\*</sup>

Zhangjiang Science and Technology College, Zhanjiang 524000, Guangdong, China

<sup>a</sup>3217570296@qq.com, <sup>b</sup>3582576342@qq.com, <sup>c</sup>471614551@qq.com, <sup>d</sup>1594482497@qq.com,

<sup>e</sup>1504208332@qq.com, <sup>f</sup>308192095@qq.com

\*Corresponding author

**Abstract:** With the rapid development of information technology, the era of big data management has come. This is both a challenge and an opportunity for the financial management of SMEs. The data age provides a more comprehensive and accurate analysis platform for corporate finance, but it also has a great negative impact on traditional corporate financial management methods. Therefore, under the background of big data analysis, corporate finance will face new challenges. In order to manage corporate finance, it must continue to innovate and reform. This article will discuss the issues of corporate financial analysis in the context of big data analysis, understand the relevant knowledge and theories of the company's financial statements on the basis of literature data, and then build a corporate financial sharing platform based on big data, and make use of the platform the cited algorithm is tested, and the test results show that the algorithm in this paper has a greater advantage in clustering time than the k-means algorithm.

**Keywords:** Big Data, Corporate Finance, Data Reporting, Corporate Decision-Making

## 1. Inductions

With the popularization of the Internet in modern society and the emergence of remarkable achievements in technologies such as the Internet of Things, cloud computing, and data mining, the arrival of big data has led to a climax of technological innovation [1-2]. The exponentially increasing amount of data has had a major impact on all aspects of life. People have begun to explore big data technology to collect, process and analyze data, and discover the hidden value behind it, so that companies can use it to improve the quality of prediction and decision-making [3-4]. Because financial data is the basic data of an enterprise, with large scale and high value, when making analysis or decision-making, first consider the processing and analysis of financial data [5-6]. For traditional manufacturing, according to the laws of competition at the time, maintaining the status quo will definitely be eliminated. Companies need to take preventive measures and apply big data to financial analysis. It is undoubtedly very important to use traditional financial systems to analyze huge and complex financial data in real time. Today, big data and related technologies are used to support the company's financial analysis and realize real-time analysis [7-8].

With regard to the financial research of Chinese enterprises, with the advent of the "smart mobile cloud" era, some researchers believe that the continuous development of computing technology has not only promoted the further improvement of China's social productivity and the overall quality of the national economy, but also the first level of accounting calculations three leaps. In summary, with the development of new technologies such as cloud computing, big data, mobile internet, and intelligence, it will break the traditional business management model of enterprises and provide more advanced enterprise automation, financial processes and data. Today, companies have their own cloud computing platforms, and the financial management center will serve as the company's largest data center, providing corporate decision-making information for various government departments, and the company's financial structure will change, and the overall activities of the company will be more related. The coming closer, so companies must use cloud computing technology, big data analysis and other new technologies to implement more dynamic and efficient monitoring and management of the company's financing control, operating cost control, investment and financing management, etc. In the information age, how companies can more efficiently control the company's finances, and how to use the information age to enhance their competitiveness in major industries are important topics [9]. Some researchers have

proposed a new definition of shared services. They said that shared business technology is a brand-new concept in modern company management models. The goal is to obtain new competitive advantages from the enterprise's original decentralized management model and relatively small hierarchical structure, and the key is to use other shared business technologies [10]. To sum up, although there are many researches on corporate finance, there are very few practical examples of applying big data analysis technology to corporate financial management analysis.

This article studies the analysis of corporate financial reports in the context of big data, analyzes the content of financial report analysis and the impact of big data on financial report analysis on the basis of literature data, and then designs a corporate financial sharing platform based on big data. The designed platform is tested, and relevant conclusions can be drawn from the test results.

## 2. Corporate Financial Report Research

### 2.1 *The Content of Financial Report Analysis*

Although financial reporting entities generally agree that true and reliable financial information plays an important role in decision-making, financial statement analysis is usually affected by the content or value of their own decisions. Differences in report trends financial report analysis is inevitably affected by different positions, and there are certain differences in the analysis process and results [11]. Therefore, this article only focuses on the common concerns of each topic in the content analysis report. Our country's current financial report analysis generally adopts a proportional analysis model. Through the analysis of balance sheets, income statements, cash flow statements and other accounting statements, it is possible to understand the status of debt repayment, operating conditions and profitability, and to evaluate the capabilities of stakeholders. Through the analysis of the balance sheet, the operator can understand the company's financial status and solvency, and judge the rationality of the company's capital structure and the liquidity of funds. Through the analysis of the income statement, understand the operating efficiency and profitability, analyze the cash flow situation, and help the company find the competitiveness, source of funds, source of funds, and whether it has the potential for sustainable development [12]. Investors can understand the company's management capabilities and income quality. From a business and development perspective, whether it is managers or investors, or related government agencies or creditors, analysts usually go to debt repayment, operation, profitability, Analysis of growth, profit quality, reports, etc, the following is the 6-dimensional analysis effect:

#### (1) Ability to pay

Repayment ability refers to the ability to repay the debts that need to be settled within a certain period of time. Debt solvency analysis will help reflect a unit's economic sustainability and existing risks, thereby predicting future income related to the unit's healthy survival and growth.

#### (2) Business ability

Operational capabilities include the unit's ability to allocate resources rationally, the ability to effectively use funds, and the ability to coordinate the normal operation of assets. Through this analysis, it can help the audience determine the scale of departmental operational risks and business performance.

#### (3) Profitability

Profitability refers to the ability of an enterprise to obtain income under general business conditions. Through the analysis of the profitability of the enterprise, it can reflect the performance of the operator and also reflect the management level of the enterprise manager. For investors and debtors, profitability is a very interesting and highly valued issue. For investors, it directly affects the resulting income; for debtors, it directly affects solvency.

#### (4) Development ability

Development capability is unit development. This is the ability of the device to continue to grow and expand under normal operating conditions. An important indicator of growth ability analysis is the value growth rate. The higher the growth rate, the faster the growth.

#### (5) Income quality

Income quality analysis is an investigation into the source of income and income-generating ability. Through this analysis, investors can truly understand the income and profitability of the unit. It is not only conducive to ensuring the legitimacy and rationality of income, but also conducive to the fair and

just distribution of income.

(6) Ability to contribute to society

Social contribution ability refers to the ability of a unit to create value for the country and society through its unique functions. The main indicators analyzed include the percentage of social contribution and the percentage of social accumulation. The social contribution rate reflects the ratio of total asset contribution to social accumulation. This ratio reflects the share of financial taxes paid in total donations.

## **2.2 The impact of Big Data on Financial Report Analysis**

(1) Data sources are more appropriate, and big data analysis is more accurate. Most of the data used in traditional business financial data analysis is static structured data within the enterprise. In the era of big data analysis, in order to remove internal financial data such as financial reports, suppliers, customers, competitors, etc. who can use big data analysis technology to analyze data are used. These big data information not only involve financial information, but also a large amount of non-financial information and data materials. In the past, due to the constraints of scientific and technological conditions, it was difficult to obtain, organize and use information, and the effectiveness of large-scale analysis was also low. However, the relevant data is often of no application value after being used due to incorrect collection and storage methods. The display of big data analysis facilitates technological upgrades such as data control, storage and processing, and also enables companies to integrate these data more effectively. Technical specifications and big data standardization requirements can significantly improve data accuracy.

(2) Differentiated financial analysis meets real-time analysis. The complexity of data sources and the diversity of data types undoubtedly broke the traditional business technical analysis methods. The structured, semi-structured, and unstructured data from inside and outside the business is complex and messy, and these data need to be filtered according to big data technology. Big data analysis has changed from traditional financial statements and other data analysis to historical data as the basis, combined with the company's internal and external financial data and non-financial data to analyze and predict future development. A major feature of big data is that it is highly topical. In view of the rapid flow of massive data, financial personnel can quickly capture and analyze data in real time, obtain hidden value from the data as soon as possible, and learn about the market before competitors. Existing financial analysis is usually based on financial reports, including regular monthly, quarterly or annual reports. As the big data technology matures, it will be released regularly or immediately in the near future. For example, the financial statements created at the end of last month become "daily reports", which can keep track of inventory and income data in a timely manner, greatly shortening the information disclosure cycle.

(3) Improve financial analysis and strengthen forecasting and decision-making management. Companies generally do not have professional financial analysts, and most of them are hired by other accountants. In the era of big data, the requirements for analysis technology and timely and accurate analysis are getting higher and higher, and the results of financial analysis have an increasing influence on business decisions and forecasts. The vision of professional analysts and financial personnel as analysts will also be expanded to include business risk prediction, decision analysis and support, and cost budget management.

## **3. Design of Corporate Financial Sharing Platform Based on Big Data**

### **3.1 Overall Platform Architecture**

The financial sharing platform includes six modules: reimbursement, lending, personal travel expenses, image management, receipts and payments, capital budgeting, and inter-module links. The platform adopts data interfaces such as OA system, personnel system, and SAP external system. This is because the financial cost system and electronic banking system of each company are interrelated. The operation modules of the financial sharing platform work together, and the platform and external systems work together to integrate various operations of the financial sharing center. The system provides basic information visualization and maintenance capabilities for staffing, location, business scope, employee names, positions, and contact numbers to facilitate communication during business operations and monitor the promotion of business information. Provide personal information management function, the administrator can change the contact number, password and other information by himself. Provide personnel and user information management functions, use the employee numbers of all employees of a

company as personal login user names, change the employee information in the data interface of the financial sharing platform and the personnel sharing platform, and transfer it to the financial sharing platform for approval. In the human resource system, the information of the two systems is disclosed, and the financial sharing platform is based on the human resource system to update personnel information in a timely manner. The system interface style is concise and clear, combining the design style of the current specific business portal system and the characteristics of the financial sharing platform itself, adopting a humanized design, and establishing an interface according to different levels and roles. The functional structure of the system is shown in Figure 1, and the specific design scheme is as follows.

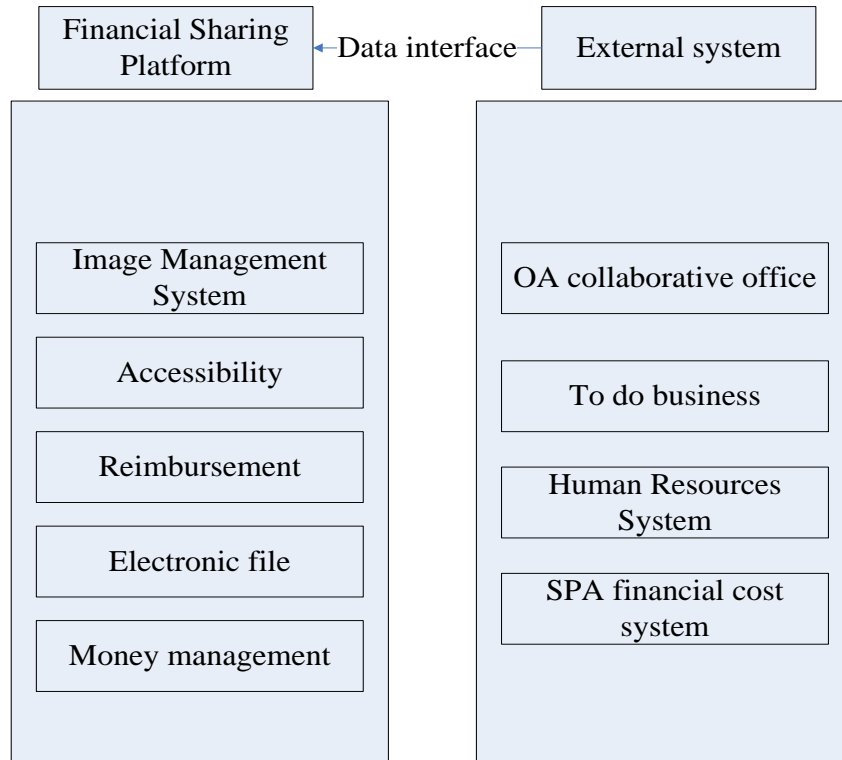


Figure 1: System function structure

**3.2 Image Acquisition System**

The imaging system is a support system for the financial assistance system. The imaging system needs to be able to electronically transfer the original documents to the financial assistance system. This allows financial or related approvers to view the original documents or vouchers directly and electronically. This greatly improves work efficiency. It also has a mobile function in the approval process, which is very useful for leaders at all levels to move approval.

**3.3 Fund Budget Module Design**

The fund budget is mainly composed of the financial accounting data of the previous year and the payment data of the current month. The financial account opening data reads the corresponding pending financial account from the coupon data of the SAP financial account through the SAP interface and according to the payment time specified in the payment management method. The payment details for this month are entered by the operations department, and submitted to the general treasury list after approval by the manager. After the salesperson uploads the attachment information to be approved, the approver is selected to start the approval process. The approval process is transferred to the department manager, and each order is approved after approval. If a certain level of approval does not match the business process, it will be re-approved and reported after the initiator changes. If approved and agreed, the data content reported by the company will be automatically saved in the original budget data sheet, and a monthly budget will be generated.

### 3.4 Big Data Analysis Module

Through macroeconomic data analysis and step-by-step data analysis, senior management can conduct a comprehensive analysis of the overall budget. The system displays various financial indicators that are of interest to senior managers in a three-dimensional dynamic format. At the same time, managers can see different index maps. The staff can customize the index name, index content, and index display mode according to the leadership requirements. The system can perform multi-level drill analysis according to the source path of the indicators, drill according to different management dimensions, adjust the drill path, drill to different parts, summarize statistical tables, or according to area, type, time, section, etc. A variety of conditions for multi-dimensional analysis.

### 3.5 Big Data Analysis Algorithm

The spectrum grouping algorithm is a data analysis method that can produce very good grouping results. It is widely used because of the best grouping results. The advantages of this algorithm are as follows. (1) Only need to solve a general matrix to perform grouping. (2) Spectrum grouping is not limited to a specific model. In other words, there is no need to assume any spatial distribution when data is grouped. (3) The spectral grouping algorithm can be placed in any space to centrally operate on the formatted data. (4) The grouping process of the spectral grouping algorithm is integrated into the local optimal solution for comparison easy. (5) When calculating high-dimensional data, n-dimensional data can be compressed into k-dimensional data to complete data dimensionality reduction.

The similarity calculation of spectral clustering algorithm is generally calculated by using Gaussian kernel function, and the elements in the similarity matrix S are  $S_{ij}$ :

$$S_{ij} = \exp\left(-\frac{x_i - x_j}{2\sigma^2}\right) \quad (1)$$

Among them,  $x_i, x_j$  are data sets of spatial shape.

According to equation (1), the obtained similarity table S uses one of the K-nearest neighbor method, the x-nearest neighbor method, and the fully connected method to dilute the similarity table. The edited table is defined as the connection table W. Next, you need to convert the edited table W to a D-level table. The formula is:

$$D = (d_i) = \sum_{j=1}^n W_{ij} \quad (2)$$

In order to solve the complexity of grouping data points and how to transfer the data belonging to the same multiple structure, they should be classified into one category as much as possible, and the data from different popular structures are far away from each other. The similarity based on distance Minkowski is proposed matrix method.

## 4. System Test

In this task, the spectrum grouping algorithm will be experimentally analyzed. The experimental data comes from financial clustering data of UCI machine learning data, seed data set and soybean data set. In this article, the spectral grouping algorithm is compared with K-means, tested on the above two data sets, and the grouping is completed according to the process of the spectral grouping algorithm. The test results are shown in Table 1.

Table 1: System test results

Time category	K -means	Spectral clustering
evd time	0.415	0.356
kmeans time	0.087	0.091
total time	0.551	0.488

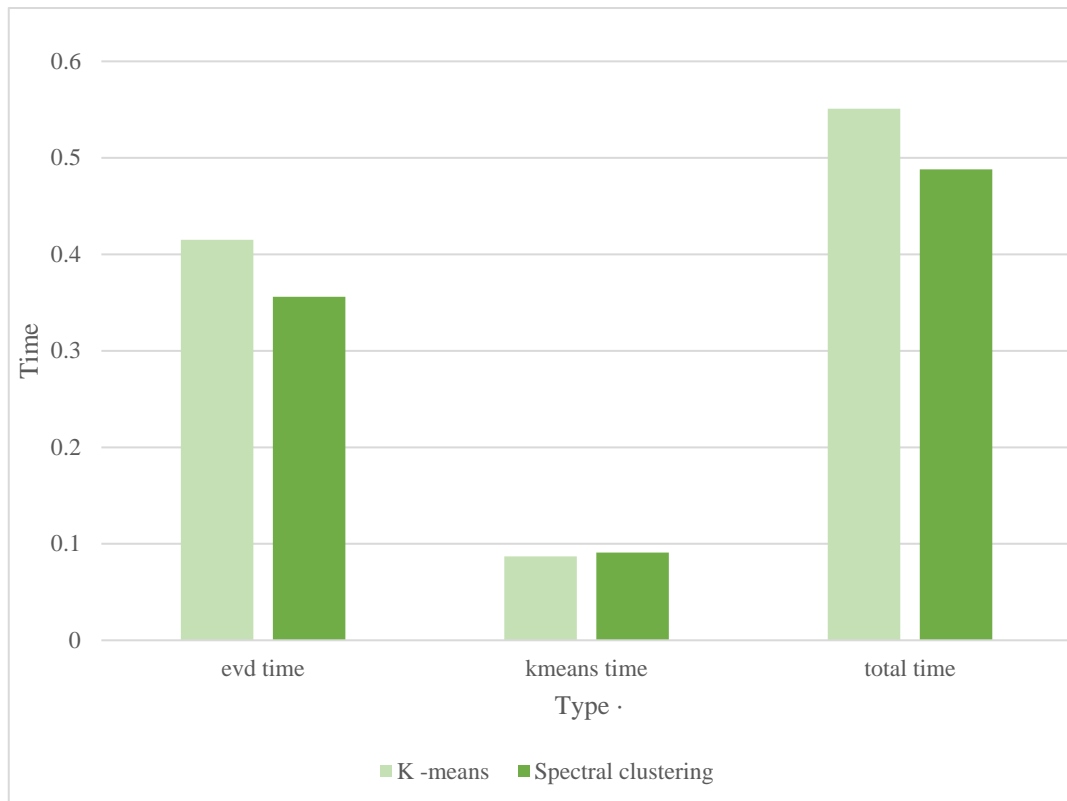


Figure 2: System test results

Through simulation experiments on traditional data sets, it is not difficult to verify from the data in Figure 2 that the spectral grouping algorithm has improved accuracy and grouping time compared to the K-means algorithm.

## 5. Conclusions

This article studies the analysis of corporate financial reports in the context of big data. After analyzing the relevant theoretical knowledge, builds a corporate financial sharing platform based on big data, and tests the big data classification algorithms applied to it, and the test results are compared with the K-means algorithm, the spectral clustering algorithm has improved clustering accuracy and time.

## Acknowledgements

This work was supported by 2020 Innovation and Entrepreneurship Training program for university students of Zhanjiang Science and Technology College: 《Analysis and research on enterprise financial reports under the background of big data》 (project number: 2021ZKYDCA22)

## References

- [1] Alexander L, Das S R, Ives Z, et al. Research Challenges in Financial Data Modeling and Analysis[J]. *Big Data*, 2017, 5(3):177-188.
- [2] Hong Y. Coclustering of Multidimensional Big Data: A Useful Tool for Genomic, Financial, and Other Data Analysis[J]. *IEEE Systems Man & Cybernetics Magazine*, 2017, 3(2):23-30.
- [3] Sehrawat M, Giri A K. Panel data analysis of financial development, economic growth and rural-urban income inequality[J]. *International Journal of Social Economics*, 2016, 43(10):998-1015.
- [4] Conover W J, VG Tercero-Gómez, Cordero-Franco A E. A Look at Sequential Normal Scores and How They Apply to Financial Data Analysis[J]. *Journal of Applied Mathematics & Physics*, 2018, 06(4):787-816.
- [5] Lilly C M, Motzkus C A. ICU Telemedicine: Financial Analyses of a Complex Intervention[J]. *Critical care medicine*, 2017, 45(9):1558-1561.

- [6] Wu Y, Shang P, Li Y. *Modified generalized multiscale sample entropy and surrogate data analysis for financial time series*[J]. *Nonlinear Dynamics*, 2018, 92(3):1335-1350.
- [7] Haykel Z, Manel M, Ziedi E N. *A semi-parametric panel data analysis on financial development-economic volatility nexus in developing countries*[J]. *Economics Letters*, 2018, 172(nov.):50-55.
- [8] Xiong, Ling, Shaozhou. *FINANCIAL DEVELOPMENT AND CARBON EMISSIONS IN CHINESE PROVINCES: A SPATIAL PANEL DATA ANALYSIS*[J]. *The Singapore economic review*, 2018, 63(2):447-464.
- [9] Nasrin, Shamima, Rasiah, et al. *What determines the financial performance of microfinance institutions in Bangladesh? a panel data analysis*[J]. *Quality & Quantity: International Journal of Methodology*, 2018, 52(3):1409-1422.
- [10] Su H C, Tu C J, Lin T T. *DIFFERENT FINANCIAL ANALYSES ON BOT PROJECTS WITH THE CASE OF HUALIEN HOPING INDUSTRIAL HARBOR*[J]. *Advances in Financial Planning and Forecasting*, 2016(7):77-89.
- [11] Nasrin S, Rasiah R, Baskaran A, et al. *What determines the financial performance of microfinance institutions in Bangladesh? a panel data analysis*[J]. *Quality & Quantity*, 2018, 52(3):1409-1422.
- [12] Dietz, Sebastian. *Statistics and Data Analysis for Financial Engineering, 2nd edition*[J]. *Journal of the royal statistical society, Series A. Statistics in society*, 2016, 179(Oct. Pt.4):1132-1133.