Research on Application of Big Data on Financial Decision-Making

Ao Chen *

Leadership Management, PSB Academy, Singapore

* Corresponding Author Email: c3473366@uon.edu.au

Abstract. In the context of the big data era, the data basis that enterprises rely on for financial decision-making includes not only financial data, but also non-financial data. Traditional financial decision-making methods cannot effectively process and analyze non-financial data. Therefore, it is necessary to big data technology is introduced into the financial decision-making process of enterprises to organize and analyze relevant data of enterprises in a timely and effective manner, providing corporate decision-makers with more scientific and effective decision-making basis. This article mainly uses two methods, literature research method and case analysis method, to conduct an in-depth study of the application process of big data technology in corporate financial decision-making. This article first explains the necessity of introducing big data technology into the corporate financial decision-making process. Then, the specific application path of big data technology in the enterprise's financial decision-making process is explained through the feasibility analysis, application principles and specific function realization of big data technology in the enterprise's financial decision-making process. This study found that the application of big data technology in the corporate financial decision-making process is mainly reflected in four aspects: first, data collection; second, data storage; third, financial analysis; fourth, decision support. Introduce big data technology into the corporate financial decision-making process, broaden the channels for data collection, enrich financial analysis and decision-making methods, and provide strong support for companies to formulate more accurate and effective financial decision-making plans.

Keywords: Big data technology, financial decision-making, Python.

1. Introduction

In the context of the new era, the emergence of big data technology has provided new impetus for economic transformation and development. The application of big data technology has brought unprecedented opportunities to realize industrial transformation and industrial innovation. China currently ranks first in the world in terms of total number of Internet users and has abundant data resources and obvious market advantages [1]. In the rapid development of information technology, the popularization and application of information technology have promoted the overall frequency of application of big data in many fields, such as industrial research and development, intelligent manufacturing, etc. In the era of big data, how to fully tap the value contained in data resources is becoming a common focus for governments, academia, and the IT industry. The use of big data technology to analyze industry conditions and event trends in various industries has become a consensus and is widely used.

However, in this era of data explosion, if companies want to maintain a certain competitive advantage in the industry, they must pay attention to and pay attention to their financial decision-making. As an important core of corporate financial management, whether financial decisions are accurate will largely affect the development of corporate financial management work. Traditional financial decision-making relies on the preservation and recording of financial information for a certain period, and financial data only has structured data. The workload is huge and cumbersome, which makes it difficult for financial information to be fed back to corporate management in a timely manner. Therefore, financial decisions cannot effectively maximize value. At present, driven by big data technology, the amount of data emerging in the market has increased significantly. Against this background, both production and market operating mechanisms around the world have been affected by big data to a certain extent. Since big data technology can acquire massive amounts of data and

efficiently process and analyze massive data, from the perspective of actual needs, the data analysis and processing capabilities displayed by an enterprise will affect the quality or efficiency of its financial decision-making work [2]. It has a great impact. Therefore, integrating the current advanced big data technology into the field of financial decision-making analysis and using big data technology to mine data that is beneficial to the development of the enterprise can accurately grasp market dynamics, find factors that affect costs, and provide management with Provide high-quality financial decision-making opinions and use this as a basis for strategic business decisions and changes [3].

This research has certain theoretical and practical significance. In terms of theoretical significance, in a CGMA (Chartered Global Management Accountant) report titled "From Insight to Impact, Unlocking Opportunities in Big Data", three related impacts were revealed. First of all, 87% of the financial experts surveyed believe that their companies are gaining valuable insights from data [4]. Big data has the potential to change the way companies operate. Second, finance personnel must transform from enterprise data analysis supporters to business partners, creating value for the enterprise, while cultivating a decision-making culture based on reliance on data rather than solely on management opinions. Finally, data visualization skills are critical for business managers, and as big data analytics tools evolve, all organizations, regardless of size, must start taking a data analytics path to stay competitive. For example, finance and accounting teams at companies in the manufacturing industry can obtain benchmark metrics from financial data service providers to measure whether the company's performance is below the industry average or whether its bad debt rate is higher than the industry average.

In terms of practical significance, with the advancement of big data analysis technology, there are two important trends affecting corporate financial decisions. First, most of the data integrated in the current financial systems developed by enterprises are unstructured data, such as video and audio data or picture and text data, etc. These data have been closely integrated with traditional data. Therefore, financial personnel are required to master big data analysis technology to process a large amount of available data, including automatically mining data (such as customer purchases, click tracking and user comments, click data analysis, etc.), using data to understand customer tendencies, analyze and predict industry development, and then Optimize company decision-making and enhance corporate competitiveness. Secondly, big data has a substantial impact on fair value assessment [5]. An enterprise's investment decisions, operating decisions, and budget management will inevitably involve the determination of fair value. Data service companies specializing in collecting data and valuation data from various sources use big data to assess the fair value of assets and liabilities to reduce the subjective judgment of financial personnel in fair value assessment.

The case study method refers to a method of analyzing a specific case in detail to reach certain conclusions. This article studies the application of big data technology in financial decision-making, taking the application of big data technology in the financial decision-making of the manufacturing enterprise A as an example, and uses big data technology to analyze the application process of A Company's investment decisions and operating decisions [6]. It also analyzed corporate financial decisions under the background of big data challenges and coping strategies.

2. Case Description

A Technology Co., Ltd. currently has 897 million tons of iron ore resources. In February 2021, A Company established a strategic partnership with a data company to build a private cloud platform for A Company to meet its requirements for IT system business flexibility, on-demand expansion, cost controllability, and simplified operation and maintenance. Through the construction of private cloud, on the one hand, it will improve the efficiency and level of information support, and improve the integration of enterprise information, digitalization, intelligence and business. On the other hand, with the help of a complete and unified cloud platform and a professional operation and maintenance team, they can achieve professional operation and maintenance support for various businesses deployed in it, effectively improve the intensity of information support, and achieve a high-quality

construction level of business support. The most important thing is that through the construction of the cloud platform, the centralized management of application systems and information data will be accelerated. Combined with the service-oriented characteristics of the cloud platform, it can greatly improve enterprise production efficiency, reduce production costs, effectively improve the level of intrinsic safety, and fully meet the urgent needs of mining digitalization [7].

Although A Technology is a leader in the domestic private mining industry, the current international situation is complex and changeable. Facing the uncertain market environment changes, it can only keep pace with the times, implement scientific and effective management levels, and use big data technology to explore the relationship with enterprises. Decision-related data can provide accurate support for the company's daily business decisions and major project investment decisions, so that the company can take the path of sustainable development. This chapter takes the investment decisions and operating decisions of A Technology as an example, and studies the specific application process of big data technology in ferrous metal enterprise investment decisions based on the design framework of the above-mentioned financial decision support platform. From the perspective of investors, from the downstream industry of ferrous metal mining and processing industry "non-ferrous metal smelting and rolling processing industry", a company with excellent comprehensive capabilities is selected for investment. The big data technology platform can crawl all listed companies in the industry Production and operation data, through visual analysis of financial indicators for five consecutive years, and cluster analysis of the top ten companies in terms of comprehensive strength, to obtain more accurate investment companies [8]. From the perspective of operators, management decisions have always been based on the company's financial personnel calculating the four major capability indicators of profitability, debt repayment, operation, and development based on report data, and using empirical model predictions to demonstrate the operating performance of the current period. By utilizing big data technology, companies can conduct both vertical and horizontal analyses of the financial data of industry benchmarks. This involves examining trends of increase and decrease within each financial metric, as well as comparing these metrics across the industry. Such analyses help identify gaps and provide robust data support for making informed business decisions.

3. Analysis of Questions of a Technology Company

Through the UFIDA Xindao Cloud Financial Big Data Analysis and Decision-making Cloud Platform, conducts internal and external financial decision-making analysis. The implementation path mainly has the following four aspects: First, obtain data, using the XBRL of the cloud platform as the data source, obtain the balance sheet, income statement, cash flow statement and related operating data sheets of A Technology Company, as well as the relevant financial reports of the affiliated company; the second is data preprocessing; the third is financial analysis and data visualization display; the fourth is a summary of financial decisions analyze. The following mainly conducts vertical analysis and horizontal comparison from various capabilities. The vertical analysis time is 2015-2019. Data analysts identify operational problems and gaps and provide data-driven support for strategic planning and budget adjustments in the upcoming period.

3.1. Profitability

The performance of an enterprise can be reflected by its profitability. By analyzing profitability, it is possible to identify problems in the company's current management model, which can significantly aid in enhancing and refining the company's management approach. The company's operating income and operating costs for this period have increased compared with the same period last year, but operating profits have dropped significantly. Companies can use the analysis cloud to gain insights into the reasons for year-on-year and month-on-month declines [9]. This approach also helps them find opportunities for investment income [9]. The trend of changes in operating profits tends to be consistent, so the reason for the decline in the company's operating income in this period

is the decrease in investment income. At the same time, b was selected for horizontal comparison. Using big data analysis, the company has observed that both its operating income and operating costs were higher than those of Company B in the same period. Despite a downward trend in investment income, it remained higher than that of Company B, resulting in a similar or better operating profit. This comparison highlights that the company possesses stronger profitability compared to Company B. Furthermore, the operating income trends of both companies are similar and appear to be influenced by broader market trends. Introducing Company B as a benchmark provides a valuable perspective for assessing the company's financial health and market position relative to industry peers.

3.2. Solvency

It is an important symbol that reflects the quality of the financial situation. The higher the debt ratio of the company, the greater the financial risk. Whether the company has enough cash or assets that can be realized at any time directly affects the strength of the company's solvency and determines the financial status of the company. By analyzing the relevant indicators of A Company's solvency, compared with the industry average, the company's quick ratio is still far behind the reasonable value of 1, the asset-liability ratio is equivalent to the industry level, and the financial risk is moderate. However, the cash ratio is low. It was found that the company's cash ratio remained stable at a low level from 2017 to 2020. The reason is that from a vertical perspective, monetary funds have been declining year by year, while current liabilities have maintained an upward trend [10]. The Company's non-interest-bearing liabilities and interest-bearing liabilities have an equal proportion, but the proportion of short-term borrowings in interest-bearing liabilities is larger, and the proportion of other payables in non-interest-bearing liabilities is higher. The Company's capital turnover is under great pressure and should be appropriately shifted to long-term borrowings loan.

3.3. Operating Analysis

From the analysis, it is observed that the company's cash ratio has remained stable at a low level from 2017 to 2020, reflecting the current asset utilization of the company. Essentially, operational capability involves utilizing as few assets as possible, achieving quick turnovers, and generating maximum profit. Compared with its competitors, A Mining exhibits extremely short accounts receivable turnover days and inventory turnover days. A Company enforces relatively strict policies and maintains a strong position within the industry chain. In a vertical comparison, since 2017, there has been a significant decrease in accounts receivable turnover days and inventory turnover days, whereas both the current asset turnover days and total asset turnover days have shown an upward trend. Since 2017, the company has adjusted its policies to focus on the management of working capital, which aligns with the observed changes in the cash ratio.

3.4. Develop Capabilities

Development capability refers to the potential ability of an enterprise to expand its scale and strength, also known as growth capability. It is a comprehensive reflection of profitability, operating capabilities, and debt repayment capabilities. In horizontal comparison with the company's performance in various indicators of its development capabilities is poor, indicating that the reason for its low development capabilities lies not in industry trends but within the company. The technical platform was used to analyze the reasons for the decline in operating profits and owners' equity. The investment income and profit decline trends were consistent, and the change trend of undistributed profits was consistent with the owner's equity decline trend. Explain that undistributed profits are the main factor affecting the decline in owners' equity.

4. Suggestions

The recommendation for the company is to improve its investment income and profitability by increasing the operating net profit margin and conducting a thorough analysis of its investment issues.

Additionally, the company should focus on liability management by increasing the proportion of interest-free liabilities and reducing the share of short-term borrowings among interest-bearing liabilities [10]. It is also advised to closely monitor and expedite the collection of accounts receivable and to optimize cash flow by strategically utilizing accounts payable and advanced receipt. While leveraging tax incentives, the company should align with national policies, expand financing options, foster technological innovation, and reduce cash flow sensitivity [11]. Furthermore, there is an opportunity to maximize the utilization of idle funds through prudent investment decisions.

5. Conclusion

With the rapid development of big data, data has become a crucial strategic resource. The ability to extract valuable information from data—including the skills to collect, analyze, apply, and mine data—has become essential for financial professionals of the future. In the era of big data, companies seeking to improve their previously lagging financial management must adopt big data technologies in their financial operations. Moreover, financial personnel must not only rely on internal company data but also seek to acquire more effective external data. By integrating and analyzing both internal and external data, they can discover potential valuable insights within vast amounts of data. This allows for feasibility analyses for market investments and provides a true, objective, and fair basis for making significant financial decisions regarding operations and investments.

The application of big data technology in corporate financial decision-making follows a design framework of 'data processing, data analysis, data presentation, and data decision-making', which leads to a financial decision-making process that evolves from automation to super-automation, intelligence, and precision. Integrating big data technology with financial decision-making enables the acquisition of richer external data, enhanced data processing and analysis, and more accurate market insights, thus significantly improving the quality and efficiency of corporate financial decisions and providing management with high-quality financial advice. Therefore, enterprises should keep pace with the times and establish appropriate financial models centered around financial decisions to reduce costs, save resources, improve efficiency, and develop scientific financial models for businesses.

The results of this research are particularly beneficial for financial analysts, corporate strategists, and decision-makers, providing them with insights that could lead to more informed and effective financial strategies. Additionally, it helps companies adapt to modern technological advances, positioning them to gain competitive advantages through improved efficiency and precision in financial operations.

References

[1] Lin Yudong. Analysis of financial index stock selection and investment strategies based on Python: A case study of China's stock market from 2009 to 2019. Business News, 2020, (01): 1 - 2.

[2] Wu Yawen. Practical exploration of developing a high school 'Python Programming' curriculum. Yangzhou University, 2019.

[3] Zhao Ze. Research on financial crisis early warning for M New Energy Company under the context of big data. Xi'an Shiyou University, 2020.

[4] CGMA. Big Data: Readying business for the big data revolution. 2014-11-10. http://www.cgma.org/Resources/Report/DownloadableDocuments/CGMA-briefing-big-data.pdf.

[5] Zeng Bihai. Application of Python in industry analysis of listed companies. China Small and Medium Enterprises, 2020, (06): 161 - 162.

[6] Yu Wei. Research on the application of big data technology. Computer Knowledge and Technology, 2013, 9 (22): 5002 - 5003.

[7] Cheng Dan. Application of big data technology in financial revenue and expenditure audit under the financial shared service model at HX Group. Hebei University of Geosciences, 2018.

[8] Sun Xiaolin. Research on the application of big data technology in university financial management. Finance and Accounting Study, 2018, (25): 12+14.

[9] Wang Danmei, Hou Qinghan. Application of a BI analysis system based on big data technology in financial management. International Business Accounting, 2020, (07): 3 - 6.

[10] Chen Qianqian, Peng Tiandian, Zhang Qi. Application of Python technology in Audit Work under the background of big data. China Collective Economy, 2021, (04): 155 - 156.

[11] Shao Guochen. Research on decision support systems and applications based on data mining. Liaoning Technical University, 2005.