

# Research on the Application of Big Data in the Comprehensive Budget Management System of Enterprises under the Background of Business-Finance Integration: A Case Study of Supply Chain Optimization in Watsons Group

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**Abstract.** This paper explores the application of big data technology in modern enterprise comprehensive budget management, particularly how big data can improve the budget preparation, execution and monitoring processes to enhance decision-making quality and business efficiency. Through case analysis, the paper delves into how Watson Group has utilized big data technology to optimize its supply chain management, thereby reducing costs and improving the accuracy and timeliness of budget preparation. The research finds that big data not only enables real-time data analysis for enterprises but also enhances their responsiveness to market changes through predictive models and trend analysis, thereby optimizing resource allocation and risk management. However, the implementation of big data also faces challenges such as data quality, technical difficulties and organizational culture adaptation. The paper suggests that while promoting the application of big data, enterprises should strengthen data security measures, cultivate professional talents, and ensure the smooth integration of technology and business processes through effective change management. Through these strategies, enterprises can better leverage big data technology to improve the overall efficiency of comprehensive budget management and achieve sustainable development.

**Keywords:** Integration of business and finance, comprehensive budget management, big data technology, accounting decision-making, enterprise finance.

## 1. Introduction

With the rapid development of science and technology, the era of Industry 4.0 has gradually arrived. The rise of technologies such as artificial intelligence, big data, and cloud computing has gradually integrated into people's daily lives. For enterprises, the rapid changes in the external environment and the explosive growth of data volume have greatly increased the pressure on their development. The traditional accounting budgeting model clearly cannot meet the development needs of enterprises.

In 2017, the Ministry of Finance issued "Management Accounting Application Guideline No. 802 - Management Accounting Information System", emphasizing that the construction and application of accounting information systems by enterprises can improve the level of budget management. In the same year, the Ministry of Finance issued "Management Accounting Application Guideline No. 200 - Budget Management", also pointing out that the development of information technology provides enterprises with good technical conditions, and enterprises should thereby improve the informatization level of budget management.

In November 2021, the State Council issued the "Outline of the Accounting Reform and Development '14th Five-Year Plan'", elaborating on the key points and development direction of the accounting industry in the next five years. The document pointed out that China's accounting reform and development, based on the successful opening of the transformation and upgrading path in the "13th Five-Year Plan" period, has begun to enter a new stage characterized by transformation and integration, quality improvement and efficiency enhancement in the "14th Five-Year Plan". The opportunities and challenges for accounting reform and development in the "14th Five-Year Plan" period are coexisting. Accounting functions are transforming from the traditional confirmation,

measurement, recording, and reporting to value management and decision support, and the emergence of new technologies and new things such as artificial intelligence and electronic accounting vouchers has brought profound changes to the accounting industry. This transformation emphasizes the application of information and big data technologies in accounting work, especially in comprehensive budget management. The integration of big data and accounting emphasizes the expansion of accounting service functions, on the basis of consolidating the traditional accounting functions of accounting, supervision, and providing high-quality accounting data, achieving better integration with the management of micro entities internally and with macroeconomic management and fiscal management externally.

In December of the same year, the Ministry of Finance issued the first "Accounting Informationization Development Plan", proposing: To serve the overall situation of China's economic and social development and the overall situation of fiscal management work, with the main line of Informationization supporting the expansion of accounting functions, based on standardization, and with digitalization as the breakthrough point, guide and regulate the continuous healthy development of China's accounting information standards, management systems, information systems, and talent construction, and actively promote the digital transformation of accounting, and build a national accounting information development system that meets the requirements of the new era..

## **2. Basic Conception**

### **2.1. Integration of business and finance**

The "Basic Guidelines for Management Accounting" issued by the Ministry of Finance in 2016 clearly stipulates that management accounting should follow the principle of integrating business and finance. The integration of business and finance refers to the organic combination and coordination of the business and finance of an enterprise, integrating the business and finance into one, considering whether the business operations are in line with the development goals of the group from the overall perspective of the enterprise, in order to achieve more efficient operation and management. This concept emphasizes the integration of traditionally separate business and finance departments into a collaborative whole, through closer cooperation and information flow, enabling the enterprise to be more flexible and rapid in responding to market changes and achieving business growth and improvement in management efficiency.

The integration of enterprises is essentially internal cooperation and operation within the enterprise. Through the collaboration of various business departments and the finance department, the effective circulation of resources and information is achieved, fully ensuring the correctness and accuracy of the company's business decisions, ensuring that the company's decision-making content is scientific and reasonable, thereby bringing more benefits to the company. The integration of business and finance can promote effective communication between the company and finance, and the interaction between business and finance is also two-way. For the business departments, throughout the entire process of business operations, there should be business thinking and risk awareness, clearly recognizing that business operations need to create value and profits for the company, control and avoid risks, reduce losses, and also create value. For the finance department, it should delve into business activities, especially moving financial management to the front end of business activities, through data prediction and analysis, feeding back to the business department and the decision-making layer, making the enterprise's management decisions more scientific; at the same time, by grasping the key control points and potential risk points of the business process and implementing targeted improvements, operational risks can be reduced.

### **2.2. Comprehensive budget management**

Comprehensive budget management is a management approach that is based on the enterprise's strategic planning and business objectives, and comprehensively implements the financial and operational planning of the enterprise. This management method emphasizes optimizing resource

allocation and maximizing enterprise value through the participation of all staff and the control of the entire process. Comprehensive budget management is a comprehensive financial management strategy that uses quantitative methods to predict and control the sales, production, expenses, cash flow, financial status, operating results, and investment expenditures of the enterprise over a certain period in the future. This management approach includes business (operational) budgets, financial budgets, and capital budgets, as well as the entire process of budgeting, from goal setting, decomposition, execution control to assessment and rewards and punishments, ensuring the overall arrangement of financial, physical, and human resources. Comprehensive budget management emphasizes the participation of all staff, promotes close interaction between business departments and the finance department, improves the transparency and efficiency of budget execution, and helps enterprises achieve strategic goals, optimize resource allocation, and enhance market competitiveness.

### **2.3. Digital intelligence**

Digitalization is the combination of digitization and intelligence. Digitization refers to the process of using technological means to transform traditional cumbersome textual information into measurable and simple digital information, and then processing this digital information through computer technology. Different from the traditional fragmented service business model of Informationization, digitization is more about systematic changes and reconstructions of business and business models. Intelligence refers to the attribute of things that, supported by technologies such as networks, big data, the Internet of Things, and artificial intelligence, can actively meet people's various needs. Intelligence achieves this through the adoption of advanced technologies and methods, enabling equipment, systems, or services to have intelligent capabilities, allowing them to autonomously learn, analyze, and make decisions to meet user needs and improve efficiency.

Digitalization uses digital technology to empower the upgrade of the finance and treasury management and operation system. Accounting digitalization is a new business model that emerges based on new technologies such as cloud computing, big data, and artificial intelligence, combined with the financial transformation and innovation development under the enterprise's internet model. The goal of digitalization is to conduct modeling and analysis using big data technology, and provide intelligent services through artificial intelligence technology, helping enterprises build efficient and standardized financial management processes, improving efficiency, reducing costs, and controlling risks.

### **2.4. Big Data**

Big data refers to a vast amount of data that is so large that it cannot be extracted, managed, processed, and organized using mainstream software tools within a reasonable time frame to generate information that can assist enterprises in making more effective business decisions. Alibaba Group was the first to introduce the concept of big data in China, but their definition was rather narrow. They believed that big data aimed to collect users' daily behavior records, statistically analyze their preferences and behavioral habits, identify potential customers that match the product or service positioning, and thereby more effectively push and sell to them. The McKinsey Global Institute defined big data as: a data collection that is so large that it greatly exceeds the capabilities of traditional database software tools in terms of acquisition, storage, management, and analysis, featuring four characteristics: massive data volume, rapid data flow, diverse data types, and low value density. In other words, big data is an enormous, high-growth rate, and diverse information asset that cannot be processed using existing mainstream software tools and requires a new processing mode, professional analysis, acquisition, and utilization.

### **3. The application of big data in the field of accounting**

#### **3.1. Data Mining and Data Storage**

Data mining refers to the process of extracting hidden and previously unknown but potentially useful information from a large amount of data. The goal of data mining is to establish a decision model based on past action data to predict future behaviors. In the information age, ERP systems have been adopted by enterprise finance departments. With the significant increase in data resources, the noise within them has also grown. Among the vast amount of data generated, there are many useless and inaccurate data, and the truly usable data for accountants is the accurate part. Under the traditional business model, accountants often need to spend a lot of human and time resources to identify this available data. However, big data technology has data mining capabilities, and accountants can conduct data mining on a large amount of data based on the different business needs of the enterprise, comprehensively grasping user needs, user preferences, market information, enterprise operations, etc.

With the rise of big data, the scale and speed of data faced by enterprises have shown a sharp increase trend. Traditional financial accounting systems and processing methods have been unable to effectively respond to this challenge. The increase in data scale has led to the pressure on traditional financial accounting systems in terms of storage and processing. A large amount of transaction data, customer data, and other related data keep flowing into the enterprise's database, resulting in a sharp increase in data storage demand. By scientifically storing valuable data, the correctness and fault tolerance of accounting information can be ensured, providing convenience for subsequent information processing and data application. However, problems such as data corruption or loss often occur during data storage, which not only restricts accounting work but also affects enterprise efficiency and incurs economic losses for the enterprise. Applying big data technology for data storage can quickly restore lost data and ensure the security and accuracy of data. At the same time, through big data technology, data storage and collection can be integrated, and data storage is completed in the cloud during the collection process, providing convenience for managers. With the expansion of the dimensions of data poor quality, the importance of data storage has become increasingly prominent. Big data technology can fully integrate data information and improve the quality of data storage.

#### **3.2. Data analysis and data prediction**

Data analysis refers to the process of discovering business value from data through analytical methods, including data acquisition, cleaning, processing, modeling, result presentation, value discovery and realization. In accounting work, a large amount of data information is generated, and analyzing these data information undoubtedly requires a time-consuming and labor-intensive task. By introducing big data technology and combining it with cloud computing technology, the system can model and analyze the available data, train mathematical models through machine learning, determine the connections between different data nodes based on users' preferences, and thereby find the important information needed by users. Big data technology enables enterprises to integrate data from various channels, including internal financial data, operational data, external market data, competitor information, etc. This multi-dimensional data set provides a comprehensive data view for enterprises, making data analysis more in-depth and comprehensive. Big data technology can provide real-time or near real-time data processing and analysis capabilities, enabling enterprises to obtain feedback on business activities in real time, quickly identify problems, and promptly adjust strategies.

In the context of big data application, data prediction becomes possible. Through the analysis of a large amount of historical data, big data technology can help enterprises establish more accurate financial prediction models, predicting key financial indicators such as future revenue, costs, and cash flow. At the same time, big data technology can analyze market trends, consumer behavior, etc., predict market changes and consumption trends, and provide data support for enterprises to formulate market strategies. Specifically, the core idea of big data prediction is machine learning. By

constructing appropriate machine learning models, using a large amount of historical data for learning and continuously correcting the models, and comparing them with recent data, determining the correlation and significance between predicted values and observed values, thereby optimizing the most suitable prediction model, and predicting the next period's enterprise financial and accounting data. For example, IBM's Cognos is the result of big data technology application. Cognos Analytics is a leader in business intelligence products, a method for predicting, tracking, analyzing, and presenting quantitative indicators related to business performance. Through data collection, management, analysis, and transformation, data becomes usable information, from which necessary insights and understanding can be obtained, better assisting decision-making and guiding actions, to help enterprise decision-makers make wise decisions at the right time, in the right place.

### **3.3. Auditing and Compliance**

Traditional auditing usually relies on manual sampling, which is not only time-consuming but also prone to be influenced by subjective biases. Big data technology will analyze the entire dataset instead of relying solely on sampling, thereby enhancing the comprehensiveness and accuracy of auditing. Through big data analysis, abnormal patterns in the data can be automatically identified, such as suspicious financial transactions, abnormal account activities, etc. Enterprises can use big data technology to continuously monitor compliance data, ensuring that all business activities comply with relevant laws, regulations, and standards, which is beneficial for auditing institutions to detect fraud earlier. Big data technology supports the realization of continuous auditing, that is, auditing activities can be carried out in real time rather than only starting at the end of the financial year. This helps to promptly identify and solve problems and reduces potential financial risks. The rolling auditing model helps the audited entity supervise its own operational situation during daily operations, and make real-time adjustments to business strategies, which not only gives enterprises more opportunities for correction but also significantly reduces the risk of violation penalties; for auditing institutions, the rolling auditing model can greatly reduce the workload of year-end auditing, improve auditing efficiency, and reduce the error rate of auditing.

## **4. The Application of Big Data in Comprehensive Budget Management**

With the advent of the digital era and the gradual improvement of the market economy conditions, efficient and accurate budget management and decision-making have become one of the core competitiveness of enterprises. With the application of big data technology in enterprises, the tools for comprehensive budget management have become more abundant, and the efficiency and quality of decision-making have been continuously improved.

The integration of big data has significantly enhanced the efficiency of comprehensive budget management of enterprises. By achieving real-time sharing and communication of data, the budget management process is more closely integrated with the actual business. This technology first uses the powerful data collection ability of big data to obtain a large amount of relevant information from both internal and external sources and stores it in cloud databases. When setting budget targets, big data technology utilizes historical and current data, combined with the specific needs of departments and subsidiaries as well as external industry dynamics, to analyze and predict reasonable budget targets. Through the cloud database, each department can access these targets in real time, eliminating the traditional manual transmission process and enabling quick feedback through the platform. Moreover, big data supports the customization of various budget models and real-time monitoring and adjustment of budget execution, ensuring the accuracy and timeliness of budget control. Through these technologies, enterprises not only can set reasonable budget assessment indicators but also can flexibly adjust according to the actual execution situation, greatly enhancing the integration and efficiency of budget management.

#### 4.1. Budgeting

Enhance the data-driven nature of the budget. Big data technology can provide extensive data input for budgeting, including historical financial data, market trends, customer behavior analysis, supply chain dynamics, etc. These data help enterprises understand the business environment at both macro and micro levels, making the budget more in line with actual needs and market conditions. By analyzing these large amounts of data, enterprises can more accurately predict key financial indicators such as sales revenue, costs, and demand fluctuations, making the budgeting process more forward-looking and adaptable.

Improve the accuracy and reliability of the budget. With the help of big data analysis tools, enterprises can deeply explore patterns and trends in historical data and conduct real-time data monitoring, enabling more accurate predictions for the future. For example, using time series analysis, machine learning models, etc., to predict future market demand and price changes, providing scientific basis for budgeting. This not only enhances the accuracy of the budget but also improves the reliability and trustworthiness of the entire budget management system. By leveraging the real-time and flexibility of big data analysis, enterprises can make dynamic adjustments during budgeting based on the latest business situations and market information. This immediate feedback mechanism allows enterprises to respond quickly to external changes and adjust the budget to adapt to new business environments and market opportunities. Dynamic budget adjustments help enterprises avoid outdated budget plans and deviations in budget execution.

Promote collaborative optimization of resource allocation. The big data platform, through centralized management and analysis of data from different departments and sources, promotes information sharing and collaborative work among departments. During the budgeting process, each department can coordinate their budget goals and plans based on shared data, ensuring the consistency of the budget and the overall optimization of enterprise resources. Big data analysis helps enterprises more effectively identify and allocate resources during the budgeting process. Through performance analysis of different business units and projects, enterprises can determine which areas have higher return on investment, thereby prioritizing the allocation of resources to support growth in these areas. Additionally, big data can reveal waste and inefficiencies in resource usage, helping enterprises conduct cost control and efficiency improvement during budgeting.

#### 4.2. Budget execution monitoring

Real-time monitoring and control. Big data technology enables enterprises to conduct real-time budget monitoring, quickly identifying behaviors and results that deviate from the budget plan. Through an integrated data platform, managers can continuously track key indicators such as revenue, expenditure, and inventory levels, and compare them with preset budget targets. This real-time monitoring helps enterprises promptly adjust operations to avoid potential financial risks and resource waste, ensuring the strict and effective implementation of the budget. With the insight provided by big data analysis, enterprises can flexibly adjust budget allocation during the budget execution period. This includes dynamically reallocating or optimizing resources and funds based on the latest business performance, market changes, or other external factors. If the market demand for a certain product exceeds expectations, the enterprise can quickly increase the production budget for that product and correspondingly reduce the budget support for other less-demanding products.

Budget effectiveness evaluation and feedback. Through continuous analysis of a large amount of data, big data tools can assist enterprises in evaluating the effectiveness of budget implementation and providing feedback. This includes identifying which budget strategies have successfully achieved the goals and which need improvement. Additionally, by analyzing the problems and challenges in budget execution, enterprises can optimize and adjust in future budget cycles. Big data technology brings greater control and flexibility to budget management during the execution phase, through real-time data analysis and feedback mechanisms, making budget management more refined, adaptable, and capable of effectively aligning with the strategic goals of the enterprise. This not only improves

financial efficiency but also promotes the optimization of enterprise resource allocation, thereby maintaining a competitive edge in a highly competitive market.

### **4.3. Risk management**

Risk identification and quantification. Big data technology analyzes various internal and external data sources such as market dynamics, customer behavior, economic indicators, etc., to help enterprises identify potential risk factors. These data sources can reflect the current problems of the enterprise at both the macro and micro levels, revealing the risks that may affect the enterprise's finance and business operations. Once potential risks are identified, big data analysis tools can further assist enterprises in quantifying the potential impact of these risks. Through the simulation analysis and prediction models of big data, enterprises can estimate the likelihood of specific risk events occurring and their specific impacts on the enterprise's financial situation. This quantitative method enables budget managers to make more informed decisions on budget allocation and resource allocation regarding risks.

## **5. Case Introduction**

### **5.1. Watsons**

Watsons was founded in 1828 and is a brand under the Watsons Group of Changjiang and Kao Group, focusing on health care and beauty products. Starting as a small pharmacy in Hong Kong, Watsons has grown into a global retail giant over nearly two centuries. The Watsons Group is committed to enhancing customer experience through innovation, including introducing the latest technological solutions, developing e-commerce platforms, and leveraging big data analysis to improve operational efficiency and market competitiveness. The Watsons Group is expanding its global presence by mergers and acquisitions and opening new stores to increase market share.

### **5.2. Introduction to the Traditional Supply Chain Model of Watsons Group**

Before the introduction of the concept of big data, Watsons adopted a traditional logistics model. Its philosophy was still at the "low price" level, and there was a "zero-sum" relationship between Watsons and its suppliers. In terms of inventory management, the enterprise regarded inventory as an asset of the enterprise, and the purpose of procurement was to replenish the inventory. However, a large amount of inventory occupied a lot of funds, slowing down the turnover of working capital and even causing difficulties in turnover, ultimately affecting the normal operation of the enterprise. The drawbacks of Watsons' traditional logistics model in this stage mainly concentrated on the lack of information collection from all parties. Watsons and its suppliers were like isolated information islands, each acting independently, and they only carried out single-stage management, resulting in low efficiency and quality, and also accompanied by significant business risks.

### **5.3. Optimization of the supply chain model of the Watsons Group**

Based on the above issues, the management recognized that the low efficiency of logistics and the supply system hindered the development of Watsons. Therefore, they decided to introduce a mature supply chain management system. The management believed that this system needed to be able to stably support the operation of the stores, while also improving the efficiency of the supply chain, reducing logistics and storage costs, in order to alleviate the financial pressure on the enterprise.

Automatic replenishment and order system. For retail enterprises, "ensuring that shelves are stocked" is one of the effective measures to enhance the competitiveness of the enterprise. The retail philosophy of the Watsons Group emphasizes product diversity and differentiation, so rapid replenishment is an indispensable part of its operation. The introduction of this system enables the POS system of Watsons to automatically settle the sales situation of the day when the stores close their business, and the system will automatically generate replenishment orders based on the sales

situation of the store on that day and send them to the logistics center. Each store will preset its own replenishment standards in the system according to the actual situation, reducing the occurrence of "overstocking" situations. The launch of this system helps stores replenish goods based on actual sales data instead of relying on experience, avoiding instability in inventory due to subjective factors uncertainty or incorrect sales forecasts. The front-end store ordering system transmits data to the ordering system of the warehouse center, and the warehouse center integrates big data to automatically send purchase demands to suppliers, achieving information sharing.

**Warehouse management system.** The Watsons warehouse management system uses barcode automatic recognition technology and wireless networks for data transmission to record and track the various stages of materials in the internal logistics warehouse management process of the enterprise, enabling enterprise logistics managers to comprehensively control and manage inventory goods, effectively utilize storage space, and ensure that materials are used in an advanced-first-out manner, ultimately improving the utilization rate of storage space in the enterprise's warehouse management system and the quality and efficiency of enterprise material management, reducing enterprise costs, and enhancing the enterprise's market competitiveness.

#### **5.4. Big data technology in the supply chain optimization of the Watsons Group: "Cost reduction and efficiency improvement"**

**Financial forecasting and planning.** With the help of big data technology, Watson's Department Store is able to make precise sales and revenue predictions based on historical sales data, market trends, seasonal factors, etc. These predictions play a crucial role in financial budgeting and planning, assisting accountants in fund allocation and liquidity management. Big data technology supports dynamic budgeting and real-time monitoring, allowing accountants to adjust budgets promptly based on the latest business conditions and market changes, ensuring the efficient utilization of resources.

**Cost control and optimization.** By leveraging big data technology, Watson's Department Store can more accurately track and analyze various cost data, including procurement costs, logistics costs, inventory costs, etc. Through in-depth analysis of these data, accountants can identify opportunities for cost savings and formulate more effective cost control measures. Big data analysis helps Watson's Department Store optimize its supply chain management by conducting predictive analysis to determine the optimal inventory levels and logistics routes, reducing inventory buildup and transportation costs, and achieving cost reduction.

**Operational efficiency improvement.** Combining big data technology with automation tools, such as ERP systems, can automate the processing of a large number of accounting tasks, such as invoice processing and account recording, reducing manual operations and improving work efficiency. Big data technology provides accountants and management with rich data analysis and insights, supporting faster and more accurate decision-making, and improving overall management efficiency.

**Risk management.** Through big data technology, Watson's Department Store can analyze and identify potential financial risks, such as credit risk, exchange rate risk, etc. These analyses are crucial for formulating risk prevention and mitigation measures. Big data technology can also help Watson's Department Store conduct financial compliance checks to ensure accounting operations and financial reports comply with relevant laws and regulations, avoiding costs due to compliance issues.

#### **5.5. The Impact of Big Data Technology on the Comprehensive Budget Management of The Watson Group**

By leveraging big data technology, Watsons is able to collect and analyze real-time financial data from its stores worldwide, including sales figures, inventory levels, costs, and profits. This makes the financial reports timelier and more accurate, providing the management with a real-time overview of the financial situation, enabling a more rapid and responsive decision-making process in response to market changes. By analyzing historical sales data, market trends, seasonal factors, and the effectiveness of promotional activities, Watsons can use big data technology for precise sales forecasting. This helps the company optimize inventory management, reduce inventory overstock,

and ensure adequate supply of popular products, thereby improving the efficiency of capital utilization. Big data analysis enables Watsons to identify inefficient links in the supply chain and cost-saving opportunities. For instance, by analyzing transportation and warehousing data, the company can optimize logistics routes and reduce logistics costs. At the same time, big data also enables Watsons to calculate various costs more accurately, thus facilitating more scientific budget management in budget preparation and cost control. Watsons' analysis of a large amount of customer purchase data and online behavior data helps it understand customer needs and preferences. These insights are not only used in the formulation of marketing strategies but also have a significant impact on product pricing, promotional activity planning, and inventory forecasting, among other accounting decisions. Better meeting customer needs also enhances sales efficiency and profit margins. Big data technology has a profound impact on Watsons' budget management, not only making financial reports and forecasts more accurate but also optimizing management processes in cost control, inventory management, and risk management. Through the use of big data technology, Watsons has enhanced the financial management level and market competitiveness of the enterprise.

## 6. Challenges

**Data quality and accuracy.** In the comprehensive budget management of enterprises, the data must be highly accurate and reliable. However, in actual operation, due to the diverse sources of data, including internal and external data, different data sources may have uneven quality issues, and incorrect, duplicated, or incomplete data will affect the results of data analysis and the accuracy of budget management. Ensuring data accuracy requires effective data cleaning and verification processes, which is not only a technical challenge but also an investment in time and cost.

**Data security and privacy protection.** As enterprises' reliance on big data for budget decisions deepens, the risks of data leakage and security attacks also increase. Enterprises need to invest significant resources to protect data security and prevent sensitive financial information from being illegally accessed or stolen. When collecting and analyzing big data, enterprises must comply with relevant data privacy laws and regulations. When handling personal and sensitive data, it is necessary to ensure legality and compliance, protecting the privacy of customers and employees. With increasingly strict data protection laws, enterprises using big data for accounting applications must ensure that all operations comply with the latest legal requirements.

**Technical and talent challenges.** Although big data technology is developing rapidly, in practical applications, enterprises still face challenges in technology integration, data storage, and processing capabilities. How to effectively integrate different data sources and technology platforms is a key issue that enterprises need to solve. Big data analysis requires specific skill sets, including data science, statistical analysis, and machine learning. However, there is a relative scarcity of professionals with these skills, and enterprises face challenges in recruiting and training such talents.

**Organizational culture and change management.** Introducing big data technology may require enterprises to adjust their organizational structure and processes, which requires the support of the corporate culture. In some enterprises, traditional working methods and resistance to change may become obstacles to promoting big data applications. Effectively managing technological changes and business process changes, ensuring that employees accept and adapt to new working models, is the key to successfully implementing big data projects.

## 7. Conclusion

With the rapid development of digitalization and intelligence, big data technology has become an important force driving the innovation of enterprise comprehensive budget management. This article, through in-depth analysis of the application of big data in the accounting field, especially in comprehensive budget management, clarifies its positive impacts on improving budget accuracy,

enhancing decision support capabilities, achieving dynamic budget management, and optimizing resource allocation.

In the case of the Watson Group, the application of big data technology not only optimized supply chain management, reduced operational costs, but also improved the accuracy of financial forecasting and planning. Through real-time data collection and analysis, Watson was able to achieve more flexible budget preparation and monitoring of execution, ensuring the accuracy and timeliness of budget control. Moreover, by integrating internal and external data, Watson enhanced its market responsiveness and competitive advantage, effectively managing business and financial risks.

However, although the application of big data in enterprise comprehensive budget management brings many benefits, enterprises also face challenges in data quality and security, shortage of technology and talent, as well as organizational culture and change management. To address these challenges, enterprises need to establish sound data management and protection mechanisms, strengthen the cultivation and recruitment of data analysis talents, and through continuous organizational culture shaping and change management, promote the in-depth application of big data technology in comprehensive budget management.

In the future, with the continuous advancement of technology and the increasing demand of enterprises for data-driven decision-making, big data will play a more core role in comprehensive budget management. Enterprises should actively explore the use of big data to deepen the integration of business and finance, enhance the strategic and forward-looking nature of budget management, and ultimately promote sustainable development of enterprises in the complex and changing market environment.

## References

- [1] Dai Juan. Challenges and Opportunities Facing Enterprise Financial Decision-making in the Digital and Intelligent Era [J]. *Modern Enterprise*, 2024 (1): 176 - 177 + 192.
- [2] Chen Junxian. Promoting the Integration and Transformation of Business and Finance and Creating Value in the Digitalization Era [J]. *Modern Enterprise*, 2024 (1): 105 - 107.
- [3] Chen Pingfeng. Analysis of the Digital Transformation Path of Management Accounting in the Digital Economy Era [J]. *Audit and Finance*, 2023 (12): 58 - 60.
- [4] Xu Xiaoli, Luo Song. Construction of the Government Accounting Management System in the Digitalization Environment [J]. *Financial Communication*, 2022 (15): 129 - 134.
- [5] Wang Yingjing, Yue Xiaofeng. Financial Management in the Digital Era [J]. *Shanghai Commerce*, 2022 (03): 62 - 63.
- [6] Yue Yu. A Brief Analysis of the Financial Transformation of Small and Medium-sized Enterprises in the Financial Digitalization Environment [J]. *Modern Business Modernization*, 2023 (4): 150 - 152.
- [7] Feng Bianling. Analysis of the Application of Big Data in Accounting [J]. *Chinese Entrepreneurs and Businesspeople*, 2021 (4): 29.
- [8] Zhao Lili. Application of Big Data Technology in Enterprise Accounting Data Analysis [J]. *China Collective Economy*, 2023 (30): 165 - 168.
- [9] Cao Qianqian, Yuan Fang, Qian Yuhang. Research on the Application of Big Data in the Development of Accounting Information Quality in Enterprises [J]. *China Township Enterprise Accounting*, 2021 (2): 129 - 130.