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Enterprise Comprehensive Budget Informatization Management Based on Cloud Accounting and Blockchain Technology

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Abstract: With the continuous expansion of enterprise scale and economic development, the traditional comprehensive budget management lacks strategic guidance and information communication is becoming increasingly prominent, making it difficult to adapt to the needs of enterprise development in the new era. In response to this, research is conducted on modeling time series algorithms based on autoregressive moving average models, and a prediction model based on backpropagation neural networks is also established. And the error variance weighted average method is used to organically integrate two single prediction models to obtain a combined prediction model. A combination forecasting model is utilized to predict and analyze the budget of G Company. The analysis results ia applied to budget management. Finally, based on cloud accounting and blockchain technology, the enterprise budget management is optimized, and a comprehensive budget information management model for enterprises is constructed based on cloud accounting and blockchain technology. The experimental findings denote that after the model is put into use, a total of three projects complete 101.1%, 102.3%, and 106.0% of the budget, all of which are able to achieve the budget goals. The model can effectively improve the accuracy of enterprise budgeting and the effectiveness of budget execution.

Keywords: Cloud accounting; Blockchain technology; Budget management; Backpropagation neural network; Composite model.

I. INTRODUCTION

Although the research on comprehensive budget management (CBM) is currently relatively mature, there is still a significant gap in the importance and application of CBM by enterprises in practice, and it is not deep and widespread enough in practical applications. Compared to foreign countries, domestic enterprises have started comprehensive budgeting relatively late and lack successful experience in local enterprises. There are still areas for improvement in budget management in implementation. It is mainly reflected in the following five aspects: 1, the combination of budget management with enterprise strategy and business activities is not enough; 2, there are inadequate supervision and control of budget execution; 3, the rolling budget mechanism has not been effectively utilized. Rolling budget is a method of dynamically preparing and adjusting budgets based on the completion of the company's early budget goals and the utilization of production capacity; 4, budget analysis and adjustment are not timely enough; 5, there arelow level of informatization and poor data transmission efficiency [3]. The emergence of cloud accounting (CA) has accelerated the process of informatization and modernization of enterprises and the entire value chain. The combination of CA and CBM will change the working methods and various links of CBM in enterprises, break through the development bottleneck of existing CBM, and play an important role in improving the level of enterprise management. Based on this background, a budget prediction model is constructed based on deep learning to provide data basis for subsequent management. Then, a comprehensive budget information management model for enterprises is constructed based on CA and blockchain technology. There are two innovative research points: 1, The organic integration of CA and budget management. 2, A combination forecasting model is used for budget forecasting and it is applied to information management. The study is divided into three parts:

1, In the literature review section, it will explore the current research status of CBM and domestic and international research on CA and blockchain technology, identify the shortcomings of existing research content, and achieve better budget management results.

2, In the method section, it provides a detailed explanation of the technology and management optimization used.

3, In the result analysis section, it will analyze and explore the performance of the constructed model.

II. RELATED WORKS

CBM is an important activity that formulates various budget objectives based on the strategic objectives of the enterprise, uniformly allocates and reasonably arranges various

resources inside and outside the enterprise through the budget, and helps the enterprise carry out various production and operation activities more scientifically and effectively, to achieve the strategic objectives of the enterprise. Gusniati et al. used qualitative research procedures and information collection methods to investigate the fiscal budget of regional qualifications, and proposed suggestions for balancing income and expenditure through observation and interviews to avoid fiscal gaps [6]. Pieralli et al. used an agricultural multi commodity market model to assess the potential consequences of introducing two specific risk management plans used by the United States into the EU Common Agricultural Policy (CAP). The outcomes indicated that the payment of the two risk management plans was sensitive to the reference price and participation share of the plan that triggers support [7]. Migchelbrink et al. established a typology of the role cognition of public managers in participatory budgeting through Q method analysis of public managers in participatory budgeting projects in seven Belgian cities [8]. To understand the knowledge management and budget planning mode of Jambi University, Fitriaty F and others adopted an inferential research design. Structural Equation Modeling (PLS-SEM) was used to analyze data. The findings denoted that the budget planning model would affect the performance and innovation of instructors [9].

The arrival of CA platforms has not only changed people's production, work, learning, and life, but also had a profound impact on various aspects of the traditional accounting industry. Shbail MOA applied the Technology Acceptance Model (TAM) and DeLone and MCLean models to explain the factors that affected the adoption of CA in the financial sector. The results indicated that there was a positive relationship between the support, organizational ability, service quality, and system quality of senior management personnel and the imagery of using CA [10]. Alotaibi et al. collected and analyzed online data through questionnaires to explore the impact of information technology governance on reducing the risk of Kuwait Telecom's CA information system. The findings expressed a positive correlation between the level of information technology and the risk of information management on CA platforms [11]. Effion SA explored the impact of CA on the cost structure coordination of production companies on the Nigerian Stock Exchange. Suggestions were made based on the discussion results, including incorporating CA costs into the management accounting structure and providing training for management accounting personnel [12]. Le O T T et al. collected data from 112 accounting and management personnel in Vietnamese enterprises through a structured survey questionnaire, and then conducted descriptive statistics and multiple regression analysis. The results found that perceived convenience and perceived ease of use have a positive impact on the intention of enterprises to use CA software [13].

Blockchain is a data chain that packages data and code into blocks, and then arranges the blocks into a chain structure according to certain rules. Envelope A E P et al. aimed to determine the determining factors of consumers' intention to adopt blockchain technology in e-commerce, constructed a conceptual framework through TAM, and conducted empirical evaluation. The outcomes indicated that there was no significant correlation between data privacy security and perceived usefulness, as well as between perceived ease of use and consumer adoption intention [14]. Hemalatha EA P used blockchain technology to monitor and protect healthcare data to protect data in hospital IoT devices from unauthorized manipulation and tampering. The outcomes showed that after using this method, the anti attack index value of medical data has increased by 10% [15]. Gupta M et al. proposed a framework for the accuracy of the detection of COVID-19 test kit to ensure that the test kit was verified through various measures, and gave the test history. Among them, licensed blockchain was used for data privacy and security [16]. Demi S et al. provided an overview and discussion on the contribution of blockchain technology to software development, and conducted systematic research. The research findings denoted that the use of blockchain technology as a centralized system could effectively promote the trust of all personnel in the software development process [17].

Based on the above literature, CBM is an important measure to help enterprises achieve sustainable development. The application research of CA is becoming more in-depth, but the research results of applying CA and blockchain technology to budget management are not ideal, and the management effects are uneven. Therefore, the study aims to construct a comprehensive budget informatization management (CBIM) model for enterprises based on CA and blockchain, with the aim of achieving more scientific and reasonable enterprise management.

III. CONSTRUCTION OF A CBIM MODEL FOR ENTERPRISES BASED ON CA AND BLOCKCHAIN TECHNOLOGY

CBM based on CA is a new model, integrating CA concepts such as information sharing and real-time communication, cloud services, cloud computing, and other technologies into CBM, thereby improving the scientific and effective nature of enterprise budget management. The study utilizes CA and blockchain technology, as well as deep learning, to construct a CBIM model for enterprises. This chapter provides a detailed explanation of the technologies used and management optimization.

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A. Budget management prediction based on deep learning

The research object is G, a biotechnology company founded in 2006 and listed on the A-share market in 2018. The study uses its financial decision data from the past three years as a test dataset. When conducting CBM, a more reliable predictive data is needed as the basis for decision-making. To this end, a department budget prediction algorithm based on time series is proposed in the study. Based on the characteristics of departmental budget data series, the time series algorithm is modeled using the autoregressive moving average model (ARIMA). The time series algorithm is mainly applied to dynamically changing discrete data and can analyze and process this type of data. The time series algorithm process is shown in Figure 1.

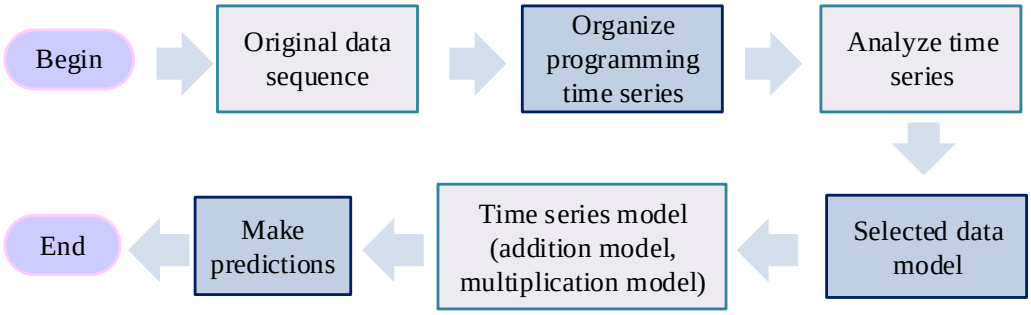

Figure 1 Time series algorithm flow

The time series algorithm requires data to have stability, so the study first uses the time series graph method to test the stability of the data. After the stationarity test, if the data to be processed is a stationary sequence, it is directly applied to the analysis and processing; If the data sequence to be processed is non-stationary, it needs to be stabilized through the method of stationarities. Different stabilization methods should be used for different forms of non-stationary data sequences. The study uses differential operation for smoothing processing, and the calculation method is shown in equation (1).

$$\begin{cases} \nabla x_t = x_t - x_{t-1} \\ \nabla^2 x_t = \nabla x_t - \nabla x_{t-1} \\ \nabla^d x_t = \nabla^{d-1} x_t - \nabla^{d-1} x_{t-1} \end{cases} \quad (1)$$

In equation (1), x_t means the data sequence; ∇x_t denotes the term obtained after making a difference; d expresses the number of differences. Model recognition needs to calculate the sample and partial autocorrelations to determine the practice sequence model. The autocorrelation of sample data is denoted in equation (2).

$$\begin{cases} \hat{\rho}_k = \dfrac{\hat{\gamma}_k}{\hat{\gamma}_0} \\ \hat{\gamma}_0 = \dfrac{1}{n}\sum_{t=1}^{n} x_t^{\,2}, \hat{\gamma}_k = \dfrac{1}{n}\sum_{t=k+1}^{n} x_t x_{t-k}, k = 0,1,2,...,n-1 \end{cases} \quad (2)$$

According to the properties of ARIMA sequenceand partial autocorrelations, the ARIMA model is preliminarily determined. The study recorded the ARIMA model as ARIMA (p, d, q), and after differential processing, the parameter d value is determined. The model is transformed into ARIMA (p, q), and its mathematical expression is expressed in equation (3).

$$\begin{cases} \left(1-\phi_1 L-\phi_2 L^2-...-\phi_p L^p\right) X_t = \left(1+\phi_1 L+\phi_2 L^2+...+\phi_q L^q\right)_t \mu_t \\ \Phi(L) X_t = \Theta(L)\mu_t \end{cases} \quad (3)$$

In equation (3), ϕ expresses a partial autocorrelation; $\Phi(L)$ and $\Theta(L)$ are polynomials of order p and order q of sequence L, respectively; μ_t is a constant. The order of ARIMA model can be preliminarily identified on the autocorrelation of stationary practice sequence, and then the order can be determined by using AIC rule. The AIC function is shown in equation (4).

$$AIC = n\log\sigma^2 + 2\left(p+q\right) \quad (4)$$

In equation (4), n denotes the number of samples of stationary series; σ^2 indicates the sum of squares of fitting residual sum of squares; p and q are parameters, and the values of the two parameters generally do not exceed 2. However, a single ARIMA model still has significant room for improvement in predicting the effectiveness of budget management. Therefore, the study uses a combination prediction model to predict enterprise budget management. In addition to the ARIMA model, the backpropagation neural network (BP) model is chosen as another prediction model in the combination. The network of the BP model is shown in Figure 2.

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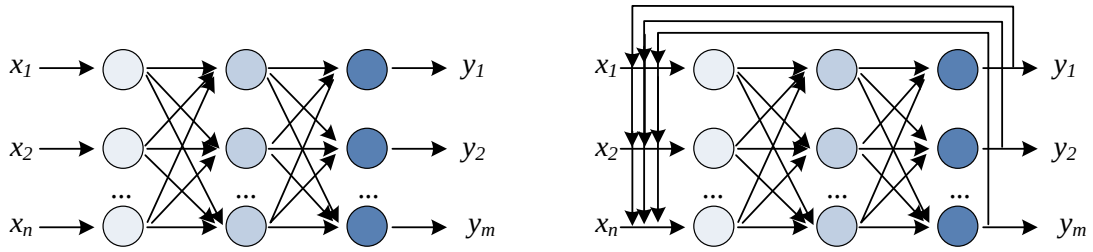

(a)Feedforward neural network (b)Feedback neural network

Figure 2 BP neural network architecture

In BP networks, there are usually one or more hidden layers, and the selection of the number of hidden layers is also a complex problem in the application of neural networks. Equation (5) is utilized to determine the amount of hidden layers and nodes.

$$n_1' = \sqrt{n' + m} + a \quad (5)$$

In equation (5), n' is the amount of input units; m is the amount of output neurons; a is a constant with a value interval of [1,10]. The transfer function determines the connection mode of neurons and plays a crucial role in neural networks. The study selects the S-type logarithmic function Logisig as the transfer function of the prediction model. The input and output control of neurons can be achieved using excitation functions. The excitation functions are divided into two categories: linear and nonlinear. If the excitation function is linear and the output is a linear combination, its practicality is very limited. If nonlinear excitation functions are used, for BP neural networks, nonlinear functions can effectively process data. The study selected the Tanh function as the excitation function of the model. The calculation method is shown in equation (6).

$$f(x) = \frac{e^{x} - e^{-x}}{e^{x} + e^{-x}} \quad (6)$$

To determine the proportion of a single model in the combination forecasting model, the error variance weighted average (EVWA) method is selected to determine the weight. The calculation method is indicated in equation (7).

$$\omega_i = \frac{j}{\sum_{j=1}^{n^*} j} = \frac{2j}{n^*(n^*+1)} \left(i, j = 1, 2, ..., n^*\right) \quad (7)$$

In equation (7), n^* represents the number of single prediction models, and ω_i means the proportion of errors. The weights of each of the two models is determined based on the calculated number of error indicators. The prediction process of the ARIMA-BP combination model is shown in Figure 3.

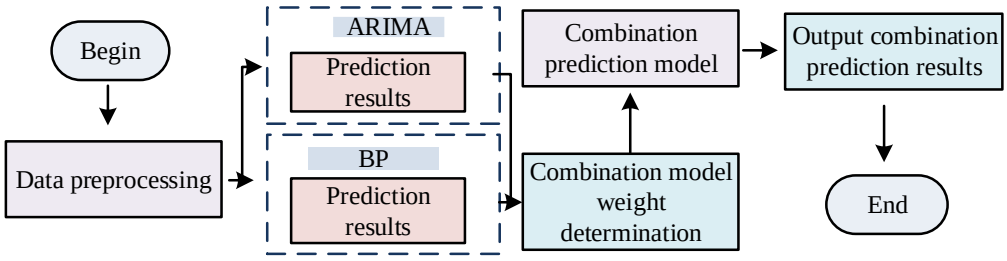

Figure 3 Prediction process of ARIMA-BP combination model

Based on the above operations, the study models time series algorithms using ARIMA and constructs a prediction model for enterprise departmental budgets. At the same time, to improve the accuracy of prediction, a prediction model based on BP is established separately. And the EVWA method is used to organically integrate two single prediction models to obtain a combined prediction model. A combination prediction model is utilized to predict and analyze the budget of G Company, providing data support for subsequent management optimization.

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B. Construction of a CBM system based on CA and blockchain technology

In response to the current situation of enterprise budget management, a new budget management model based on CA has been constructed. In response to the drawbacks of G Company's comprehensive management, the study introduces Yuannian Technology to build a CBM system based on CA. The overall framework of the system is shown in Figure 4.

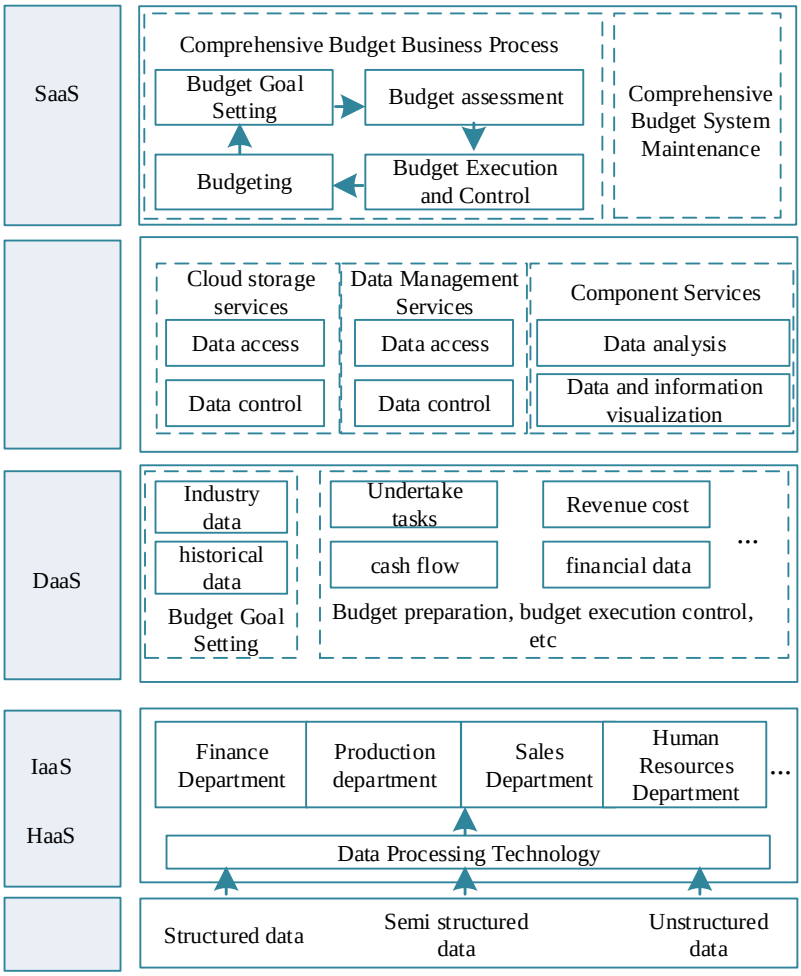

Figure 4 Overall framework of CBM system

The CA CBM system of Company G consists of five levels: Iaas, Haas, Daas, Paas, and SaaS. The Iaas and Haas layers jointly provide network infrastructure and hardware resources for implementing data processing technologies such as data mining and warehousing. The Daas layer serves as the data processing center for the entire company, integrating various structured and semi-structured data generated by various subsidiaries and software systems under the company into the CA platform for management. The Daas layer analyzes and manages company historical data such as revenue and expenses, as well as industry data, through data mining and other technologies. The basic data constructed by departments such as finance, production, and sales is stored in the Daas layer. The Pass layer is the carrier for the operation of cloud storage, data management, component services and other functional modules, and has three main functions: development and testing, system operation, and operation and maintenance. The Saas layer utilizes the Internet to provide visual operating interfaces and interaction platforms to some employees through intelligent mobile terminals. Users can use this to carry out CBM work.

To ensure the approval efficiency of the CA software and the authenticity of the data, and realize the real-time supervision of financial funds, it is studied to build an alliance chain through the application of the consensus mechanism of the blockchain. Through the nodes deployed by various organizations, the blockchain is used to carry out seamless communication between organizations and synchronize data. Secondly, the non-tampering feature of blockchain is applied to manage the uplink data, ensuring that it cannot be tampered with from the moment it is generated, truly ensuring data security. This system needs to provide an early warning mechanism to alert for data tampering, improve monitoring mechanisms, and ensure data security. Thirdly, it applies

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blockchain to establish an alliance chain to trace and verify data on the chain. It ensures the authenticity, reliability, and security of data from the source.

Based on management requirements and business status, G Company needs to improve budget and accounting related business processes, as well as optimize application management. Research is focused on optimizing and transforming the original budget management, accounting management, and decision analysis at three levels to build an integrated management solution for G Company's finance, budget, and accounting. Before constructing a budget management system, it needs to study the construction of a 4-level budget management system based on the company's management requirements and budget status, as displayed in Figure 5.

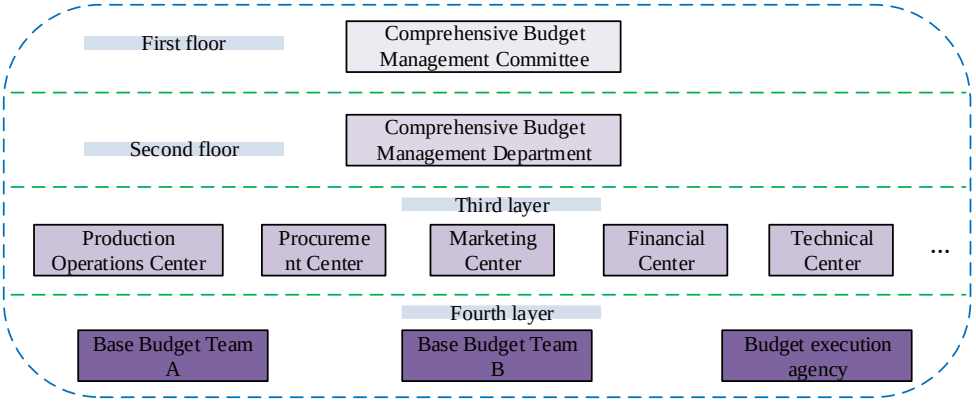

Figure 5 Diagram of level 4 budget management system

After improving the organizational structure of CBM, research is conducted to optimize the management process. Through backwashing the group's business characteristics and management needs, the company's CBM is ultimately decomposed into scenario simulation, viscosity budgeting, monthly budgeting, budget analysis and budget control processes.

The scenario simulation function uses a target simulation model that combines supervision, supply, production, and sales to develop the overall budget goals of the group and subdivide them. Research will decompose the annual budget into two business models: the annual budget for industrial products and the annual budget for fast-moving consumer goods. The CBM system will construct an annual budget preparation model based on dimensions such as production, supply, and sales. After determining the annual budget goals, it breaks them down into monthly budgets and establishes a rolling budget model on a monthly basis. The budget analysis process is indicated in Figure 6.

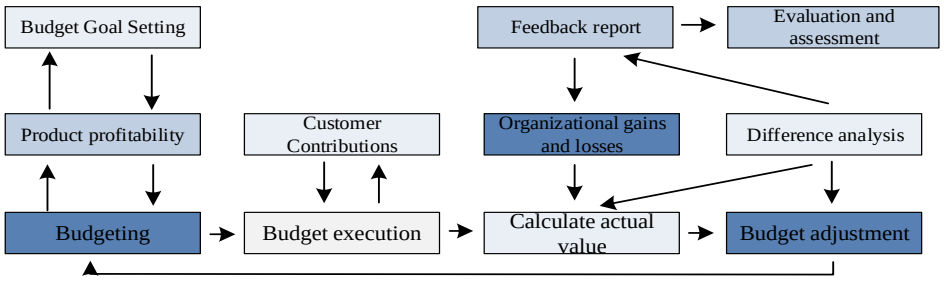

Figure 6 Budget analysis process

Budget targets in a timely manner is adjusted based on the budget forecast results described in the research, as well as the monthly and annual budget execution status. In addition, research has been conducted to set alert values for expenses and expenditure items in the system according to relevant regulations in guidance documents such as the CBM Manual. A control mechanism is established for pre-application, in-process approval, and post evaluation. The research uses the CA software to optimize the budget control process. All budget work of employees can be executed through the CA software, which makes the execution process more standardized and improves the execution efficiency of expenditure projects.

Based on the above operations, this study predicts partial budgets based on deep learning and applies the predicted

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results to the subsequent CBM process. Research has been conducted to optimize the budget management process of G Company using CA and blockchain technology, and corresponding budget management systems have been constructed.

IV. APPLICATION EFFECT AND PERFORMANCE ANALYSIS OF THE CBM MODEL

To obtain accurate budget prediction results, the ARIMA-BP combination model was studied and constructed. To test the improvement of the prediction effect of the combination prediction model compared with the single model, the ARIMA prediction, BP and ARIMA-BP combination models were used to predict the same data, and the prediction results were compared with the actual results. The predicted comparison results are shown in Figure 7.

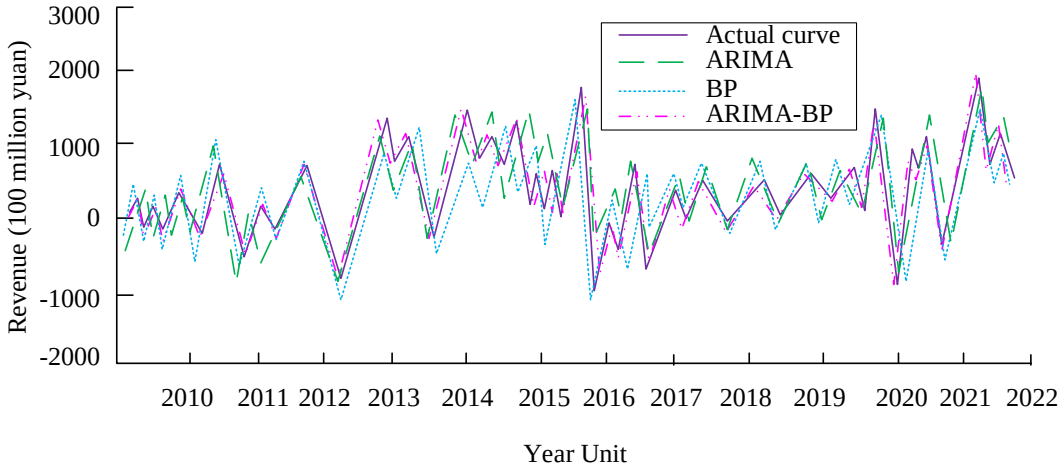

Figure 7 Comparison of prediction results between single prediction model and combined prediction model

ree models was basically consistent, with the ARIMA-BP combination model having the highest fitting degree with the actual curve. The mean absolute deviation (MAD) of ARIMA-BP prediction was 1.96%, and the average absolute percentage error of two single prediction models was 4.12% and 3.45% respectively. From this, the prediction accuracy of the combination prediction model was higher than that of a single prediction model, and the ARIMA-BP combination model had more stable prediction performance.

When constructing a combination prediction model, the study selected the EVWA method (Method 1) to determine the model weight. To test the rationality of the weighting method used in the study, it was compared with the equal weight method (Method 2), the reciprocal error weighted average method (Method 3), and the prediction results of the weighted combination model. The evaluation indexes included: MAD, root-mean-square deviation (RMSE), and prediction accuracy. The comparison results are denoted in Table 1.

TABLE 1. PERFORMANCE COMPARISON OF COMBINATION PREDICTION MODELS UNDER DIFFERENT WEIGHTING METHODS

Project	weight		MAD	RMSE	Accuracy (%)
	ARIMA	BP			
Method 1	0.33	0.67	1.89%	2.49	98.48
Method 2	0.50	0.50	2.94%	5.68	92.74
Method 3	0.42	0.58	2.81%	4.24	93.12

In Table 1, the MAD value of Method 1 was 1.89%, which was reduced by 1.05% and 0.92% compared to the other two methods, respectively; The RMSE value of Method 1 was 2.49, which was reduced by 58.20% and 41.28% compared to the other two methods. The prediction accuracy of the combination model constructed by Method 1 was 98.49%, which was significantly better than the other two methods. From this, the weighting method selected in the study could maximize the advantages of two single prediction models and achieve more accurate budget predictions.

Test the performance of the CBM model designed by the research institute, the experiment applied the model to the simulation software, used the budget management model for enterprises, and used four indicators, namely, sales gross

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margin (SGM), sales profit margin (PMoS), return on equity (R), and total return on assets (TRoA), to show the profit changes of G Company within 10 years (2012-2020) of implementing the model, as shown in Figure 8.

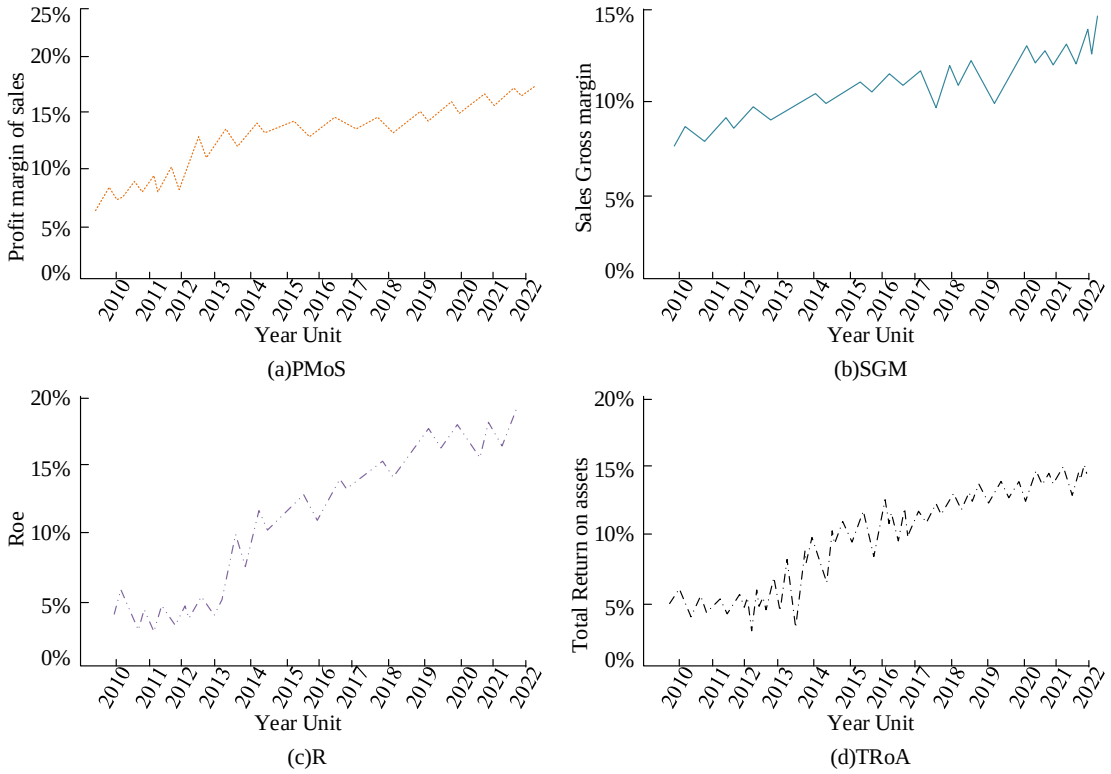

Figure 8 Changes in various indicators of profitability after enterprises put the model into use

In Figure 8, after the implementation of the new budget model from 2012 to 2015, all indicators showed an increase and gradually maintained a stable level. In 2020, the enterprise SGM increased by 5.72% compared to before using this model; PMoS has increased by 3.78% compared to before using this model; And the R value increased by 12.44%; The value of the TRoA indicator increased by 7.17%.

Solvency refers to the ability of enterprises to repay long run and short run debts with various assets. The current ratio (CR), quick ratio (QR), equity ratio (ER) and asset liability ratio (ALR) were taken to reflect the solvency of G Company after using this model. The changes in each indicator are indicated in Figure 9.

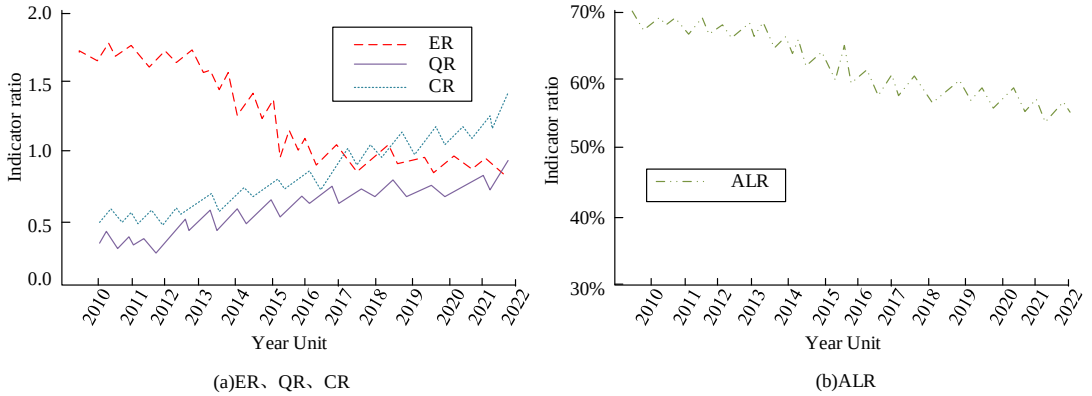

Figure 9 Changes in debt repayment ability of enterprises after applying the model

In Figure 9, before using this model, both ER and ALR reached high levels, while CR and QR were both low, indicating a weaker debt paying ability of the enterprise. With the implementation of the CBM model designed by the research institute, CR and QR of enterprises have been continuously and rapidly improving since 2013, with an

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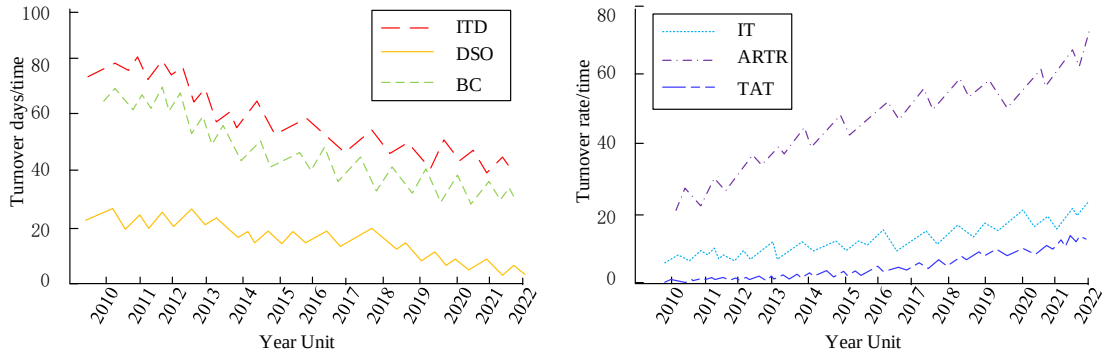
increase of nearly 80% compared to before in 2020; ER and ALR gradually decreased by 50% and 15% as the model was put into use. Based on the content of Figure 9, the CBM model has significantly improved the debt paying ability of enterprises.

Operational capability refers to the ability of an enterprise to comprehensively utilize various assets such as human, material, and financial resources to obtain profits. The study selects inventory turnover (IT), accounts receivable turnover ratio (ARTR), total asset turnover (TAT), inventory turnover days (ITD), accounts receivable turnover days (DSO), and business cycle (BC) to measure the change of company G's operating capacity, as shown in Figure 10.

From Figure 10, after the implementation of this budget management model by Company G, IT, ARTR, and TAT showed an overall upward trend, with increases of 121.43%, 158.57%, and 50.64%, respectively; ITD, DSO, and BC showed an overall downward trend, decreasing by 16.34%, 50.34%, and 15.34%, respectively. This indicated that the new budget management model has accelerated the turnover speed of assets such as inventory, funds, and accounts receivable in G company, while optimizing the allocation of resources and strengthening the effective management of various assets.

To test the ability of the model to improve the accuracy of budget preparation and the effectiveness of budget execution, the study recorded the specific situations of several projects that the company came into contact with after using the model, and compared the project execution before and after using the model. The details are shown in Table 2.



(a)ITD、DSO、BC (b)IT、ARTR、TAT

Figure 10 Changes in the operational capacity of enterprises after the model is put into use

TABLE 2. BUDGET PREPARATION AND EXECUTION STATUS OF ENTERPRISES BEFORE AND AFTER MODEL INVESTMENT

Project	Before use				After use			
	Opening balance	Increase in current period	Budget amount	Difference rate	Opening balance	Increase in current period	Budget amount	Difference rate
1	-	9945411	55335895	17.9%	9945411	55346444	64563226	101.1%
2	15056733	12453467	24665432	111.5%	14265434	23456743	36874358	102.3%
3	7323454	8445632	68432895	23.1%	15365433	26544451	39535624	106.0%

From Table 2, before the enterprise put into use the CBM model, the budget preparation was relatively rough, with low accuracy, and a high difference rate in budget execution. Project 1 and Project 3 actually only completed 17.9% and 23.1% of the budget, far below the budget level. After being put into use, all three projects achieved 101.1%, 102.3%, and 106.0% of the budget targets, all of which were able to achieve the budget goals. Based on the content of Table 2, this model could effectively improve the accuracy of enterprise budget preparation and the effectiveness of budget execution.

V. CONCLUSION

The arrival of CA platforms has not only changed people's production, work, learning, and life, but also had a profound impact on various aspects of the traditional accounting industry. A budget prediction model was constructed based on deep learning to provide data basis for subsequent management. Then, a CBIM model for enterprises was constructed based on CA and blockchain technology. The experimental findings indicated that the MAD of ARIMA-BP prediction was 1.96%, which was 2.16% and 1.49% lower than the average absolute percentage error of the two single prediction models respectively. The prediction accuracy of the

combination prediction model was higher than that of a single prediction model, and the ARIMA-BP combination model had more stable prediction performance. The prediction accuracy of the combination model constructed by Method 1 was 98.49%, which was significantly better than the other two methods. The weighting method selected in the study could maximize the advantages of two single prediction models and achieve more accurate budget predictions. After the implementation of this budget management model by Company G, IT, ARTR, and TAT showed an overall upward trend, with increases of 121.43%, 158.57%, and 50.64%, respectively; ITD, DSO, and BC expressed an overall downward trend, decreasing by 16.34%, 50.34%, and 15.34%, respectively. The enterprise SGM has increased by 5.72% compared to before using this model; PMoS has increased by 3.78% compared to before using this model; And the R value increased by 12.44%; The value of the TRoA indicator increased by 7.17%. From this, the investment in the model had a positive impact on enterprise performance. All three projects completed 101.1%, 102.3%, and 106.0% of the budget, all of which were able to achieve the budget targets. At present, the practical application of CA is still in its initial stage, and it is difficult to grasp detailed data on the scale of CA and CBM applications. In future research, it is necessary to continuously deepen and optimize the model.

REFERENCE

[1] F. E. Kayode, A M. Tunrayo "Management of sports budgeting on maintenance of facilities in Kwara State Sports Council, Nigeria". Indonesian Journal of Sport Management, 2022, 2(1): 7-15.

[2] Н. Гавкалова, Л. Акімова, А. Зілінська, С. Лукашев, Л. Аведян, О. Акімов, "Functioning of united territorial communities and identification of main problems of organizational support of local budget management. Financial and credit activity problems of theory and practice, 2022, 2(43): 107-117.

[3] Z. Alrawadieh, D. Guttentag, M. Aydogan Cifci, G. Cetin, "Budget and midrange hotel managers' perceptions of and responses to Airbnb: evidence from Istanbul". International Journal of Contemporary Hospitality Management, 2020, 32(2): 588-604.

[4] Raewf M. B., Jasim Y. A. Information technology's impact on the accounting system. Cihan University-Erbil Journal of Humanities and Social Sciences, 2020, 4(1): 50-57.

[5] J. Jermias, Y. Fu, C. Fu, Y. Chen, "Budgetary control and risk management institutionalization: a field study of three state-owned enterprises in China". Journal of Accounting & Organizational Change, 2023, 19(1): 63-88.

[6] P. Gusniati, N. R. B. Rahmani, "Analysis of the Role of the Regional Inspectorate in the Budget Management Review on the Implementation of the Deli Serdang Regency APBD". Journal of Indonesian Management (JIM), 2022, 2(2): 363–366.

[7] S. Pieralli, I. Perez Dominguez, C. Elleby, T. Chatzopoulos, "Budgetary impacts of adding agricultural risk management programmes to the CAP". Journal of Agricultural Economics, 2021, 72(2): 370-387.

[8] K. Migchelbrink, S. Van de Walle. "Serving multiple masters? Public managers' role perceptions in participatory budgeting." Administration & Society, 2022, 54(3): 339-365.

[9] F. Fitriaty, D. Elliyana, T. A. Lubis, "The Relationships among Lecturers' Performance, Knowledge Management, Budget Planning Models and Innovation: Evidence from Three Universities in Jambi". Indonesian Research Journal in Education| IRJE|, 2022, 6(2): 206-221.

[10] M. O. A. Shbail. "Cloud-Based Accounting Adoption in Jordanian Financial Sector". Journal of Asian Finance Economics and Business, 2021, 8(2):833-0849.

M. Z. Alotaibi, M. F. Alotibi, O. M. Zraqat, "The impact of information technology governance in reducing cloud accounting information systems risks in telecommunications companies in the state of Kuwait". Modern Applied Science, 2021, 15(1): 143-151.

[12] Effiong S A, Udoayang O, Davies S D. Cloud Accounting Costs and Cost Structure Harmonization in Manufacturing Firms. Test Engineering and Management, 2020, 83(4):24307-24321.

[13] O. T. T. Le, Q. M. Cao, "Examining the technology acceptance model using cloud-based accounting software of Vietnamese enterprises". Management Science Letters, 2020, 10(12):2781-2788.

[14] A. E. P Envelope, G. P. Envelope, L. P. Envelope, "Determinants of consumers' adoption intention for blockchain technology in E-commerce – ScienceDirect". Journal of Digital Economy, 2022, 1(2):89-101.

[15] E. A. P, "Hemalatha. Monitoring and Securing the Healthcare Data Harnessing IOT and Blockchain Technology". Turkish Journal of Computer and Mathematics Education (TURCOMAT), 2021, 12(2):2554-2561.

[16] M. Gupta, V. Kumar, V. Yadav, et al. "Proposed Framework for Dealing COVID-19 Pandemic Using Blockchain Technology". Journal of Scientific and Industrial Research, 2021, 80(3):270-275.

[17] S. Demi, R. Colomo-Palacios, Mary Sánchez-Gordón. "Software Engineering Applications Enabled by Blockchain Technology: A Systematic Mapping Study". Applied Sciences, 2021, 11(7):2960-2960.

[18] C. Batt, P. Rikhardsson, T. Karlsson, "Exploring the impact of organizational context on budgeting". Corporate Ownership and Control, 2021, 18(4): 134-151.

[19] M. Barma, U. M. Modibbo, "Multiobjective mathematical optimization model for municipal solid waste management with economic analysis of reuse/recycling recovered waste materials". Journal of Computational and Cognitive Engineering, 2022, 1(3): 122-137.

[20] Z. Chen. Research on internet security situation awareness prediction technology based on improved RBF neural network algorithm. Journal of Computational and Cognitive Engineering, 2022, 1(3): 103-108.