

Visual Analysis and Prospect of Accounting Information Quality Research based on CiteSpace

Weiting Cai *, Lunzhi Gan

College of Management, Sichuan University of Science & Engineering, Yibin, Sichuan, China

* Corresponding author: Weiting Cai

Abstract: Focusing on the quality of accounting information, this paper uses Citespace software to visualize and analyze relevant domestic literature, and explore the research context and hot trends in the field of accounting information quality in our country. The results show that the main research topics are the discrimination of accounting information quality and its relationship with capital activities, corporate governance and other fields. In terms of hot trends, accounting information quality research related to financial sharing, blockchain, supervision effect, property right nature, intermediary effect, digital transformation, industry and financial integration has become an active topic, and technology-driven accounting information quality has become a new research hotspot. In addition, research on the quality of accounting information related to ESG factors, big data and artificial intelligence is of great potential value.

Keywords: CiteSpace; Accounting Information Quality; Visualization; Hot Trend.

1. Introduction

Accounting information is recorded, processed and transmitted through the accounting system to reflect the financial status of enterprises and business activities of the information, is the basis and pillar of market economy operation. The concept of accounting information quality depends on accounting information. The quality of accounting information determines the credibility and effectiveness of accounting information. With the implementation of the high quality development strategy of our economy, scholars have set off a wave of research on the quality of accounting information, and the related research is increasing day by day. By combing the literature, it is found that the review of the research on the quality of accounting information in China mainly focuses on the discrimination of the characteristics, influencing factors and evaluation system of the quality of accounting information, and does not cover other achievements of the research on the quality of accounting information, such as the impact of the quality of accounting information on other cross-domain factors. The knowledge graph analysis of accounting information quality in China has not been reported, and the hot frontier research is relatively scarce, leaving a vacancy in the quantitative analysis of accounting information quality literature. Therefore, sorting out the hot spots of accounting information quality research and analyzing the evolution trend are of great significance for grasping the future research direction of accounting information quality and promoting the high-quality development of accounting information.

CiteSpace is a visualization software developed by Professor Chen Chaomei and his team, which has the functions of keyword analysis, cluster analysis and spatio-temporal analysis. It can systematically analyze and visually display the research hotspots and frontier trends in a certain academic field. In this paper, CiteSpace software is used to make a comprehensive analysis of the main literature on accounting information quality in China, and to explore the knowledge structure and development trend in the field of

accounting information quality research from multiple perspectives, in order to provide references for related scholars in the future research direction.

2. Research Design

2.1. Research Method

In this paper, CiteSpace6.3. R1 64-bit basic visual analysis software is used to carry out visual analysis of literature co-authors, institutions, keywords and other content. The analysis can dig deep into the relationship between academic literature, find the core literature, authors and institutions in related fields, identify research hotspots, and predict the frontier trends of research.

2.2. Research Sample

In this paper, the database of CNKI is used as the source of literature data, and the academic journals, featured journals and academic journals are searched with the quality of accounting information as the main topic. As of December 30, 2023, the source category is limited to Peking University Core and CSSCI. According to the above establishment conditions, 1805 relevant literatures were retrieved, and then the first literature screening was carried out to remove the literatures unrelated to the research, such as reviews, conferences, newspapers, news, reviews, etc., and 1786 literatures were obtained. The data were imported into CiteSpace for the second screening, and a total of 1720 literatures that could identify the publication date were used as research samples.

3. CiteSpace Data Result Analysis

3.1. Analysis of the Number of Publications, Authors and Institutions

3.1.1. Analysis of the Number of Documents Issued

With the help of CiteSpace, the number of documents published in the study of accounting information quality in China over the years has been sorted out, as shown in Figure 1.

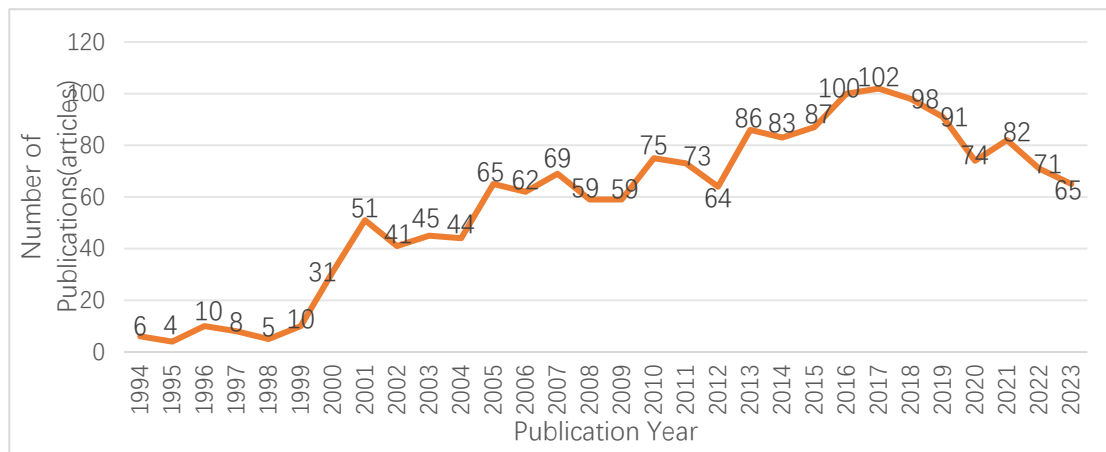


Figure 1. Number of publications on accounting information quality research in China from 1994 to 2023

The number of annual publications can intuitively show the development dynamics and potential trends of the research field. As can be seen from the changes in the number of publications shown in Figure 1, the research literature on the quality of accounting information in China was published in 1994, showing a three-stage development trend. The period from 1994 to 1999 was the initial development period. Although there were researches in this stage, the annual publication volume was less than 10. The period from 2000 to 2018 was a period of rapid development, during which the number of published documents increased rapidly and reached its peak in 2017. After the development of this stage, the quality of accounting information attracted extensive attention from Chinese scholars. The period from 2019 to 2023 is a stable development period, and the number of published papers in this stage is still at a high level although it has declined. The quality of accounting information directly reflects the credibility and effectiveness of financial reports, and then affects the trust and decision-making of stakeholders, and its importance determines that it is the long-term focus of attention in related fields.

3.1.2. Author Analysis

In CiteSpace, set the time as 1994-2023, time slice as 1 year, node type as co-author, g-index parameter $k=8$, clipping mode as Pathfinder and each time period, and other parameters are set by default, the network density is 0.0009, and the number of nodes is 245. The co-occurrence map of authors with 27 connections (omitted). Nodes represent authors, meaning a total of 245 authors participated in the study, indicating a large number of researchers in the field. The number of lines represents the frequency of cooperation between authors, and 27 lines show the relative sparsity of cooperation relationship compared with 245 nodes. The density of the network reflects how closely the nodes are connected. The network density is only 0.0009, which further indicates that connections between nodes in the network are sparse and there are relatively few cooperative relationships between nodes. On the whole, domestic scholars' research on the field of accounting information quality shows an obvious trend of "independent combat", and a large scale cooperation network has not been formed. Scholars need to strengthen academic exchanges and cooperation.

According to the calculation formula of Price's law: the minimum number of published papers by the core author = the square root of the number of published papers by the most productive author multiplied by 0.749, the result is 1.67 papers, rounded up to 2 papers. The authors with two or more

publications are the core authors, and there are 49 of them, who have made important contributions to the research on the quality of accounting information in China and have shown great influence in related fields. However, the number of papers published by core authors only accounted for 6.4% of the total number of papers in the sample, indicating that the field of accounting information quality needs to further play the leading role of core authors in "continuous breakthrough" to promote the in-depth development of academic research.

3.1.3. Analysis of Issuing Institutions

In CiteSpace, the node type was set as institution, and other parameters were set in accordance with the parameters analyzed by the author. The cooperative co-occurrence map of institutions with network density of 0.0031, number of nodes of 220, and number of connections of 75 was obtained (omitted). Nodes represent institutions, and the number of connections represents the frequency of cooperation between institutions. This indicates that there is a significant number of research institutions involved in the partnership, but not all institutions are closely linked, and some of the cooperation between institutions may be more peer-to-peer, rather than forming a tight network structure.

According to the calculation formula of Price's law: the minimum number of papers issued by the core institution = the square root of the number of papers issued by the most productive institution multiplied by 0.749, the result is 3.75 papers, rounded up to 4 papers. There are 35 core institutions with 4 or more publications, accounting for 21.74% of the total number of publications. Among them, Shanghai University of Finance and Economics, Dongbei University of Finance and Economics, Wuhan University, Southwest University of Finance and Economics, and Xiamen University ranked the top 5 in the number of publications, and these institutions play an important role in the field of accounting information quality. Strengthening cooperation between institutions can increase the network density and intermediary centrality, so as to play a leading role more effectively and promote the continuous progress and development of research in the field of accounting information quality. However, the degree and scope of cooperation between domestic core institutions still need to be further expanded and deepened.

3.2. Research Topic Analysis

Keywords can not only summarize the content of literature, but also reflect the common concern of scholars. Keyword clustering map is to cluster keywords in literature according

to their similarities, focusing on the similarity between keywords and the division of research fields to show the correlation between keywords and research hotspots. Generally speaking, if the value of network module $Q > 0.3$ in the graph, the network structure is considered significant. The average contour value $S > 0.5$ and the closer it is to 1, the more reliable the network is considered to be.

In CiteSpace, the node type was set as the keyword, and other parameters were set in accordance with the analysis parameters of the author. LLR algorithm was selected for cluster analysis, and the keyword clustering graph (Figure 2) and the list of clustering label words (Table 1) were obtained.

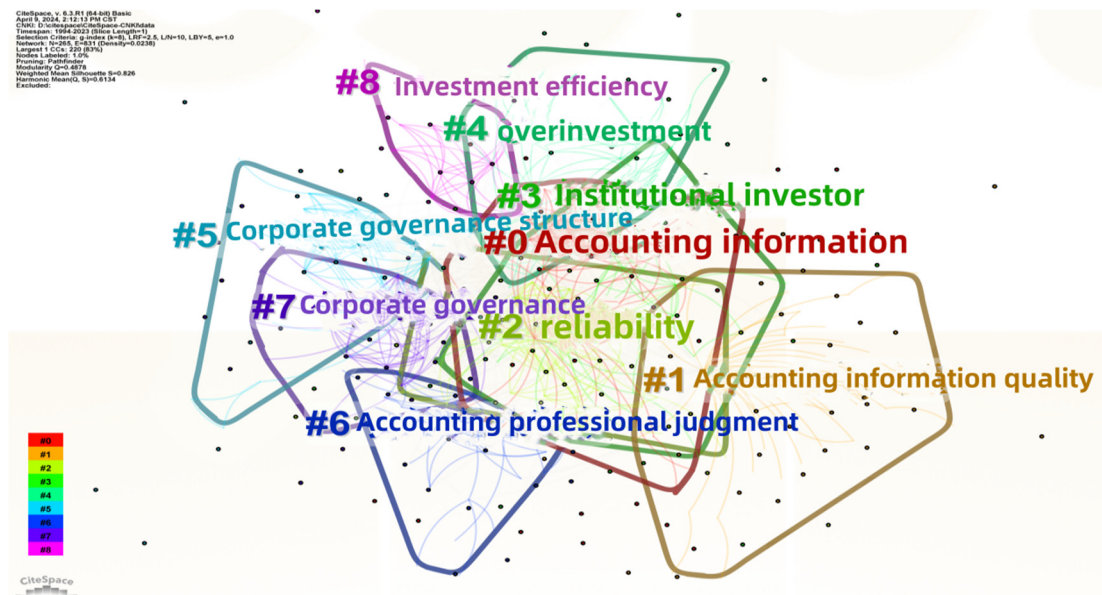


Figure 2. Keywords clustering map

Table 1. Cluster Label Word List

Cluster No.	Cluster Label	Cluster Size	Label Words
0	Accounting Information	35	Accounting information, Information quality, Internal control, Accounting information quality, Mediating effect
1	Accounting Information Quality	34	Accounting information, Accounting information quality, Information quality, Listed companies, Quality
2	Reliability	28	Reliability, Relevance, Earnings management, Listed companies, Cost of debt financing
3	Institutional Investors	26	Institutional investors, Stock price synchronicity, Field research, Heterogeneity, Audit fees
4	Overinvestment	26	Overinvestment, Underinvestment, Financing constraints, Capital allocation efficiency, Asset collateralizability
5	Corporate Governance Structure	21	Corporate governance structure, Property rights, Accounting behavior, Enterprise informatization, Accounting responsibility entity
6	Accounting Professional Judgment	20	Accounting professional judgment, Accounting standards, Accounting information distortion, Value relevance, New revenue recognition standard
7	Corporate Governance	18	Corporate governance, Ownership structure, Quality, Strategy, Board characteristics
8	Investment Efficiency	12	Investment efficiency, Measurement noise, Quality change, CFO power, Executive compensation contract

Due to the large amount of data, 46 clusters and 9 cluster labels were obtained (see Figure 2). The results of cluster analysis showed that $Q=0.4878$, $S=0.826$, indicating that the cluster structure was significant and had high confidence. By analyzing the label words in each cluster, it is found that the research contents of these clusters cross each other, and the research in the field of accounting information quality in China can be further summarized into three themes: accounting information quality discrimination, accounting information quality and capital activities, accounting information quality and corporate governance.

3.2.1. Quality Analysis of Accounting Information

This topic combines the four cluster labels of "accounting information", "accounting information quality", "reliability" and "accounting professional judgment", including the keywords of accounting information, information quality, relevance, reliability, accounting standards, new income standards and so on, and mainly aims at the definition and differentiation of the characteristics of accounting information quality. For example, Qiao Pengcheng and Li Siyu [1] discussed the mechanism of correlation of accounting information quality from the perspective of blockchain. Gao Caixia and Wan Fang [2] emphasize that the

implementation quality of accounting standards will directly affect the quality of accounting information. Wang Yu and Wang Jianxin [3] used the PSM-DID method to research and show that the accounting information of enterprises implementing the new income standard is more comparable.

3.2.2. Accounting Information Quality and Financial Activities

This topic combines three cluster labels of "institutional investors", "overinvestment" and "investment efficiency", including the keywords of institutional investors, overinvestment, underinvestment, investment efficiency, financing constraints, debt financing cost, etc. These literatures are mainly studied in combination with investment activities and financing activities. In terms of investment activities, the first is the direct impact of accounting information quality on investment efficiency. Xiu Guoyi, Yu Liping and Song Liping [4] believe that under-investment and over-investment will lead to low investment efficiency of enterprises, and improving the quality of accounting information disclosure can significantly alleviate enterprises' inefficient investment behavior. Secondly, accounting information quality, as an intermediary variable, has an impact on investment efficiency through other factors, such as the influence mechanism of short loan and long investment, common institutional ownership, mixed ownership reform, etc. In terms of financing activities, the main research is how the quality of accounting information affects financing. For example, Li Yongmei and Bai Xiaojuan [5] confirmed the promoting effect of accounting information quality on enterprise financing behavior by constructing regression models. At the same time, some studies have shown that improving the quality of accounting information by means of digital transformation, auditors' business expertise, and reducing corporate strategic aggressiveness can also effectively improve financing efficiency and alleviate financing constraints.

3.2.3. Accounting Information Quality and Corporate Governance

This topic combines four cluster labels of "accounting information", "corporate governance structure", "corporate governance" and "investment efficiency", including keywords such as internal control, corporate governance structure, corporate governance, equity structure, board characteristics, CFO power, and executive compensation treaty. This paper mainly studies the influence of corporate governance on the quality of accounting information from four perspectives: internal control, ownership structure, board of directors and management. First of all, from the perspective of internal control, factors such as internal environment, risk assessment, control activities, information and communication have a significant impact on the quality of accounting information, and the effective functioning of these factors can significantly improve the comparability of accounting information [6]. Secondly, regarding the impact of ownership structure on the quality of accounting information, scholars selected the proportion of state-owned shares, the proportion of tradable shares, the proportion of the largest shareholder and the HIV index as key indicators in the empirical study, and analyzed the correlation between the nature of ownership, the degree of ownership concentration, the degree of equity balance and the quality of accounting information. Thirdly, from the perspective of the board of directors, the independence, composition, behavior and other characteristics of the board of directors will affect the quality

of accounting information. Accounting background The greater the proportion of independent directors, the higher the quality of accounting information [7], while the insider transactions of board members affect the company's accounting information system, thus reducing the comparability of the company's accounting information [8]. Finally, in terms of the influence of management on the quality of accounting information, factors such as the shareholding ratio of senior executives, the level of executive compensation, and the power of CFO may affect the behavioral choice of management on the quality of accounting information. Excessive power of the management is more likely to manipulate accounting information and thus reduce the quality of accounting information [9]. When executive compensation is reasonably adjusted and improved, earnings management will decrease, which is conducive to improving the quality of accounting information [10].

3.3. Hot Trend Analysis

By analyzing the occurrence frequency, correlation and evolution law of keywords in literature, CiteSpace can reveal the hot trends and emerging directions in the research field. Keyword time series map displays the evolution trend and correlation degree of keywords through the time axis, and reveals the dynamic characteristics of the development of the research field. The keyword emergence map indicates the new trends and hot spots in the research field by showing the keyword groups that appear suddenly or grow rapidly in the research field.

3.3.1. Dynamic Characteristics of Accounting Information Quality Research

On the basis of keyword clustering map, CiteSpace was used to obtain keyword timing map (Figure omitted).

It can be seen from the keyword sequence map that the keywords of accounting information quality, accounting information, internal control and corporate governance have a long continuity and a large time span, and there are related research results almost every year, and they are closely related to other keywords.

The year and duration of keyword appeared showed a three-stage development trend.

1994-2005 is the first stage, that is, the initial development period of the number of documents and the early stage of rapid development. The research focus is mainly related to accounting information, internal control, accounting supervision, accounting system, accounting standards, accounting professional judgment, corporate governance, quality control and other aspects. The research focus of this period is mainly in the field of accounting. Scholars have discussed how to guarantee, supervise and control the quality of accounting information.

The period from 2006 to 2020 is the second stage, that is, the middle and late period of rapid development of the number of documents and the early stage of stable development. The research focus gradually turns to agency issues, new accounting standards, earnings management, investment, financing, nature of property rights, big data, intermediary effect, audit and other related aspects. The research in this period showed the characteristics of comprehensiveness and diversity, involving cross-field research in finance, economics and other fields.

The period from 2021 to 2023 is the third stage, that is, the middle and late stage of the stable development of the number of papers, during which emerging and active topics emerge,

showing the hot spots of future research, mainly related to financial sharing, blockchain, supervision effect, intermediary transmission effect, etc. In the context of digital economy, this period focused on the cross-research of accounting and information technology, reflecting the trend of technology-driven and innovation, and scholars began to explore how to use new technological means to integrate financial resources and improve the quality of accounting information.

3.3.2. Hot Trends of Accounting Information Quality Research

On the basis of the keyword timing map, the keyword emergence map was obtained (Figure 3).

Top 17 Keywords with the Strongest Citation Bursts



Figure 3. The keyword emergence map

On the whole, the property right nature and intermediary effect appear in the latest time, indicating that this is the frontier trend of domestic accounting information quality research. On the one hand, this paper studies the impact of different factors on the quality of accounting information from the perspective of property rights. In this direction, the impact of internal factors such as directors' and senior executives' liability insurance, senior executives' academic experience and internal control on the quality of accounting information under the nature of state-owned and non-state-owned property rights is deeply explored. Zhang Ruigang and Huo Hanwen [11] demonstrated empirically that the introduction of directors' executive liability insurance can improve the quality of accounting information of enterprises, and this effect is more significant in state-owned enterprises. Guo Yuanli [12] found that the academic experience of senior executives in non-state-owned enterprises plays a significantly better role in improving the quality of information disclosure than that of state-owned enterprises. On the other hand, it mainly uses the theory of intermediary effect to analyze the influence mechanism of accounting information quality and other factors. The above literatures from the perspective of property right nature are basically studied using this theory. The introduction of intermediary effect also actively broadens the academic horizon, including cross-disciplinary factors such as employee employment, corporate tax burden, and digital transformation. Wang Liangcheng [13] found that internal control can promote employees' employment by improving the quality of enterprise accounting information; Li Qing and Ma Zehan [14] demonstrated that reducing corporate tax burden can improve the quality of accounting information by reducing financing constraints and agency costs. Shi Daoyuan and Dai Jialin [15] show that digital transformation can promote enterprise innovation by improving the quality of accounting information disclosure. In short, the research on accounting

information quality from the perspective of property right nature and intermediary effect has become more popular in recent times. Researchers can follow this frontier trend and further reveal the complexity and diversity of accounting information quality through in-depth exploration and comprehensive analysis, so as to provide powerful theoretical support and practical guidance for improving accounting information quality, optimizing corporate governance and promoting economic development.

3.3.3. The Trend of Accounting Information Quality Research

This paper further reviews the published literature in 2024 that is not included in visual analysis, and finds that these literature focus on the study of accounting information quality from the perspective of digital transformation and the integration of industry and finance, which is a frontier topic worthy of attention. Digital technologies such as big data, cloud computing and artificial intelligence have changed the generation, transmission and use of accounting information, and the integration of industry and finance requires the seamless docking of business and financial data, which puts forward new challenges and requirements for the quality of accounting information. In addition, the paper notes that there is little existing literature or potential value in the following emerging areas:

(1) ESG factors have gradually become an important indicator to evaluate the comprehensive strength and sustainable development ability of enterprises. However, the research on how ESG factors affect accounting information systems is still scarce. In the future, we can further study how ESG factors specifically affect the disclosure of financial reports and the credibility of accounting information of enterprises, and how these effects are ultimately reflected in the investment decisions and market performance of enterprises.

(2) With the advent of the era of big data, data has become one of the important assets of enterprises. As a new field of data asset accounting, the impact of data collection, processing, management technology and control process on the quality of accounting information is a topic worth studying.

(3) The application of artificial intelligence such as ChatGPT in financial work is also an emerging topic. It is possible to discuss how artificial intelligence changes the processes and methods of financial work, and how these changes affect the generation and use of accounting information, so as to discuss the impact on the quality of accounting information.

4. Conclusion

By using CiteSpace software, this paper visually analyzes 1720 major research literatures on accounting information quality on CNKI, explores the development track of the research field of accounting information quality, and summarizes and extracts the research topics and hot trends in the field of accounting information quality. The results show that: First, from the perspective of the number of published documents, 1994-1999 is the initial development period of China's accounting information quality research, 2000-2018 is the rapid development period, and 2019-2023 is the stable development period. Second, from the perspective of authors and institutions, the distribution of domestic researchers and research institutions is relatively scattered, and the research in

the field of accounting information quality shows an obvious "independent battle" situation, and a large-scale cooperation network has not been formed. Third, from the perspective of research topics, the research topics in the field of accounting information quality in China focus on three aspects: the discrimination of accounting information quality, accounting information quality and capital activities, accounting information quality and corporate governance. Fourth, from the perspective of hot trends, the connection between financial sharing, blockchain, supervision effect, property right nature, intermediary effect and other topics and accounting information quality is a current research hotspot, and the study of China's accounting information quality from the digital transformation, industry and financial integration, ESG factors, data assets, artificial intelligence and other entry points is expected to become a future development trend.

References

- [1] Q. P. Cheng and S. Y. Li, "Research on the path and mechanism of blockchain in improving accounting information quality," *Journal of Accounting and Communications*, no. 11, pp. 15–19+117, 2022.
- [2] C. X. Gao and F. Fang, "Thoughts on promoting high-quality implementation of enterprise accounting standards," *Finance & Accounting*, no. 12, pp. 14–17, 2023.
- [3] Y. Wang and J. X. Wang, "Does the implementation of the new revenue standard improve the comparability of accounting information?," *Accounting and Economics Research*, vol. 37, no. 3, pp. 38–53, 2023.
- [4] G. Y. Xiu, L. P. Yu, and L. P. Song, "Research on the impact of information disclosure quality on corporate investment efficiency," *Friends of Accounting*, no. 1, pp. 127–131, 2019.
- [5] Y. M. Li and X. J. Bai, "Accounting information quality, financing costs, and refinancing," *Friends of Accounting*, no. 4, pp. 44–51, 2020.
- [6] H. T. Guo and H. L. Guo, "Internal control and accounting information comparability: A mediating effect test based on agency costs and information transparency," *Friends of Accounting*, no. 8, pp. 79–86, 2021.
- [7] C. M. Zheng, G. L. Wu, and G. R. Wen, "Can independent directors with financial and accounting backgrounds improve accounting information quality under the ESG framework?—From the perspective of internal control effectiveness," *The Theory and Practice of Finance and Economics*, vol. 42, no. 6, pp. 89–95, 2021.
- [8] D. H. Zhou and X. K. Yang, "Does insider trading affect accounting information comparability?," *Accounting Research*, no. 3, pp. 27–33, 2018.
- [9] F. Huang and L. F. Zhang, "Management power, private relationship between audit committee chair and executives, and accounting information quality," *Journal of Nanjing Audit University*, vol. 17, no. 1, pp. 25–33, 2020.
- [10] R. B. Shen, "Macro environment, executive excess compensation, and accounting information quality," *Journal of Accounting and Communications*, no. 12, pp. 19–23+46, 2018.
- [11] R. G. Zhang and H. W. Huo, "Directors' and officers' liability insurance, ownership nature, and accounting information quality—Based on data from A-share listed companies in Shanghai and Shenzhen," *Journal of Financial Development Research*, no. 9, pp. 77–85, 2022.
- [12] Y. L. Guo, "Research on the impact of listed company executives' academic experience on information disclosure quality," *Journal of Accounting and Communications*, no. 14, pp. 45–49, 2022.
- [13] L. C. Wang, "Internal control and employee employment," *Journal of Xiamen University (Philosophy & Social Sciences Edition)*, vol. 72, no. 6, pp. 67–79, 2022.
- [14] Q. Li and Z. H. Ma, "Research on the relationship between corporate tax burden and accounting information quality," *Journal of Nanjing Audit University*, vol. 20, no. 5, pp. 41–50, 2023.
- [15] D. Y. Shi, J. L. Dai, and S. Q. Jiang, "Corporate digital transformation, accounting information disclosure quality, and corporate innovation," *Finance and Accounting Monthly*, vol. 44, no. 20, pp. 80–87, 2023.