

Evolution Path and Development Trend of Internal Control and Audit Opinion Research: Based on Citespace Knowledge Graph Analysis

Zhi Chen* and Shuanghua Zhuang

Abstract—Since 2000, The Enron incident in the United States that resulted internal control failure of the company, which has aroused the academic attention and Research on internal control and audit activities. There are also many similar cases in China such as the Asiatic incident in 2001 and the changsheng biological incident in 2019, highlighting the importance of the relationship between internal control and audit. In the past related literature on CiteSpace in China, there is a lack of interrelationship between topics, mainly focusing on a single topic. This paper uses CiteSpace visualization software to analyze 2106 articles from China source journal such as CSSCI and Peking University Core from 2010 to 2021 on the theme of whether the effectiveness of internal control affects the relevance of the audit opinion in their annual report. The result shows that the research hotspots on internal control and audit opinion mainly focus on ten aspects of internal control audit, auditor change, audit opinion, audit fees, internal control quality, internal control information disclosure, internal control defects, audit risks, internal audit and certified public accountant audit, and with government regulations stipulating and clearly regulating the responsibility of certified public accountants, internal control and audit opinion are bound to carry out corresponding research and discussion around the participation of certified public accountants, and will also become the focus of researcher in this field for Chinese scholars in the future.

Index Terms—Citespace, audit opinion, internal control, bibliometrics, knowledge map

I. INTRODUCTION

Since 2000, the failure of internal control has led to frequent cases of business failure, such as the Enron incident in the United States, which has attracted the attention and research of domestic and foreign scholars on internal control. In China, Asia incident (2001), Changhong incident (2004), Yaxiya crisis (2006), Wanfu Shengke incident (2013), Zhangzi Island incident (2018), and Changsheng biological incident (2019) are also cases caused by the failure of internal control. Since China issued *The guidelines on internal control of listed companies* to *The basic norms of enterprise internal control* on the Shanghai Stock Exchange in 2006, and since the issuance of audit standards, China has continuously revised them, highlighting the government's concern about internal control and audit opinion. With the increasing attention of academia to internal control and audit opinion, it is necessary to sort out and analyze the relevant literature and research status. This paper selects the relevant literature on

internal control and audit opinion from 2010-2021, and analyzes the research topics, research content changes, keyword highlights and other aspects with the help of CiteSpace visualization tools, presenting the research context and evolution path in the field of internal control and audit opinion in recent years, so as to provide a more critical direction for future related research.

II. LITERATURE REVIEW

In the past, many scholars discussed the relationship between internal control and audit quality or audit opinion. Hammersley *et al.*, 2008 has discussed the relationship between internal control and audit opinion, arguing that the higher the quality of the audit committee of listed companies, the more likely it is to disclose internal control defects, and the greater the possibility that a non-standard audit opinion will be issued on the financial report, which is conducive to the improvement of audit quality. Beneish *et al.*, 2008 shows that the higher the quality of internal control of listed companies, the lower the risk of audit failure faced by the auditor. To a certain extent, it is helpful for certified public accountants to issue better audit opinions. Altamuro and Beatty, 2009 used the internal control objectives as a guide to measure the quality of internal control and found that the high-quality internal control in listed companies improved the quality of financial reporting information, which in turn improved the audit opinions issued by certified public accountants. Bambang Pamungkas *et al.*, 2018 concluded that the weakness of internal control is analyzed by the number of audit findings in three categories, that is, the weakness of internal control structure; the weakness in the control system of revenue and expenditure budgets realization; and the weakness in accounting and reporting control system.

In China, there are relatively few studies on the combination of CiteSpace knowledge graph, an analytical technology, with the field of finance and accounting, and the research methods are relatively simple (Wang, 2019). In 2012, Chinese academics began to study management accounting under the background of big data. And the research hotspots focus on the impact of big data on the functions of management accounting, the impact of big data on the ability needs of management accounting talents, and the impact of big data on the management accounting information, etc. Yang and Gao, 2017 found that the number of management accounting literature showed an upward trend based on CiteSpace visualization tool, but it did not form a scale in literature authors, excellent journals and research institutions. Yu and Gu, 2021 found that the research on internal control in recent 10 years is mainly divided into three stages:

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focusing on theoretical basis research; focusing on corporate value research and focusing on investment and financing research. And that hotspot research on internal control was also focused on the five elements of internal control. Wang, 2020 found that the beginning of domestic research on internal control focused on internal management, during the same period, internal control in the United States focused on corporate performance while reforming its own structure. Yang and Cui, 2021 reveals that the images in the Knowledge Graph visualize trends in audit quality over time, and research into the audit quality literature relating to audit opinions and audit fees remains a popular topic at the moment, with the same types of topics being refined on an ongoing basis. Zhang, 2021 found that the requirements of the era of technological information technology and the influence of enterprise management, for the future of internal audit research to keep pace with the times, from the audit objective positioning, process control and method guarantee and other aspects of self-transformation, so that it can provide new ideas for modern accounting management research. All of the above studies are analyzed and sorted out for a single hot topic, but lack of correlation between topics.

Due to the close relationship between internal control and audit opinion, this paper uses the CiteSpace visualization tool to categories and discuss the relevant literature from the perspective of the relationship between internal control and audit opinion, trying to find out the development trend of future topics and other hot topics, so as to provide reference for relevant research in the future.

III. RESEARCH METHODS AND DATA SOURCE

A. Research Methods

1) Bibliometric analysis

In 1969, A. Pritchard first proposed "Bibliometrics". Since then, bibliometric analysis methods had been widely used. Bibliometric analysis is a mathematical and statistical methods of analysing the quantitative relationship, distribution structure and patterns of change in the literature, evaluating the research status of the literature and its intrinsic patterns, and forecast future trends.

2) Knowledge map analysis

Knowledge map analysis is an analysis method of metrology that uses visualization techniques to describe knowledge and its carriers, to mine, analyze, construct, draw and display knowledge and its relationship, and displays the development process and structural relationship of relevant research as visual images, which can be used to understand and predict the frontier and dynamics of the discipline. By generating visual knowledge maps such as keyword co-occurrence, keyword clustering and emergent words, it presents research hotspots, core themes and evolution process through visual images, providing judgment basis for clarifying the future research direction in this field.

This paper uses Citespace58.R1 software to carry out literature visual analysis, which can avoid the impact of analysts' subjective judgment on the research results and thus enhance the objectivity and scientific validity of the results.

B. Data Sources

This paper adopts the CNKI database, which has a strong authority and representativeness in China. In the advanced search, "internal control" and "audit opinion" were taken as the main research objects, and the period was set from 2010-2021. A total of 2106 CSSCI papers were selected as the literature samples for this paper by reading the title, abstract, keywords and other information of the initial literature one by one.

IV. RESULTS AND ANALYSIS

A. Trends in Internal Control and Audit Opinions Research Results

In this paper, we analyze the trend of the change in the number of 2106 core journal documents from 2010 to 2021, and draws a line chart according to the publication time of the documents. As shown in Fig. 1, it can be seen that the number of research literature published on internal control and audit quality in the past decade has shown an obvious upward trend in 2012 and 2017, This is because the new auditing standards were formally implemented on January 1st, 2012. Therefore, the number of documents issued from 2012 to 2014 has increased, indicating that the promulgation of the new auditing standards has increased the research heat in the audit field to a certain extent.

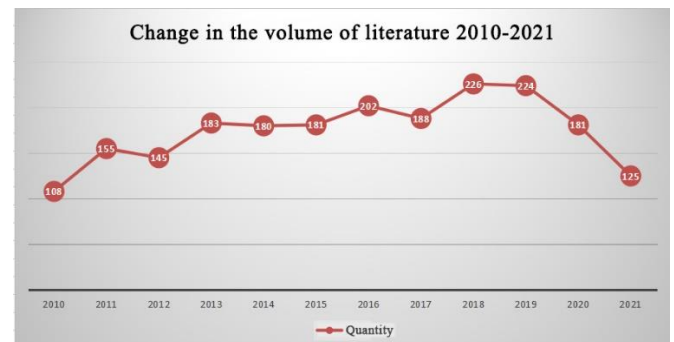


Fig. 1. Change in the volume of literatures 2010 to 2021.

On December 26, 2017, *The auditing standards for Chinese certified public accountants No. 1504 communicating key audit matters in audit reports* was officially promulgated. As a result, the issuance of audit opinions and internal control related documents in audit reports was significantly increased in 2017. In 2019, there is a downward trend in the amount of relevant literature published, indicating that the research field of audit opinions and internal control has become less popular. Considering the numerous instances of global internal control failure resulting in the issuance of non-standard opinions, to a certain extent, it shows that there is still much room for improvement in this field.

To sum up, the update of industry standard has a significant impact on the number of literatures published, and it is a positive stimulus. Researchers should pay attention to the adjustment of industry standard and the direction of update, which will be conducive to the selection of research direction.

B. Keyword Cluster Analysis

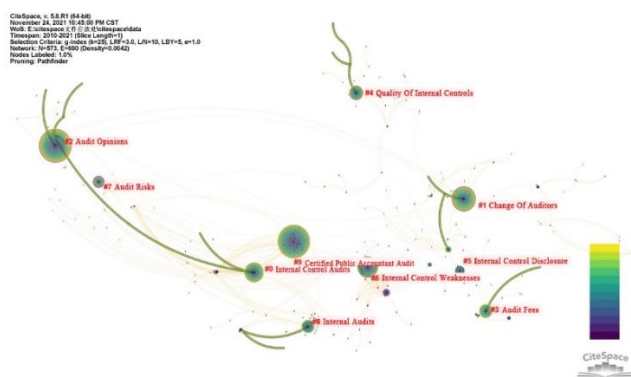


Fig. 2. Keyword clustering map.

As shown in Fig. 2, this study is generated a total of 573 nodes, 690 connections and a network density of 0.0042. Among the keywords captured, there are 10 keywords whose frequency is no less than 5 times, indicating that the research foundation in this field is relatively solid and has initially formed a research hotspot of a certain scale. From the ten key hot research words, we can see the main research directions and the focus of Chinese scholars on internal control related audit opinions in the decade since 2010. Along with the regulations and clear norms of the law of the people's Republic of China on Certified Public Accountants on the audit responsibilities of certified public accountants, China's audit opinions on internal control are bound to carry out corresponding research and discussion around the participation of certified public accountants, which will also become a key research direction in this field.

C. Keyword Co-occurrence Analysis

As shown in Fig. 3, the most of researchers on internal control is mostly based on the existing cases of internal control failures and exploring means of prevention. With the continuous advancement of the research on internal control and audit opinions, the research hotspots began to look deeper into the factors that affect the quality of internal control within enterprises. At this stage, we can see on the graph the keywords "audit opinion", "audit fees" and "nature of property rights" that recent research has focused on the quality of audits. For example, the impact of price controls on the audit fees on audit quality, the impact of the nature of property rights on the internal control and so on. In recent years, the research on internal control and is still the focus.

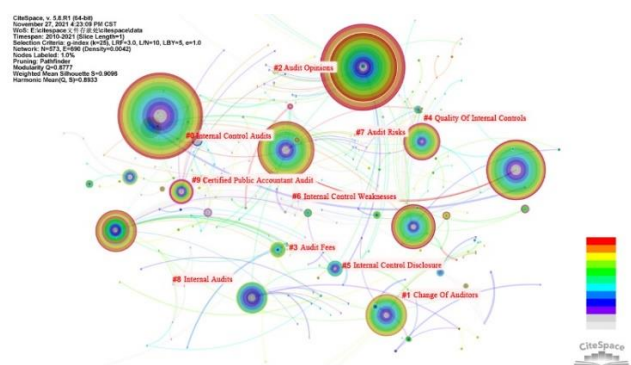


Fig. 3. Keyword co-occurrence map.

D. Keyword Time Zone Analysis

Through the keyword highlighting function of CiteSpace, the results in Fig. 4 are presented, forming the top 20 highlighted keywords in the field of internal control and audit opinion in last 11 years, and the corresponding time range and intensity in which internal control information disclosure, CPA audit, audit failure, audit fees, audit opinions, etc. show the research hotspots in this field in recent years.

Top 20 Keywords with the Strongest Citation Bursts





















Keywords	Year	Strength	Begin	End	2010 - 2021
Internal Control Disclosure	2010	7.78	2010	2014	
Certified Public Accountant Audit	2010	6.47	2010	2011	
Statement Audit	2010	5.9	2010	2011	
Internal control evaluation	2010	5.44	2010	2012	
Relevance	2010	5.41	2010	2013	
Influencing factors	2010	4.5	2010	2013	
Audit Committee	2010	4.1	2010	2011	
Internal Control Report	2010	3.99	2010	2013	
Auditing Standards	2010	3.34	2010	2011	
Empirical studies	2010	4.94	2012	2015	
External Audit	2010	4.18	2014	2018	
Audit Reports	2010	3.68	2014	2015	
Quality of internal controls	2010	4.89	2016	2018	
Internal control audit fees	2010	4.73	2016	2018	
Related party transactions	2010	4.66	2017	2021	
Nature of ownership	2010	4.47	2017	2021	
Audit opinion purchase	2010	4.01	2017	2021	
Audit failures	2010	15.7	2018	2021	
Audit Fees	2010	6.06	2018	2021	
Key audit matters	2010	4.43	2018	2021	

Fig. 4. Keyword time zone map.

Over the past 11 years, the research on internal control and audit opinion has been expanding in breadth and depth, which can be roughly divided into three stages:

First, the stage of internal control information disclosure (2010-2013): This stage mainly studies the influence of enterprise internal control and its related factors under the national institutional norms. Since 2010, the failure of internal control has led to the failure of the company's operation, which has prompted many researchers at home and abroad to step up the research on internal control. Documents such as *The internal control norms*, *The guidance and internal control report management system* all highlight the state's attention to internal control. Although the laws and regulations require the information disclosure of internal control of enterprises to gradually change from voluntary disclosure to mandatory disclosure, most companies lack the awareness of active disclosure, and the information disclosed lacks substantive content, with serious formalism. On this case, the research on internal control information disclosure reaches the peak in this range.

Second, pay attention to the connection stage between internal control quality and audit report (2014-2016): The main representative words in this stage include external audit, audit report and internal control quality. This part is the research on improving the quality of internal control and issuing audit report based on the theory and case study of internal control disclosure.

Third, the research on enterprise internal control is gradually transitioning to the research on audit quality (2017-2021): The more frequent words are audit fees, audit opinions, audit opinion purchase, related party transactions and audit failure. In recent years, the financial fraud cases of domestic

listed companies occur frequently, and the audit failure cases of accounting firms also occur frequently, which has aroused the attention of the public and researchers to the audit quality. The popularity of prominent words such as audit fees, audit opinions and audit failure in recent years may be due to the complexity of the economic business and accounting matters of the auditee, the high level of inherent risk and risk control, the need for certified public accountants to expand the audit scope, the high time cost and the impact on the audit fees and quality. Audit fees are linked to the generation of audit opinions, which also reflects the possible problems in the quality of some audit opinions at this stage. It is understood that now, for some enterprises whose problems are not very serious but have defects, many firms "audit for the purpose of issuing an unqualified audit report". They clearly know that the auditee has some problems. For economic interests or other reasons, many certified public accountants will choose to adjust the problem appropriately to make the final report easy to accept. However, in the final analysis, this behavior has great problems, and the occurrence of similar events in recent years has also attracted the attention of scholars. At this stage, the word "key audit matters" is frequently used, which also reflects that the research on the audit risk of internal control has gradually transitioned to the field of key audit matters.

E. Keyword Time Zone Analysis

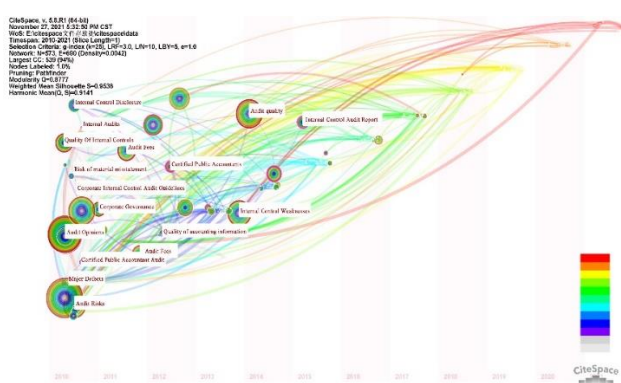


Fig. 5. Keyword time zone map.

For audit opinion and internal control, time zone map can provide an evolution path of research topics in the field of audit opinion and internal control, visualizing in images form the development and changes in the field of audit opinion and internal control research over various time periods. As can be seen from Fig. 5, audit opinions and internal control diverged from 2010 to a series of key nodes, and the period 2010 to 2019 belongs to the stage of steady development of audit research, with hot keywords emerging one after another, and the focus of research has shifted from core areas to sub-segments, such as the relationship between internal audit quality and internal control, The research on the sub areas of audit opinion and internal control began to deepen.

V. CONCLUSIONS

This study uses CiteSpace visualization software to analyze and sort out the literature related to internal control and audit opinions in China, showing the research hotspots

and progress of internal control and audit opinions from 2010 to 2021. The research results are as follows:

Analysis of the trend of internal control and audit opinions: it can be seen that the update of industry standard has a significant impact on the number of literatures published, and it is a positive stimulus. Researchers should pay attention to the adjustment of industry standard and the direction of update, which will be conducive to the selection of research direction.

Keyword cluster analysis: it can be seen that the current research hotspots of internal control are internal control audit, auditor change, audit opinions, audit fees, internal control quality, internal control information disclosure, internal control defects, audit risks, internal audit and CPA audit, which indicated that the research foundation in this field is relatively solid and has initially formed a certain scale of research. From the ten key hot research words, we can see that since 2010, Chinese scholars' main research directions and focus on internal control related audit opinions have become the key research directions in this field.

Keyword co-occurrence analysis: it can be seen that the word frequency and centrality of keywords such as "internal control audit", "auditor change", "audit opinion" and "audit fee" rank high. These subject words represent the research direction with high research heat, stable and mature research system and effective connection with other fields.

Key salient analysis: it can be seen that the research on internal control and audit opinion has been expanding in breadth and depth in recent 11 years, which can be roughly divided into three stages: one is the stage of internal control information disclosure (2010-2013). This stage mainly studies the influence of enterprise internal control and its related factors under the national system norms; Second, focus on the connection stage between internal control quality and audit report (2014-2016);

Third (2017-2021) the research on enterprise internal control is gradually transitioning to the research on audit quality.

At present, internal control in China is at a stage of rapid development, but there are still many problems in the industry that need to be studied and solved; As the law of the people's Republic of China on certified public accountants stipulates and clearly regulates the audit responsibilities of certified public accountants, the audit opinions and internal control in China are bound to carry out corresponding research and discussion around the participating subject of certified public accountants, which will also become the key research direction of domestic scholars in this field.

Some of the research institutions have maintain closer cooperation with the authors of the articles. In the future, cross-institutional, cross-regional and cross-national cooperation, exchange and academic research can be further strengthened, and literature analysis and discussion of cross-national cases can be increase.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Zhi Chen conducted the research; Shuanghua Zhuang

analyzed the data; Zhi Chen and Shuanghua Zhuang wrote the paper together; all authors had approved the final version.

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