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Research on Economic Responsibility Audit of State-owned Enterprise Leaders under the Environment of Big Data

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Abstract

As a unique economic supervision system in China, economic responsibility auditing is an important means to strengthen the economic responsibility of the leaders of state-owned enterprises and improve the operational efficiency of enterprises. Along with the continuous application of big data technology, the traditional audit approach has been unable to adapt to the audit requirements in the new era. This paper firstly elaborates on the application of big data in the economic responsibility audit of state-owned enterprise leaders, argues that there are currently imperfect laws and regulations on the use of big data, insufficient use of data association and unskilled auditors, and puts forward corresponding perfect countermeasures in order to promote the innovation and reform of economic responsibility audit.

Keywords

Big data; State-owned enterprises; Leading cadres; Economic responsibility auditing.

1. Introduction

In 2015, the State Council issued the Action Outline for Promoting the Development of Big Data, which pointed out that big data would soon become a new driving force for economic transformation, a new opportunity to reshape the country's competitive advantage, and a new way to enhance the government's governance capacity. on June 22, 2021, the Office of the Central Audit Commission and the Audit Office issued the "14th Five-Year " national audit work development plan, Article 17 points out the need to adhere to science and technology to strengthen the audit. It can be seen that the changes in the general social environment have put forward new requirements for the economic responsibility audit of the leaders of state-owned enterprises, and the existing audit methods will be increasingly unable to meet the audit needs in the big data environment. Therefore, it is an urgent research content to promote the more efficient implementation of the economic responsibility audit of the leaders of state-owned enterprises by using big data technology in the big data environment.

2. Literature Review

With the rapid development and innovation of information technology, the application of big data has become more widespread and mature, and accordingly, academics are paying more and more attention to the theoretical and practical research on big data in auditing. In recent years, scholars have also paid attention to the application of big data in economic responsibility auditing, and have conducted various studies on the changes of economic responsibility auditing in the era of big data and the promotion of full coverage of audit supervision, etc., although most Scholars have focused on the response measures and development trends of economic responsibility auditing in the big data environment. For example, Gao Junguo (2021) presents the problems in the development of economic responsibility auditing and analyses its

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development trend in the context of the big data era, arguing that the big data era has brought changes to the way economic responsibility auditing works, the thinking concept and the overall operation process [1]. Yuan Navy (2021) analyses the importance and significance of economic responsibility auditing in the big data environment, argues that it can improve the quality of work, coverage and reduce risks, and then proposes the problems and innovative strategies that will be faced, and looks forward to the development trend of economic responsibility auditing in the big data era [2]. Liu Yanqing et al. (2021) take their unit, the Bank of Qingdao, as an example to propose targeted measures to help transform the economic responsibility audit of banks [3].

In summary, domestic scholars' research on big data economic responsibility auditing has made some research results, but weaknesses still exist. The studies that have been conducted tend to focus more on the development trend of economic responsibility auditing in the era of big data and how to respond to it, and less on the application research of big data in the economic responsibility auditing of state-owned enterprise leaders, and less on state-owned enterprises. Therefore, based on the literature research of relevant scholars, this paper focuses on the application research of economic responsibility auditing of state-owned enterprise leaders in the environment of big data, aiming to suggest suggestions to promote the wide application of big data technology in economic responsibility auditing of state-owned enterprise leaders.

3. The Application of Big Data in the Economic Responsibility Audit of State-owned Enterprise Leaders

3.1. Data Collection

In the big data environment, collecting the data needed for auditing is the first step in carrying out economic responsibility audits of state-owned enterprise leaders. The types of data collection include both structured data and a small amount of semi-structured data obtained through the current basic audit methods, such as financial statements, books of accounts, procurement, sales, investment, contract management and other data, as well as unstructured data, such as the basic situation of the audited unit, scope of operations, organizational structure, minutes of meetings, unstructured data related to information systems and so on. In the big data environment, the network formed is interlocked, interrelated and cross-checked because of the characteristics of big data such as high-frequency, value, mass and diversity, in which almost all people, matters and objects can be "datafied", i.e. recorded, measured and collected electronically, and then transformed into data. Therefore, the integration of these fragmented, high-value unstructured information, and the discovery of relevant relationships between these business events recorded from different perspectives and at different levels, form a complete information value chain, providing more ways for auditors to obtain audit evidence. In general, data can be collected through the following four sources: firstly, data provided by the Group Audit Centre; secondly, various types of data regularly collected by each secondary audit department and uploaded to the Group Audit Centre or the data centre of the department. This type of data is mainly aggregated and stored by the Group Audit Centre or the secondary audit departments in the course of their usual audit work; thirdly, various types of data collected as required during the implementation of audit projects; and fourthly, public data captured from the Internet through big data tools [4].

3.2. Data Analysis

In the process of economic responsibility audit of state-owned enterprise leaders, the audit team analyzes the collected data to find suspicions and guide the on-site audit team to check

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and verify evidence collection. And in the big data environment to carry out economic responsibility audit of state-owned enterprise leaders, for the data collected need to use the relevant methods for data analysis, so as to find audit suspicions, the common data analysis methods are as follows: one is based on SQL data query method. Generally through the analysis of audit issues, the construction of the corresponding SQL statements, and then by running the above SQL statements in some database tools (such as Microsoft Access, SQL Server, etc.) or audit software, to find out the relevant audit clues. Second, big data visualisation techniques. Based on the integration and pre-processing of audit big data, visual modelling analysis of audited data is carried out with the help of some big data visualisation software (e.g. R language, Python, Tableau, etc.). Auditors combine their background knowledge of auditing with the sensitivity of the human visual system to analyse, observe and cognise the visualised resultant graphics and images to systematically understand and analyse the connotations and characteristics of the audited data in general, thereby discovering audit clues and obtaining audit evidence.

3.3. Data Storage

The cloud computing platform or distributed file system enables data storage and management of economic responsibility audits of state-owned enterprise leaders in a big data environment. With the help of cloud computing platform or distributed file system, a massive data storage system for auditing can be built in the group audit centre or audit department, and the collected data can be partitioned and managed according to different applications or logic, or according to data characteristics and types. For example, for general basic data, such as taxation, industry and commerce data, query access can be opened to relevant subordinate units; for specific professional data, query access needs to be authorised according to the actual needs of the annual audit project; for cross-regional or cross-unit data, query access needs to be authorised. For cross-regional or cross-unit data, joint authorisation and approval from relevant units is required; for other special needs data, approval from relevant departments should be reported according to the actual situation.

The daily security management of stored data should be strengthened. Firstly, state-owned enterprises should establish corresponding security management functions, set up corresponding security management positions and improve the corresponding management system to provide organisational and institutional safeguards for the security management of stored data information systems. Secondly, in terms of internal data management post settings and personnel arrangements, attention should be paid to the implementation of the separation of duties system; in terms of data usage, the data security awareness of internal auditors should be strengthened. Finally, attention should be paid to preventing security risks in the data centre operating environment that affect the normal and reliable operation of the system, and protecting various data from threats such as destruction, replacement and loss.

4. Big Data Environment under the State-owned Enterprise Leadership Economic Responsibility Audit Problem Analysis

4.1. Relevant Laws and Regulations Are Not Perfect

At present, from the perspective of the relevant laws and regulations concerning the economic responsibility audit of the leaders of state-owned enterprises in China, the implementation details under the big data environment are not yet clear [5]. At the same time, some enterprises will have the problem of insufficient cooperation in providing data during on-site audits, or slackness in providing data that is not comprehensive or timely, resulting in low efficiency of auditors, etc. In addition, even if the auditors conclude that there are some implementation loopholes in the audited unit based on the data analysis model, it can only be used as the basis

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for issuing audit reports, and the audit results cannot be presumed entirely based on the model results, and there is also a problem of recognition of big data by the audited unit and society, which will greatly reduce the efficiency of economic responsibility audits of state-owned enterprise leaders.

4.2. Insufficient Use of Data Association

The application of big data in the economic responsibility audit of state-owned enterprise leaders in China is still in the preliminary exploration stage, a national unified networking platform has not yet been formed, the data sharing platform established by the relevant departments is not mature and has not been fully promoted, there is still a certain process from the full coverage of big data audit, there are incompatibilities or errors in the collection, pre-processing and integration of data, and based on the principle of confidentiality, the Information sharing between state-owned enterprises generally exists between units within the enterprise and is authorised within the group to form a mutual flow of data and information [6]. It is a long process to achieve information sharing among state-owned enterprises, and during this period, the phenomenon of data and information silos is common, which leads to the data only existing singularly and cannot be related and analysed through multi-level, multi-directional and multi-angle data to dig deeper values and realise value-added.

4.3. Unskilled Auditors

Auditing in the big data environment requires relevant practitioners to have skills in computer science, language, technology, visualization and analysis, while the current information and data skills of most internal auditors are only in the mastery of basic computer knowledge, such as Excel, Access, etc. In the massive and complex big data environment, the financial and business-related information of the leading cadres of state-owned enterprises during their tenure At the same time, the current widely used auditing methods do not meet the needs of economic responsibility audits of state-owned enterprise leaders. In addition, the age structure of the auditors of large state-owned enterprises in China is inclined towards the middle-aged group, and for them, they tend to rely more on the audit experience accumulated in the past in the actual audit projects, and it is a gradual process for them to change their mindset, and they are relatively slow to learn new knowledge of big data audit technology, and their acceptance of new things is relatively low, which makes the application of big data technology in the economic responsibility audit of state-owned enterprise leaders more difficult. Big data technology is more difficult.

4.4. Mismatch of Audit Technology Tools

The core of solving big data problems is big data technology. Compared to other auditing projects, economic responsibility audits require access to and analysis of more and more complex data and data analysis tools are difficult to apply universally due to the different management models of individual SOEs and the inconsistent form and scope of management of leaders during their tenure. The process of auditing the economic responsibility of SOE leaders involves a large number of documents, pictures, minutes of meetings, audio and video, geographic information systems and other data, and it is an urgent task to carry out rapid analysis of this unstructured data. Most of the data analysed and processed in actual audits is structured data, mainly stored in the form of tabular data, but there is a blind spot for the analysis and processing of unstructured data. Not only is there a lack of effective guidance concepts, but there is also a lack of efficient and stable analysis tools, and the actual audit efficiency and audit quality are bound to be affected. In addition, the operational guidelines accompanying it are unclear, resulting in the slow development of big data auditing in this field.

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5. Measures to Improve the Economic Responsibility Audit of State-owned Enterprise Leaders in the Big Data Environment

5.1. Sound Laws and Regulations

With the continuous application and development of big data technology in the economic responsibility audit of state-owned enterprises leaders, the process of auditors using big data technology to obtain audit evidence will be more effective and convenient, and the corresponding audit procedures should also be standardized and adjusted to clarify the status of big data technology in the process of auditors executing audit projects to avoid touching sensitive information and violating the provisions of the guidelines. In addition, laws and regulations are the basis for the real and effective application of big data technology, and without the corresponding legal and regulatory basis, there will be uncertainty factors in the execution of audit operations by auditors, and the relevant responsibilities of auditors cannot be clarified, and the legal status of the data stored in the big data platform, whether it involves the definition of privacy or confidential information and other issues need to be stipulated by laws and regulations.

5.2. Establishing A Sharing Platform

The era of big data is one in which data is becoming more and more transparent. The huge commercial value implied by the massive amount of information in big data is being taken more seriously, and this massive data information can play an unexpected role in government, science, medical care, transportation, auditing and other fields[7]. In this sea of data, the person or organisation that can fully understand and apply its powerful value will be in a position to take advantage of the fierce competition in the future and achieve more long-term goals. More importantly, as single, fragmented and unstructured audit evidence has its limitations and the greatest value will be realised through interactive shared data, audit data agencies should be organised across departments so that information can be shared across departments to avoid situations caused by information failures. In addition, the legislation and platform operation system should be improved, and the regular maintenance and updating of the platform should be done to ensure the information and data security of the big data platform.

5.3. Training Audit Talents

At present, there are fewer audit talents within state-owned enterprises in China, and the acquisition of professional knowledge of internal auditors is mainly based on title examinations, while the existing accounting and auditing title examinations are also based on accounting and auditing-related knowledge, and there is a lack of auditors familiar with computer technology, although there are also professional talents such as registered information system auditors, but there are few professional talents, and audit talents with the ability to analyze big data audits are even more There is a shortage of auditors with the ability to analyse big data, and such professionals are more often found in accounting firms, while state-owned enterprises have almost no relevant personnel due to their cultural environment. Therefore, state-owned enterprises should develop a mechanism to train professional talents, reasonably consider the development strategy of the industry and the enterprise, make a good reserve of talents, increase human, material and financial resources for the training of talents, strengthen theoretical knowledge education, focus on the combination with practical operation, master the relevant audit work, and cultivate complex audit talents.

5.4. Optimising Audit Tools

The economic responsibility audit of state-owned enterprise leaders has its own special characteristics compared with other audit projects, especially when it comes to the outgoing audit of state-owned enterprise leaders, the information and data that need to be accessed and

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analysed span a longer period of time, and the data in various aspects are more complex, which makes it more necessary to share a big data financial information platform to promote the efficient operation of future audits. In addition, the most used big data visualisation and analysis tools (such as R language and Python) currently require the use of English and are also developed by foreign companies, which also makes it difficult for internal auditors of state-owned enterprises to learn the relevant audit tools and operating systems, making it urgent and necessary to develop a language that uses Chinese programming. Recently, Huawei is developing its own programming language, "Cangjie", which is expected to break this English dominance and open up new directions for future innovation in audit tools.

6. Conclusion

In conclusion, the big data environment has opened up a wide space and created endless opportunities for the economic responsibility audit of state-owned enterprises, and the data contained in it is like an "ocean" waiting for our talents and experts in various fields to explore, discover and apply. As a state-owned enterprise with national importance, it is important to fully consider the development of the social environment, combine it with the enterprise's own development strategy, do a good job of strategic planning, make reasonable use of the value of big data, and improve audit efficiency.

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