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Research on the Application of Big Data Auditing in Y City Audit Bureau

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Abstract: Big data auditing has become an ability that national auditing institutions must master and improve rapidly at present.It is an inevitable choice for national auditing institutions to meet the challenges of the times,fulfill auditing functions and break through auditing bottlenecks.Against this background,this paper takes the application research of big data auditing in national auditing institutions as the topic,sorts out the existing problems and their causes,and puts forward corresponding improvement suggestions.

Keywords: Big data, Big data auditing, Government auditing.

1. Introduction

Human society has entered the era of big data, which is marked by the possession of massive data and complex big data technologies. Against the backdrop of the big data era, audited entities have been carrying out reforms and innovations one after another. They conduct their business by applying modern information technologies such as big data, Internet Plus, cloud computing, artificial intelligence and 5G communication, continuously improving their own informatization construction level and building intelligent work models. When facing the large amount of electronic data and advanced information systems of the audited entities, if national auditing institutions still conduct audits by traditional means, they are likely to face the risks of insufficient and not in-depth audits, or even fall into the situation where audits cannot be carried out. Therefore, in the era of big data, it is necessary to conduct research and explore the application of big data auditing to adapt to the complex changes of the new situation.

2. Literature Review

2.1. Foreign Literature Review

Foreign research on big data auditing is mainly manifested in aspects such as the impact of big data on auditing, the technical methods of big data auditing, and the problems and countermeasures existing in big data auditing.

In terms of the impact of big data on auditing, Earley (2015) discussed the opportunities and challenges provided by big data analysis technology for auditing work. Mueller O (2016) believes that auditors can apply big data technologies such as data mining and multi-dimensional analysis to big data for data mining and multi-dimensional analysis, and can discover the interrelationships among data. Adrian Gepp, Martina K. Linnenluecke, Terrence J. O'Neill, Tom Smith (2018) summarized and generalized the actual application of big data technologies in fields such as accounting and financial analysis, and predicted the application and development prospect s of big data technologies in auditing theory and practice.

In the research on the technical methods of big data auditing, Kathryn Enget, Gabriel D. Saucedo, Nicole Wright (2016) studied the specific implementation mode of applying big data to auditing work, and proposed that the implementation path of auditing work in the context of big data is data acquisition, data analysis and data output. C. Q. Wilson, M. Q. ernando (2016) studied the visualization of the data analysis process and proposed a scheme that can make the analysis process visible, providing visual information of the data analysis process for analysts.

In the research on the problems and countermeasures existing in big data auditing, Michael Alles Glen L. Gray (2016) explored the key obstacles in applying big data technologies in the audit of financial statements and proposed solutions to the obstacles. Yoon (2015) explored issues such as the integration of traditional audit evidence generated by big data, information transmission problems, and privacy protection of data information, and gave possible solutions to the problems.

2.2. Domestic Literature Review

The research directions of domestic scholars are generally consistent with those of foreign scholars. However, what makes them different is that the research of domestic scholars has more Chinese characteristics.

In terms of the research on the impact of big data on auditing, Chen Shu (2021) believes that big data technology has an impact on auditing thinking, auditing modes and auditing methods. Wan Xin (2021) holds that the era of big data has both favorable impacts on auditing work, such as the improvement of auditing technology and the increase in auditing work efficiency; and there are also unfavorable impacts, such as auditors' technology failing to keep up with the development of big data technology and the threat to the security and confidentiality of auditing data.

In the research on the technical methods of big data auditing, Wang Xinying (2021) introduced the characteristics of comprehensive coverage, great depth and high efficiency of big data government auditing, and on this basis, constructed the government auditing framework under the big data environment. Hu Jiaqi (2021) believes that big data will lead to changes in auditing methods, implementation ways and organizational modes of auditing work. To do a good job in big data auditing, it is necessary to make auditing technical preparations in four aspects, namely data collection, data storage, data cleaning and data analysis. Wang Biaohua (2020) based on the content of the "Research on Big Data Auditing

Theory and Practice" special seminar, discussed from the perspectives of six types of big data technologies such as machine learning algorithms, unstructured data analysis technologies and visual analysis technologies how new technologies are applied to government auditing.

In the research on the problems and countermeasures existing in big data auditing, Lu Gaoming, Zhao Bangfang and Lu Dahai (2019) believe that there are still seven problems in the implementation of big data auditing by national auditing, such as the incomplete establishment of the concept of big data auditing, the imperfect top-level design and the uncompleted construction of the auditing comprehensive analysis platform, and put forward countermeasure suggestions such as establishing the concept of big data auditing, expanding the technologies and methods of data utilization. Chen Zhaomiao and Pei Xiao (2021) believe that big data has brought challenges to auditing, and the measures to cope with the challenges include changing the thinking mode, constructing a cloud auditing platform and strengthening data control.

2.3. Literature Review and Commentary

Summarizing and generalizing the theoretical research and practical discussions on big data auditing by domestic and foreign experts and scholars, it can be found that big data auditing has been generally recognized and valued by them. Big data auditing will change the organizational forms, auditing methods and ways of thinking in audit supervision, and will bring about revolutionary development in auditing. At present, big data auditing in China is also in a thriving development stage. However, the development level of big data in China is still at the primary stage, and the research on big data auditing still needs further exploration and attempts.

3. Case Analysis of Y City Audit Bureau

3.1. Information System Construction Situation

Y City Audit Bureau has always attached great importance to the construction of informatization. With increased capital investment, it has built the "Y City Digital Auditing Integrated Platform" integrating functions such as project management, data analysis, and online auditing, providing equipment and technical support for the development of big data auditing. First, an electronic data query platform has been established to collect and integrate electronic data obtained from various channels and sources. Second, a bastion host is purchased in a timely manner to ensure data confidentiality and security protection. Third, virtual machines, remote desktops, and VPN technologies are used to enable auditors to conduct online data analysis and improve the utilization rate and security of sensitive information.

3.2. Management System Construction Situation

As early as 2018, Y City Audit Bureau issued the Management Measures for the Collection, Storage and Use of Auditing Electronic Data, making clear regulations on data collection and reporting, data processing, storage management, sharing and utilization, comprehensive analysis, and security and confidentiality. It also established a regular release mechanism for auditing data resource directories, regularly publicizing the data resource directories to auditors to meet the needs of big data auditing in the audit institutions at the city and county levels. Meanwhile, a data collection demand planning was established. The audit bureaus at the city and county levels and various business departments report their data collection demands, and the Data Department of the bureau arranges the collection uniformly to avoid the phenomenon of repeated collection.

3.3. Organizational Structure Construction Situation

The Y City Audit Bureau has specifically established an Electronic Data Auditing Department, which is responsible for data-related requirements and work in a concentrated manner. Firstly, it is responsible for data collection, cleaning, and conversion. It cleans, converts, and standardizes the data from various channels and sources. Secondly, it is responsible for providing technical support and technical guidance. It attempts to implement the auditing ideas and thoughts put forward by auditors by using computer language statements, algorithms, application software and other computer technology means. Thirdly, it is responsible for data-related communication and docking. It maintains the security and stability of data sharing with the Big Data Bureau, and assists the business departments in communicating and docking with the departments and units that need to obtain data. Fourthly, it conducts big data auditing research. It timely collects and explores the big data auditing techniques available to auditing institutions, and promotes the exchange of big data auditing experience in the whole city.

3.4. Talent Team Cultivation Situation

The Y City Audit Bureau also attaches great importance to the cultivation of big data auditing talents and promotes the big data auditing level of the cadres in the bureau through various means. Firstly, it takes the initiative to arrange the young cadres in the unit to participate in the computer technology training organized by the National Audit Office and the Provincial Audit Department. Secondly, a big data auditing technology group is established. The technology group holds regular experience exchange meetings and seminars to discuss the application of cutting-edge technologies and project practical experience. Meanwhile, experts are invited to the bureau to give lectures and share achievements and experiences. Thirdly, outsourced services are utilized to supplement the strength of big data auditing and make up for the shortage of big data auditing talents.

4. Oblems and Causes of the Application of Big Data Auditing in Y City Audit Bureau

4.1. Existing Problems

4.1.1. Lack of specific operational norms for big data auditing

As a newly emerging auditing method and means at present, big data auditing is in a state of waiting to be formulated and perfected regarding relevant regulations, measures, etc. at the levels of laws, regulations and specific operations. When carrying out big data auditing, the Y City Audit Bureau mainly relies on the internal management system of the unit. However, the system mainly consists of major principle-based agreements and does not specify the specific implementation process and operation norms. During the auditing implementation, it is mainly carried out by each

auditing team according to their own project situations and auditing experiences. This leads to the situation that auditors do not have unified operation process regulations when implementing big data auditing, which is not conducive to the management of project implementation.

4.1.2. Lack of sufficient data support for big data auditing

Currently, when obtaining the data required for big data auditing, the Y City Audit Bureau is facing a series of problems such as collection, processing, and storage. Firstly, due to the limited data access rights, there are certain problems in obtaining data from other relevant units other than the audited units. Secondly, as the data storage formats and software and hardware facilities of each unit are not exactly the same, and the system software is diverse and complex, there are difficulties in data collection in actual auditing projects. Thirdly, since the situation of encountering large-capacity data in auditing is becoming more and frequent, and the demand for data storage space is getting higher and higher, there is a problem of limited data storage space.

4.1.3. Lack of technological innovation ability for big data auditing

The Y City Audit Bureau is facing quite a few difficulties in the application and innovation of big data technologies. Firstly, the application level of big data technologies is relatively shallow, and there is a lack of in-depth applications. Currently, what the Y City Audit Bureau uses more often is still the correlative comparison and analysis between tables. Technologies that require higher technical skills, such as machine learning and visual display, are less applied. Secondly, the types of big data auditing projects are single, and it is difficult to come up with new ideas in terms of technical methods. At present, the scope of big data auditing carried out by the Y City Audit Bureau is relatively fixed. The projects carried out mainly focus on those types with large data volumes and many affiliated departments. The auditing mode and big data auditing methods are basically fixed and formed, making it rather difficult to bring out new ideas.

4.1.4. Lack of technical talent reserve for big data auditing

The Y City Audit Bureau has cultivated a group of leading computer talents and computer technology backbones through continuous strengthening of computer technology exchanges in recent years, and has reserved a certain number of big data auditing technical talents. However, compared with the entire auditing team, their proportion is still not high, and quite a number of auditing cadres are not proficient in or unable to carry out big data auditing. Firstly, most of the young cadres recruited by the Y City Audit Bureau in recent years are still mainly from traditional majors related to finance, auditing, and engineering. Secondly, most auditing personnel have not yet established the thinking of big data auditing, and the traditional thinking still prevails.

4.2. Reasons for the Existing Problems

4.2.1. The supporting system for big data auditing is not yet complete

The newly revised Audit Law has added the legal basis for auditing institutions to conduct big data auditing. It clearly states that auditing institutions can request data from the audited units, the national government information systems and data sharing platforms, and conduct verification and inspection on the obtained electronic data and relevant information systems. However, there are still no clear regulations in the upper-level system regarding matters such as how to obtain electronic data, what scope of electronic data to obtain, the custody, use and destruction processes of the obtained electronic data, and how to hold accountable for violations. The unified, generally recognized and authoritative operating procedures and implementation measures at the national level have yet to be introduced. The lack of top-level design also has a certain restrictive effect on the conduct of big data auditing.

4.2.2. The phenomenon of data silos has still not been rigidly broken

The state has been vigorously promoting the publicity of government information and the sharing of government affairs information. In January and September of 2016,it respectively issued the "Notice on Organizing and Implementing Major Projects to Promote the Development of Big Data" and the "Interim Measures for the Management of the Sharing of Government Affairs Information Resources", emphasizing the need to increase the opening and sharing of national government information resources to the outside world, promote the interconnection and opening of government affairs information systems, build data sharing platforms, and improve the level of government information services. However, looking at the current situation of data sharing and use, it is found that the phenomenon of information silos still exists, the sharing paths among various data subjects have not been completely unblocked, and the degree of data openness still needs to be improved.

4.2.3. The technical methods of big data auditing are rather complex

The technical threshold for conducting big data auditing is relatively high, and the cost of human resources is considerable. It is rather difficult for auditing institutions to improve the big data auditing level of their auditing cadres in a short period of time. Big data auditing is usually closely associated with computer technologies such as database systems, programming, algorithms, and application software. Only compound talents who are proficient in both auditing business knowledge and computer technologies can successfully transform auditing ideas into big data auditing methods and models. Moreover, there are numerous types of big data technologies. The more advanced the technologies are, the more obscure and difficult they are to understand. It is quite challenging for non-computer majors to learn and apply them, and it is also no small challenge for computer majors.

4.2.4. It's difficult to quickly cultivate big data auditing talents

In addition to having sufficient data, big data auditing also requires a sufficient number of big data auditors to use the data. However, there is a widespread shortage of big data auditing talents in the audit institutions of Y City. Firstly, there are restrictions on staff recruitment. As a government department, audit institutions cannot quickly recruit a large number of computer professionals in a short period of time to supplement the big data auditing strength of the unit. Secondly, among the recruited staff, the majors are mainly related to traditional auditing such as auditing, accounting, and engineering. Computer majors have still not become the mainstream majors in recruitment.

5. Suggestions on Improving the Application Level of Big Data Auditing in Y City Audit Bureau

5.1. Optimize the Data Environment for The Development of Government Auditing

First, strengthen the construction of the big data auditing system. The system serves as the standard guidance for all behaviors. Without a sound and complete supporting system, mistakes are likely to occur in work. Especially for state organs and administrative units, they should exercise their management functions within the framework of the system to ensure the standardized operation of power.

Second, strengthen the management and control of big data auditing data. Data is the core material of big data auditing. Obtaining a sufficient amount of valuable data is the prerequisite for the successful implementation of big data auditing. Data management and control involve data planning, collection, processing, analysis, as well as storage and protection. Precise management and control need to be implemented in every aspect.

Third, strengthen network security management. Big data auditing is closely related to information network security. The circulation of data is inseparable from the information network. The construction and operation of the big data auditing platform also require a safe, stable and reliable information network environment.

5.2. Build a Big Data Application Platform for Government Auditing

First, utilize the functions of cloud computing to build an auditing data sharing platform. Data sharing is an effective way to improve the efficiency of data utilization. Therefore, it is necessary to apply cloud computing technology to construct a centralized and shared data storage and analysis platform, uniformly store and collect data, and provide auditing personnel with query and analysis functions to achieve open sharing of data.

Second, strengthen the research on big data auditing techniques and enhance the analytical capabilities of big data auditing. There are numerous types of big data technologies, ranging from simple spreadsheet comparison and analysis to complex artificial intelligence data algorithms, with a large span in difficulty and many subdivisions in the field. Auditing institutions are required to invest more human and material resources for research and promoting development.

5.3. Use Big Data to Optimize the Government Audit Model

First of all, widely adopt the electronic data auditing mode. With the popularization and use of the Internet, electronic data auditing has become the new normal in auditing. Based on big data analysis, auditing institutions can process and comprehensively judge the scattered information of various departments in different time periods, so that the sampled auditing data can be representative and truly and comprehensively reflect the actual situation of the unit under audit.

Secondly, expand the application fields of big data. Actively promote the development of big data auditing in more types of auditing projects, explore the entry points and focuses of carrying out big data auditing in various types of auditing projects, conduct analysis and mining by using big data technology, and realize the wider application of big data auditing.

Finally, strengthen coordinated auditing. Big data auditing has expanded the correlation range of auditing data. It is not only aimed at the internal data of the audited unit but also needs to obtain the peripheral correlation data of the audited unit. Therefore, it is necessary to strengthen the collaborative cooperation with other various departments and strengthen coordinated auditing.

5.4. Strengthen the Cultivation of Big Data Audit Talents

First, intensify the transformation of auditing thinking and establish the thinking of big data auditing. Big data auditing determines the key contents and analysis directions based on data. Data planning should be well done before the start of a project, and the method of "centralized analysis, identifying doubts, decentralized verification, and systematic research" should be applied for auditing. Therefore, the thinking of big data auditing needs to be established.

Second, increase the introduction of new forces and expand the base number of auditing talents. The shortage of computer professional and technical talents is a common situation in auditing institutions. Therefore, in future personnel selection and recruitment, auditing institutions should attach importance to the introduction of computer auditing talents.

Third, strengthen the cultivation of existing talents and improve the level of auditing cadres. Attach importance to the cultivation of the big data auditing capabilities of existing personnel. Improve the theoretical knowledge of big data auditing of auditing cadres through education and training, and enhance their practical experience in big data auditing through project practice.

6. Conclusion

Currently, audited units are carrying out digital reforms one after another, emphasizing the exertion of their management functions empowered by digital means. Correspondingly, the audits of auditing institutions are gradually shifting towards data-based audits. The proposition of full coverage of audit supervision has presented new topics and requirements to national auditing institutions, prompting them to continuously expand the scope of audits, intensify the depth and strength of audits, and achieve comprehensive audits of audited units without any blind spots or dead angles in supervision. Against this backdrop, big data auditing is the inevitable path for auditing institutions to meet the challenges of the times and fulfill their shouldered missions.

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