Proceedings of the 2nd International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/73/20231730

Study on the Application of Big Data Technology in Inventory Audit

- Taking Swertia Audit as an Example

Jingyi Liu[1,a,*]

[1]*Department of Accounting, Beijing Institute of Petrochemical Technology, Beijing 102627, China*
a. rlee62040@student.napavalley.edu
**corresponding author*

Abstract: The arrival of the big data era provides new ideas for auditing to help transform traditional auditing into modern auditing. In this paper based on the existing literature, the basic data and application framework of big data auditing models are extensively reviewed, analyzed and summarized. The research and application of big data and its technology has become a domestic and foreign hot topic. In this paper, the application of big data technology in auditing is based on inventory analysis and auditing based on the analysis of the original auditing procedures and methods as well as the associated risks and difficulties. The case study of the Roe Deer Island scallop inventory audit event is used to study the possibility of applying big data auditing techniques in this area and the risk response in the case of the audit model, which provides a reference for the application of big data auditing in other inventory companies.

Keywords: inventory audit, big data, fixed assets

1. Introduction

Accompanied by the increasing attention and wide application of the application of big data technology, the auditing field has begun to gradually use big data technology. China points out the need to improve the auditing ability in auditing, to help the construction of auditing informationization, and to explore and apply the contribution of big data technology in auditing. Inventory as an important part of enterprise production and operation, but also manufacturing enterprises to achieve its market value of the direct carrier, some inventory is not easy to recognize and measure, easy to lead to reporting errors and thus provide opportunities for fraud. This paper takes the inventory item as the entry point, and studies the possible application and application path of big data technology in it, so as to improve the auditing efficiency. The analysis of the application of big data technology can help popularize the application of related technology, which in turn can help the information construction of the industry.

2. Literature Review

Existing research on the combination of big data and auditing is more from the perspective of big data application. Ruzhuo Liu et al. proposed the basic concept of audit analysis model and its

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algorithm, and studied how to construct system analysis model, category analysis model and individual analysis model, and the creation of a correct model is the key to big data audit research [1]. Yujie He and Junchao Zhang studied the application of structured query language and multidimensional data analysis in auditing practice [2]. Chen Wei et al. studied the application method of data analysis using text information in big data auditing, and pointed out that due to the large accumulation of document files brings the information base, but also for the auditors heavy and inefficient collation and analysis tasks, the content extraction and visualization analysis of text and other unstructured data becomes the auditor's to improve the auditing efficiency to cope with the auditing risks in the big data environment favorable means [3]. According to Chen Danping , the basic path of data mining auditing includes data collection, preprocessing, discovering patterns, finding anomalies, and proposing treatment suggestions [4].The framework is centered on analyzing the dilemmas faced by remote internal auditing in terms of data collection, security, and analysis, and proposing measures to solve them, aiming to provide new ideas for the development of remote internal auditing in the context of big data in order to help transform traditional internal auditing into modern internal auditing [5]. Audit technology methods include three major aspects: extensive collection of government procurement-related data, construction of government procurement audit data analysis model, and use of advanced big data analysis and processing technology tools [6]. Wang Zhong and Wu Zhe introduced the application of data mining to realize the overall analysis process of audit data, and proposed the application of fuzzy neural network combined with genetic algorithm to solve the overall analysis of audit data under the conditions of massive data [7]. The summarization of big data technology is mostly based on the processing process of big data, and some scholars define big data technology as a series of collection, storage, management, processing, analysis, sharing and visualization technology collection [8]. Yang Guoyong summarizes the difficulties of inventory auditing as three aspects of valuation, quantity and quality, and correspondingly puts forward suggestions for improvement; it also points out that the unfamiliarity of auditors with the audited unit leads to their inability to make reasonable judgments about the quality of inventory materials, which ultimately makes the audit results deviate from the actual situation, and therefore it is necessary for auditors to improve relevant aspects of their own professionalism to make more comprehensive and detailed judgments about the company's Inventory situation for a more comprehensive and detailed grasp [9]. Wu Dengqiang studied how to create a model for big data auditing in the field of inventory, as well as to identify inventory misstatements and financial fraud, and also put forward some prospects for the application of big data technology in civil auditing [10].

In summary, the research based on the application of big data auditing to the inventory aspect is not comprehensive, lacking the extensive application of the auditing application framework based on the big data environment, as well as the accurate analysis of the subsequent data analysis and risk point identification, which can not lay the foundation for the future application of big data auditing. This paper intends to analyze Swertia as an example, so as to provide theoretical reference for the application of big data auditing and the development of inventory aspects.

3. Big Data Audit Concept and Application

Big data audit is to carry out in-depth, complex and comprehensive analysis of data, and accordingly build a certain digital audit model. Big data audit makes full use of internal and external data, financial data and business data to carry out comprehensive analysis, which is conducive to the national audit to strengthen management, improve performance and safeguard national economic security to play an important role.

With the development and progress of the Internet, big data to promote the full coverage of the audit, and gradually cover the unit or project finances to achieve revenue and expenditure without

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dead ends, and to promote the improvement of the system of big data audit applications. Big data audit can not only analyze the data in related fields, dig out the common characteristics of group behavior, show the embedded laws, provide a key basis for the government to formulate policies, but also assess the effectiveness of the implementation of government policies, thus helping the government to identify problems and improve the method.

4. The Application of Big Data Technology in Inventory Audit Analysis

4.1. The Concept of Inventory Audit

Inventory audit, refers to the increase or decrease in inventory, resulting in changes and balances, authenticity, legality and correctness of the audit. Inventory audit affects the objective reflection of the financial position of the audited unit, inventory audit is conducive to a true and detailed reflection of the status of the audited unit's inventory, to solve the problems related to difficult to carry out the audit, while the inventory audit workload, the steps are complex or due to the inventory obsolescence and damage and other circumstances that make it difficult to make a reasonable judgment.

4.2. Big Data Audit Application and Framework

Based on the relationship between big data and auditing, the two are connected to each other, and the process of auditing big data through big data technology is reasonably processed, and the substantive procedures in inventory risk response are applied again to inventory auditing projects. The application of big data audit model to carry out a simple four-step process, respectively, data collection, pre-processing, data analysis and analysis results, to assist in the realization of the inventory project to respond to the risk when the report analysis.

Through the use of big data processing technology to assist in auditing, the analysis of traditional technology in big data, the application of big data technology in financial statement audits and specific statement project audits, to achieve continuous improvement of the process of big data processing auditing work, and then through the inventory risk response substantive procedures applied to inventory project audits. The ultimate goal of big data auditing is to assist the audit to complete the appropriate data requirements, to do a good job of control testing in the face of risk, not to be exploited, and to do a good job of project review and analysis.

4.3. Analysis of Big Data Processing Technology and Efficiency

Through the steps of the application of big data technology in auditing, first of all, data collection, auditors through the traditional way of collection or network crawler way, efficiently complete the required data needs of data summarization, according to different data types using different crawler application system for data collection.

In data preprocessing, single or multiple data models are first constructed based on the data, and the data analysis model can be divided into overall analysis model and individual analysis model. The overall analysis model is used for overall data analysis and mastery, and the individual analysis model is used for screening clues. Audit generally in accordance with the first overall and then individual way to create audit models respectively. At the same time, the audit data model created in preprocessing is also used to establish the risk early warning model to realize the risk early warning. The key of the risk early warning model lies in the design of risk early warning indexes, establishing and calculating the indexes, and then comparing the indexes vertically and horizontally, discovering and selecting the abnormal and fluctuating indexes to react to, so as to achieve the purpose of early warning. According to the auditing needs of each company, a risk early warning

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analysis report is formed based on the analysis results of the risk early warning system using visualization technology. Trace the early warning doubts and confirm the audit focus. The remote online monitoring system is based on the risk early warning, more in-depth digging to find out the specific problems of the data, and then through a multi-dimensional way to display, such as the account balance project is marked abnormal, at this time, you need to compare the abnormal data to the bill or the balance sheet, so as to realize the cross-region, cross-departmental, cross-industry data analysis and comparison, and often can be found in the conventional It is often possible to find problems that are difficult to find in the conventional government procurement audit model. Audit model is based on the application of database SQL technology and the results show that remote auditors can add the audit model to the model module of the audit management system by writing SQL statements to realize the remote operation of fixed asset data query, filtering and sorting, calculation and analysis. Remote operation in the inventory process, remote auditors for the discovery of risk areas and risk points to start the on-site audit to carry out the audit work, before the on-site audit work can be carried out remotely through the auditing system to operate in the forensic part of the on-site audit will reflect its irreplaceability. Remote screening and then on-site inventory to improve audit efficiency. Properly receive the inventory record sheet and make an electronic version of the archives, all types of assets summary, classification, together with the inventory process images uploaded to the audit system, to facilitate the sharing of information, remote personnel can carry out subsequent operations, combined with graphical interfaces, visualization technology, the audit of big data to achieve a multi-faceted analysis of the data laws and data features can be more intuitively appear, the formation of the audit working papers. Through the Internet system can realize the information sharing, auditors can follow up the effectiveness of corrective measures for real-time monitoring and evaluation, timely communication with the relevant personnel, thus improving the quality of the audit, and at the same time more accurate and efficient in the face of risk assessment when the audit of big data analysis.

5. The Application of Big Data Technology in the Audit of Roebuck's Inventory

5.1. Roe Deer Island Event Background and Inventory Introduction

Roe deer island farming products mainly include scallops, sea cucumbers, etc., scallop production scale is the most huge, occupying the vast majority of the share of the seafood of Roe deer island. Roe deer island event, a total of three times scallop large-scale disaster, such as aquaculture sea water temperature anomaly; bait shortage and scale expansion aggravate the shortage of problems; pests and diseases and other comprehensive impact. Three times scallop disaster death, reduced production is not exactly the same reason, but all make roe deer island write off a large amount of inventory with a large amount of decline in value, and ultimately have a serious impact on net profit.

5.2. The Path of Big Data Technology Application Use and Analysis

In the past roe deer island in the audit inventory, the use of all manual inventory, due to the large area, judging the growth cycle of seafood requires a lot of professional knowledge, the need for more professionals to observe, in the end, the past audit when the cycle is long, inefficient, the fact that there are some deviations from the results. After the incident of the swineherd island, the area has carried out a number of investigations. With the help of Beidou navigation and positioning system, through big data technology to accurately locate the satellite data of the fishing boat, and restore the actual fishing area of the company in the past two years. With the Beidou satellite navigation system, the latitude and longitude position, speed and direction of the fishing vessel can be recorded at a fixed frequency. With the help of positioning information, further analysis of the speed can also identify the specific operating status of the vessel. Based on the fishing operation

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status and navigation track, the actual fishing area can be identified. Based on the data requirements, information and evidence on the stock of swede scallops can be obtained. The Beidou positioning data generated by the fishing vessels will be useful for auditing and forensics. To further ensure the authenticity, accuracy and completeness of the data collected, the CSRC also obtained data from the shipboard equipment installation company of the Roe Deer vessel for comparison. The results showed that the two data were consistent, proving the reliability of the NORTHCOM data. Subsequent analysis and mining were carried out next using pre-processing processes such as data cleaning and transformation. Carry-overs were made based on the company's cost transfer methodology to determine if there were any false entries in areas such as Roebuck's inventory.

In trajectory data visualization, there are three categories: direct visualization, aggregation visualization and feature visualization. Direct visualization includes plotting and displaying each trajectory one by one; Aggregation visualization is the process of segmenting and aggregating trajectory data according to the commonalities and differences reflected in the data itself or set up artificially, or removing or hiding irrelevant or redundant parts according to the data requirements, retaining or emphasizing the target trajectory data, and then visualizing the final result to highlight its important parts; Feature visualization is the process of firstly calculating the features of a trajectory and then the process of plotting and displaying those features directly or collectively. After determining the capture trajectory consisting of capture points, the area covered by the trajectory is generated as an aggregation surface, and finally the capture area is obtained. After obtaining the catch area of roe deer scallops, a similar methodology was used to obtain the bottom-seeded area and stocked area, and suspicions were found: part of the bottom-seeded area of roe deer scallops did not overlap with the previous catch area; part of the stocked sea area overlapped with the previous catch area. Further verification found that there is still an amount on the books of the upper bottom-seeded sea area before the bottom-seeded, and it is true that there is no collection. However, the implementation of bottom-seeding without collection means that a batch of inventory is given up, and the corresponding amount on the books should be written off, so Roe Deer undercounted the verification and inflated the amount of inventory; the inventory of the above sea area has been collected in the previous periods, and the scallops in this sea area should have no inventory or a low inventory. Based on the above application path, the starting point for applying big data technology to inventory auditing is to clarify the data requirements. In order to determine the inventory of scallops, the auditor breaks down the requirements into stock areas, inventory areas, harvest areas and book carry-over areas, and eventually visualizes and accurately analyzes whether it is normal or not.

Today, big data technology is being used in audits to ensure that swede seafood information is synchronized in real time, and that the trajectory of vessels and organisms is accurately tracked, eliminating data falsification as much as possible. The relevant sea areas are identified through positioning systems and analytical tools respectively. Depending on the sea area, the auditor can determine whether the inventory sea area is completely covered by the inventory sea area, and confirm whether the area is authentic based on book valuation or other information. If missing, it can be manually added to ensure the correct inventory area. Finally, by investigating and verifying discrepancies and obtaining inventory evidence, the auditor can supplement or replace the original monitoring program with big data technology, thereby reducing inspection risk and responding to the inventory audit crisis.

6. Conclusion

In this paper, the swineherd island as an example, through the use of big data application technology in inventory auditing on the application of research, compare the difference between the past audit and big data auditing, in the big data environment, the use of computerized auditing

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technology can significantly improve the audit efficiency, to deepen and enhance the audit efficiency to provide help. Relative to the manual use of big data basis, greatly reducing the auditor inventory time, can more easily obtain relevant data and then analyze the effective data, so as to determine whether the financial assets are fraudulent. At the same time, by analyzing the massive amount of data to create a big data model, does not guarantee that the audit of the data and the scope of 100% and requirements to ensure consistency, the auditors also need to further analyze the risk points of error, at the same time in the basis of big data, the safe storage of data from theft by others is also a certain test. However, the application of big data in the audit of the footsteps gradually in various companies to try, the future will also be better for people to use.

References

[1] *Liu R.Z, et al. (2005). Algorithms for Audit Analysis Modeling. Beijing: Tsinghua University Press.*

[2] *He Y.J, Zhang J.C. (2006). Database Technology in Computer Auditing. Auditing Research (Supplement), 33-44.*

[3] *Chen W, Smieliauskas W. (2016) Electronic Data Auditing in Big Data Environment: Opportunities, Challenges and Methods. Computer Science, 43, 8-13+34.*

[4] *Chen D.P. (2009) Research on the Use of Data Mining Technology in Modern Auditing. Journal of Nanjing Audit Institute, 2, 61 65.*

[5] *Yu H, Chen J.X, Wang J.C. (2023) Remote Internal Auditing Based on Big Data: Application Framework and Problem Study. Business Accounting, 2, 15-19.*

[6] *Bao S.W. (2016) Exploration of Government Procurement Audit Ideas and Technical Methods Under Big Data Environment. Audit Research, 6, 13-18.*

[7] *Wang Z, Wu Z. (2005) Application of Data Mining in the Analysis of Audit Information. Computer Application Research, 2.*

[8] *Yan X.F, Zhang D.X. (2013) Big Data Research. Computer Technology and Development, 23, 168-172.*

[9] *Yang G.Y. (2011) Analysis of Inventory Audit Risk and Improvement Measures. China Township Enterprise Accounting, 6, 145-146.*

[10] *Wu D.Q. (2023) Research on the Application of Big Data Technology in Inventory Project Audit. Zhejiang Gongshang University.*