Data Analytics and Its Implication on Auditing

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Abstract. Data analytics is a new approach for auditors to prevent and detect fraud involving examining patterns in actual data. However, implementing data analytics requires a significant investment in hardware, software, skills, and quality control in the business world. This paper aims to analyze data analytics as a tool for auditors in the audit process and analyze the impact of using data analytics on the auditor profession. This article is a literature review that examines phenomena based on the literature and the results of previous studies. The discussion implies that data analytics helps the auditor to improve audit quality in the big data era. Therefore, auditors should master data analytics skills. Otherwise, the auditor will face more threatening in the future.

Keywords: Data Analytics · Auditing · Implication

1   Introduction

Information technology (IT) innovations that have taken place over the past two decades worldwide have led to a substantial increase in the amount of digital data. Technological developments have given raised to new standards and new methods for collecting and analyzing data [1], including in the field of auditing. Furthermore, the interconnection on the Internet and the constant exchange of information between the different systems have resulted in an enormous amount of data being available for access and analysis. This massive quantity of data is called big data. However, the availability and accessibility of big data also require expertise and sophisticated tools to analyze it so that it becomes valuable information [2]. The available raw data is so massive that it will not have any value if it is left unmanaged.

Meanwhile, if properly managed and analyzed, data can produce helpful information for various purposes of analysis and decision making [3]. In this case, IT plays an essential role in collecting, managing, and analyzing data. At the same time, end users must also have superior skills to manage IT tools in managing data. Thus, worries about jobs that are currently being taken over by computers can be anticipated by mastering data analytics skills. Humans are still needed to find hidden patterns from data and make them the basis for decision making [4]. Sure, to survive in this digital era, we need to have more than just technical skills, namely managerial and strategic skills in managing data.

In the auditing field, the need for data analytics is beginning to affect audit firms' operations, audit processes, and the highly regulated environment in which they operate [5]. In addition to simplifying and speeding up the audit process, data analysis expertise also allows auditors to focus on the key risks facing the company. In addition, data analytics expertise continues to grow to automate the audit process through Advanced Data Analytics (ADA) [6, 7]. ADA can automate the daily audit process, so auditors have more time to deal with matters that require professional judgment. These accelerations have resulted in the external audit of financial statements experiencing a data revolution. It is very likely that in the future, the changes will have a broader impact on auditing practices in the future. Therefore, it is not surprising that many researchers suspect that the auditor profession will transform both the way auditors work and the audit function itself. However, it is still challenging to formulate the profile of future audits and auditors [8]. The auditor must have data analytics expertise due to the changing form of the audited information into digital data and the company's massive external and internal data transmission in daily business operations. Therefore, data literacy becomes the primary skill that the auditor has must possess.

This paper aims to theoretically analyze the role of data analytics as an auditor's tool in the audit process and analyze the impact of using data analytics on the auditor profession. The results of this theoretical review will provide insight into how this technology can assist auditors in the fraud detection process. Furthermore, the authors give a foresight regarding the auditing profession and potential data analytic skills that auditors need in the years to come to remain relevant in their careers.

2   Literature Review

2.1   Data Analytics

Data Analytics is the process of examining data to conclude information with the help of specialist systems and software. Data analytics technology and techniques are widely used in industry to enable organizations to make more information as a basis of strategic decision making in business [7]. In auditing, Data Analytics is a new approach that auditors use to prevent and detect fraud or fraud involving examining patterns in actual data. Auditors use data analytics to combine data and gain an understanding of the big picture of transactions in the company and analyze the digital footprint of transactions that are the focus of the audit [3, 9, 10]. Due to the large amount of transaction data that must be accessed, such as previous years, data from various business units, and data from multiple vendors, IT in data analytics becomes an essential instrument in the audit function. It has proven to be very helpful for auditors in determining the age of debtors, creditors, and accurate inventories. Thus, the auditor can identify potential or obsolete inventories, slow-moving inventories, bad debtors and creditors, and recoverable debtors.

2.2   IT Audit

In this era of digital transformation, the proper use of IT is the best choice for companies. In other words, IT has become the primary tool of business transformation. Therefore,

companies must have the ability and knowledge of good IT investment selection and implementation. In addition, top management needs to have a strong sense of belonging and community participation to support effective IT implementation [11]. IT audit is the process of collecting evidence and evaluating the information technology system owned by a company. The aim is to understand the level of conformity of the information technology system with the established procedures and to understand whether the design and implementation are practical and efficient, Economical. Another objective of an IT-based audit is to determine whether the ability to protect or safeguard assets is sufficient to ensure the integrity of the data provided. In practice, the informatization audit will cause compatibility problems between the company's existing information technology systems and the company's business strategy [12].

3 Methodology

The method used in this article is systematic literature Review. Systematic literature review uses research methods and processes carried out by identifying and evaluating critically related to relevant studies, as well as collecting and conducting in-depth analysis of the data from these studies. The literature study began by collecting relevant literature and research results on the development of auditing and the importance of data analytics expertise in the audit function of the 2016–2021. Next, the author formulates the opportunities and challenges of the audit function in the digital era and synthesizes solutions to answer these opportunities and challenges.

4 Result and Discussion

4.1 Data Analytics

Data Analytics is known to be a comprehensive method for collecting and processing data to produce valuable insights to form a competitive advantage for companies or individuals [13]. However, big data analytics generated concern for business professionals, including auditors, because of the vulnerability of their work which was probably taken over by IT [14]. The use of IT in big data analytics reduces a lot of technical requirements for human labor. Therefore, it will have implications for reducing the costs of data collection, data processing, and information storage in the audit process while still providing more reliable and relevant audit evidence for auditors [15].

Thus, big data analytics in the audit function results in inefficient human resources and immediately results in better audit quality. Therefore, to survive in this information age, auditors must scale up their expertise by mastering data analytics skills to survive in this information age. With that expertise, auditors probably escalate their expertise and audit function, such as conducting audits on digital data, providing more advanced control, giving credible opinions and recommendations. Data Analytics is integrated into an audit approach that complies with International Standards on Auditing (ISA). Analytics data can be exploratory (plan audits) or performed further audit procedures (i.e., tests of controls and substantive procedures). Therefore, data analytics can be applied throughout the audit phase, as shown in Fig. 1.

Fig. 1. Implementation of Data Analytics in the Audit Phase

4.2 Transformation in Auditing

Some researchers argue that the current auditor profession is critical because of the vulnerability of the job being replaced by IT. The auditing practice has developed since the early twentieth century, which was carried out manually through contracts between auditors and auditees. The auditor is tasked with collecting and analyzing physical audit evidence and forming an opinion related to internal control and the reliability of financial information through a formal auditor's opinion report [16]. In line with the advancement of IT, accounting practices have been transformed from paper-based to electronic-based transaction documents. Digitalization of accounting information systems is seen as having excellent efficiency, effectiveness, and quality of information. It will reduce the problem of information asymmetry and risk transfer between managers and stakeholders [12]. This transformation certainly has an impact on the format of the data analyzed by the auditor. So there began to be changes related to auditing practices. Audit firms are starting to use IT to automate data processing and limit manual intervention.

Innovation in auditing started with the emergence of Computer Assisted Audit Techniques (CAATs). CAATS is a technical tool to improve audit effectiveness and efficiency. However, companies planning to use CAATS should consider more advanced procedures, including simulating future audits and providing a higher level of confidence [4, 7]. The auditor should consider data automation, control, and process strategies in a particular auditing function domain. If the goal is to transform the auditing function completely, then companies still practicing manual audit processes need to face this innovation problem in most aspects of their company. The level of need for innovation in auditing practices refers to the characteristics of the audited company data. For example, if the auditee has a complete digital platform database without any physical files, the auditor must adapt to the auditee environment. At the same time, auditors must automate data, controls, and processes in a manner that is compatible with the technical functions they implement so that the data analytics function can optimize audit quality [9, 12, 17]. It means that the data analytics capabilities that companies and their auditors must have do not have to be equivalent to the data analytics skills of an IT expert. Auditors need to have data analytics expertise in accordance with their function as auditors in analyzing financial information. Likewise, auditors still have to take the time to learn and develop themselves to welcome future audits. For a better understanding how the auditor will go in the future, it can be observed in Fig. 2.

4.3 Types of Data Analytics Relevant to Auditor Task

Business transformation has changed the orientation of the company's information system from paper-based to digital-based. Many businesses are adopting Enterprise Resources Planning (ERP) and Electronic Data Interchange (EDI) systems. However,

Fig. 2. Data Analytics: The Future Audit

the system produces an enormous volume of data base and high data transmission intensity, making it challenging to analyze traditionally. In the audit function, which naturally interacts with company data, this is undoubtedly very inconvenient. Therefore, auditors have no choice but to adapt to an IT-based work system. What needs to be noticed is that the business transformation does not change the central role of the auditor. However, the way auditors work has changed due to the changing nature of the data being audited. Therefore, the current audit function must be integrated with the data analytics function to improve auditor work. Given that data analytics reviews structured data, artificial intelligence, deep learning, data extraction, and data restructuring, it is very relevant to the auditing needs of complex data. To further test the relevance of the data analytics function with the auditing function, it is necessary to review the types of data analytics as presented in Fig. 3.

1. *Descriptive analytics* is a data analytics function that describes the problem by using raw data presented in the form of tabulation or data visualization. The presentation of descriptive statistics can be in the form of tables, graphs, or diagrams. Applications commonly used for this purpose are Tableau, ACL, Microsoft Excel, and IDEA. A survey conducted by CPA Canada (2017) on audit firms revealed that around 46% of the sample had applied data analytics, and 26% used descriptive statistics.

2. *Diagnostic analytics* has at least three main functions, namely (i) identifying anomalies in the data; (ii) explaining the cause of the anomaly that occurs; and (iii) establishing linkages between activities that give rise to identified deviations. For example, in the audit function, the auditor needs to identify the possibilities of fraud and identify the causes and root causes of the fraud. Thus the external auditor can provide a precise and objective opinion, while the external auditor can provide recommendations on controls that are right on target.
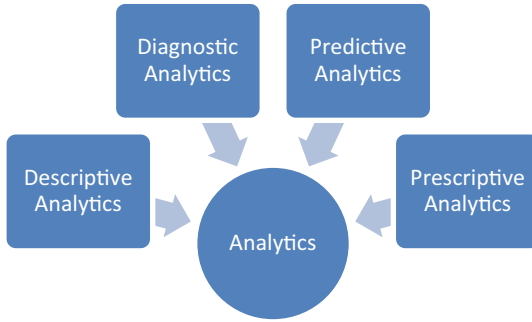
Fig. 3. The four type of Data Analytics

3. *Predictive analytics* aims to predict using past data. This analysis involves using statistical techniques such as regression and cluster analysis using ACL, IDEA, and Python tools. This data analytics function is not always beneficial for the auditing function unless the auditor wants to explore the relationship between an alleged fraud and other phenomena. In this aspect, it seems that the role of the internal auditor is more relevant than the external auditor.

4. *Prescriptive Analytics* is a form of data analytics that uses descriptive and predictive analysis. The results of the prescriptive analysis provide the most value-added in business practice because it can provide strategic recommendations and future solutions. For example, with prescriptive analytics, auditors can formulate the entire range of possible results from the audit inputs obtained with prescriptive analytics. It will be very useful in the formulation of the company's internal control strategy. The results will then help support decision-making.

Based on the types of data analytics above, it can be understood that the data analytics function has powerful relevance to the auditing function. In turn, the data analytics function will add value to the audit by increasing audit credibility. However, the problem is that auditing practices in the digital era require auditors to have data analytics expertise. Meanwhile, current professional auditors generally do not have this expertise. As a result, there is a demand for formal or non-formal educational institutions to prepare auditors with data analytics expertise [3].

The next challenge is that technical skills such as data registration, control, and auditing, which were also initially carried out by auditors, are no longer needed [2]. So that, the quantity of auditor profession will be reduced, and in turn, the competition will be tighter. However, that condition can increase audit intensity due to the continuous availability of financial information. Therefore, audit professionals should consider applying progressive audit methods [4]. Thus, the audit workload becomes relatively high so that the number of human resources needed will also be quite large.

Other researchers also point out that there are challenges in using data analysis, namely knowledge and skills, data problems, time and cost, customer resistance, litigation risk, and SAI activities [18]. Therefore, auditors must possess a certain level of skill and awareness of technology about big data analytics, including mastery of software (e.g., Oracle, SAP, QuickBooks, Sage, Python, SPSS, SAS, and Excel); data mining,

interpretation, data design, modeling, programming, and Management Skills [19]. Auditors must also know how to efficiently store, organize, use, maintain, and analyze various types of data to assist with risk assessment, analytical procedures, and in-depth audit processes. Mastery of these complex skills is a significant and crucial challenge to be addressed by the auditor.

With the mastery of data analytics expertise, the auditor will gain efficiency and effectiveness in auditing work. Auditors will spend less time auditing financial statements, audit evaluations will be more focused and quality, produce higher quality audit evidence, and improve the quality and insight of the audit itself [18]. Auditors can gain insight into the company's risk exposure, operations, and performance and build a complete database of valuable information. Data analytics can also help reduce discrepancies between accounting and reporting standards. Thus, not only the way the mastery of data analytics will significantly help the auditor's works but also the quality and accuracy of his work will increase in line with the benefits obtained [15]. These advantages will be more substantial if the application of auditing practices is integrated with the auditee's big data environment [4]. However, the concept certainly requires further adjustments due to the high risk of distribution of company data due to the potential for hacking.

5 Conclusion

The integration of data analytics into the audit process significantly improves audit quality and credibility. With rapid technological advances, data analysis capabilities will continue to develop to improve the efficiency of audit work while maintaining high quality. Big data has been on auditors' faces with large amounts of data. Therefore auditor should deal with the data analytics skill to describe phenomena accompanying interpretation and prediction formulas for identifying fraud, internal control, management decision making. In that case, data analysis is indeed more effective. Data analysis transforms auditing by allowing auditors to process 100% of transactions in a data group. Auditors can quickly see patterns and connections in large amounts of data, graphically present survey results, and identify high-risk areas for further audit testing with the help of data analytics. Data analysts and auditors need to have clear communication channels to establish the most effective and valuable ways to use data analysis in the future. It will significantly improve audit quality and make audits more specific and focused on addressing high-risk areas better. It can ultimately help provide more detailed and helpful feedback to customers.

Although the central role of the auditor will not change, the conduct of future audits will be very different from today's audits, and so will the audit subjects. However, it is undeniable that because of technological automation, this shift will threaten the loss of the auditor profession. In addition, competition in the big data era comes from audit companies and auditee companies. To that end, the industry needs to work closely with key stakeholders, from audited companies to regulators and standard setters, namely the Indonesian Institute of Certified Public Accountants and the Indonesian Institute of Accountants, to respond quickly to developments by reviewing applicable audits and accounting standards. Auditors also need to improve their skills in using data analysis tools effectively. Finally, the main hope is that data analysis as a strategic analysis

provides a macro overview of fraud risk to do mitigation. Future research could look at how other technologies affect the auditing industry, such as artificial intelligence (AI). It will enable the audit industry to prepare for the upcoming changes that will affect the industry in the years to come.

Based on this literature study, there are still some limitations in the method of analysis and development of a framework that uses a literature review that is limited to existing theories. Nevertheless, the implications of this research are for auditors to see opportunities for the auditor profession in the future by developing self-competence following the big data era. In the future, new discoveries may bring an impact from blockchain technology. In addition, a depth interview will be great for research. It allows a better representation of the population.

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