

Adoption of Big Data Analytics in Indonesian Public Sector Auditing

Rahayu Alkam^{1*} Achdian Anggreny Bangsawan² Indri Iswardhani³

^{1*,3} Universitas Negeri Makassar, Makassar, Indonesia.

Email: rahayu.alkam@unm.ac.id, indri.iswardhani@unm.ac.id

² Universitas Muslim Indonesia, Makassar, Indonesia.

Email: achdian.anggreny@umi.ac.id

ARTICLE HISTORY

Submitted : May 09, 2026
Reviewed : May 16, 2026
Revised : May 24, 2026
Accepted : May 29, 2026
Published : May 31, 2026

Conflict of Interest Statement:

The author(s) declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

ABSTRACT

Purpose: This study aimed to examine the adoption of big data analytics (BDA) in public sector auditing in Indonesia, based on empirical data collected in 2022. The growing use of digital technologies in audit processes is expected to improve effectiveness and efficiency; however, their implementation also demands considerable financial and organizational resources. Thus, it is important to explore both the benefits and challenges of BDA adoption in the public sector context.

Research Method: Data were collected through in-depth semi-structured interviews with eight auditors from IT and non-IT backgrounds. A qualitative approach was used to analyze the data, supported by a big data governance framework.

Results and Discussion: The findings indicate that BDA adoption in Indonesian public-sector auditing remains at an early stage. Although BDA offers opportunities such as improved red-flag detection, full-population analysis, and enhanced audit effectiveness and efficiency, several challenges remain, including platform stability, data accessibility, and human resource readiness.

Implications: This study provides empirical evidence on the processes, opportunities, and challenges of BDA utilization from the perspective of public-sector auditors. Future studies should examine further developments in BDA use in Indonesian public institutions and offer new perspectives through different participants or methods. BPK is expected to prioritize human resource readiness and platform development.

Originality: This study contributes to the limited empirical research on BDA utilization in public sector auditing by presenting insights from auditors' perspectives.

Keywords: big data analytics; BPK; public sector audit.

1. Introduction

Adoption of various types of information technology in the public sector has increased significantly in recent years. This is inseparable from the phenomenon of digital transformation across sectors, including the public sector. Direct digitization and digitalization increase the volume of data managed by public sector entities. For example, by 2021, the European Data Portal, which collects public-sector information on EU countries, had 1.1 million datasets (Domeyer *et al.*, 2021). Rapid data management is certainly a positive thing because it can increase the value provided by the public sector. McKinsey

Global Institute even estimates that the value that can be provided by data and analytics in the public and social sectors is up to \$1.2 trillion (Ghia *et al.*, 2021).

In the transformation process, public sector entities adopt big data and data analytics, often referred to as big data analytics (BDA). BDA adoption has been proven to provide added value in public sector management. For example, the use of big data analysis in public policy formulation, using social, historical, and predictive data, can improve policy accuracy by offering anticipatory, reflective, and innovative solutions (Rahmanto *et al.*, 2021). Big data analytics is expected to have a major impact on the functioning of public sector organizations in the future, as it can create new opportunities for these entities (Gamage, 2016). Accountability and transparency can also be strengthened through the implementation of data analytics, AI, and other forms of digitization (Ferry *et al.*, 2022).

Furthermore, the transformation of the public sector has implications for public sector audits, as audits must meet the needs and expectations of their clients. This means that the public sector's dependence on digitalization also affects the transformation of public sector audit institutions. The increase in the volume of data managed by the public sector also affects the audit process, which is transforming. In this case, the public sector audit institution, the Supreme Audit Agency (BPK), also adopts the latest audit technology, such as BDA. The need for BDA use in audit assignments can be linked to fluency theory, as information overload can affect audit effectiveness and efficiency. Research has shown that large amounts of information can lead to low processing speed and highly skeptical judgments and actions, which can result in inefficiencies and ultimately impact audit quality (Andiola *et al.*, 2019).

If reviewed more deeply, the use of BDA in audit assignments also has various positive impacts. Research has found that data analytics can add value to auditing practices by increasing audit efficiency and supporting the digital transformation of audit work (Hezam *et al.*, 2023). In addition, BDA analysis of data collected during the audit process can yield better audit outcomes (Zam *et al.*, 2021). From an auditor's perspective, empirical research on the impact of BDA on the audit and assurance services market in Australia reveals that BDA can make auditors focus their minds and expertise on types of work that require critical evaluation or on key audit considerations rather than wrestling with manual and intensive tasks (Kend & Nguyen, 2020). In addition, regarding the auditor's acceptance of BDA and its impact on audit quality, it is known that both perceived usefulness and perceived ease of use have a direct effect on audit quality, even when not moderated by the actual use variable (Al-Ateeq *et al.*, 2022). This result is supported by other research, which posits that the use of analytical data can increase audit quality (Appelbaum *et al.*, 2017). Moreover, auditors can use big data in their analysis to improve audit quality and continuity of audit reviews (Ditkaew & Suttipun, 2023). Also, the various benefits of using analytical data in public sector audits will improve audit performance, which will directly and indirectly improve public financial management, public accountability, and responsibility, thereby improving public policies and services (Lazarevska *et al.*, 2022). This issue becomes increasingly important as governmental auditors are required to adopt strategic, risk-oriented approaches that align audit objectives with organizational goals and priorities (Noch & Sonjaya, 2024).

Although it has promising implications for auditing practice, the use of data analytics in audit assignments still lags behind other practice areas due to the specific challenges audits face in implementing data analytics (Earley, 2015). The use of big data techniques in audits is less widespread than in other related fields (Gepp *et al.*, 2018). The amount and type of data used in analysis have increased significantly in recent years, even though data analysis has long been used in accounting (Herath & Joshi, 2023). Earley also put forward the challenges that led to the suboptimal implementation

of data analytics in audit assignments into three main categories: auditor training and expertise; availability, relevance, and integrity of data; and expectations of regulators and users of financial statements (Earley, 2015).

Various challenges that arise after the implementation of BDA in public sector audits can certainly affect the success of the adoption. The implementation of technology to increase the effectiveness and efficiency of public sector audits requires significant financial resources. Therefore, it is very important to examine the issues and challenges involved in adopting a technology such as BDA. The success of technology adoption can then be increased by understanding and managing the identified issues.

This research was conducted using a qualitative approach. Data were obtained through in-depth interviews with eight participants who are public sector auditors with IT and non-IT backgrounds. Analysis was carried out by grouping themes and sub-themes from interview transcripts to answer the research questions. The results of the analysis show that the use of BDA in public-sector audits in Indonesia remains in its early stages. Several issues, including platform stability, accessibility, and resource readiness, are challenges in BDA utilization. However, there are various potential benefits of using BDA in Indonesian public sector audit institutions, including ease of red-flag detection, population testing, and increased audit effectiveness and efficiency.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents research methodology. Section 4 provides empirical results and discussion. Section 5 presents the conclusion.

2. Literature Review and Hypothesis Development

Empirical research on BDA in auditing generally represents a private-sector audit perspective, such as (Kend & Nguyen, 2020); (De Santis & D'Onza, 2021); (Dagiliene & Kloviene, 2019); (Ditkaew & Suttipun, 2023). Discussions regarding the utilization of BDA in public sector audits are also generally carried out in the literature or in theoretical studies, such as Rozario & Issa (2020) and Zam *et al.*, (2019). Several existing empirical studies have been conducted only in the context of certain countries, such as Zam *et al.*, (2021) and Lazarevska *et al.*, (2022). Empirical research on the use of BDA in public sector audits in Indonesia remains very limited, particularly studies that specifically explore the opportunities and challenges encountered in BDA implementation. This research can complement the research by Pratama and Komariyah (2023), which examined the acceptance of the BDA technology platform by Indonesian government auditors.

Therefore, this study seeks to fill the gap by analyzing the use of BDA in public-sector auditing in Indonesia, examining the opportunities and challenges for optimizing BDA in the future. The research results are expected to provide empirical insights into BDA utilization from the perspective of public sector auditors. Based on the background and objectives stated, this study formulates two research questions: how is big data analytics utilized in public sector audits in Indonesia, and what are the opportunities and challenges for its utilization in public sector audits in Indonesia.

Furthermore, the definition of big data in Gartner's IT Dictionary is high-volume, high-speed, and/or diverse information assets that require cost-effective and innovative information processing to enable greater insight, decision-making, and process automation (Gartner, 2016). The BDA is a method that uses sophisticated analytical techniques to obtain, organize, and analyze massive data sets. Data

analytics requires technology and statistical methods to monitor business processes, analyze performance, and present financial data in a more meaningful form (Herath & Joshi, 2023).

To elaborate on the analysis, this study uses the model developed by Kim & Cho (2018), namely the Big Data Governance Framework in Figure 1. This framework is used in the analysis because it is considered capable of evaluating BDA utilization by assessing the extent to which big data is managed. The big data management framework includes four important aspects: IT infrastructure, components, strategy, and objectives. Each aspect includes several sub-aspects that can be linked to BDA utilization in the public sector.

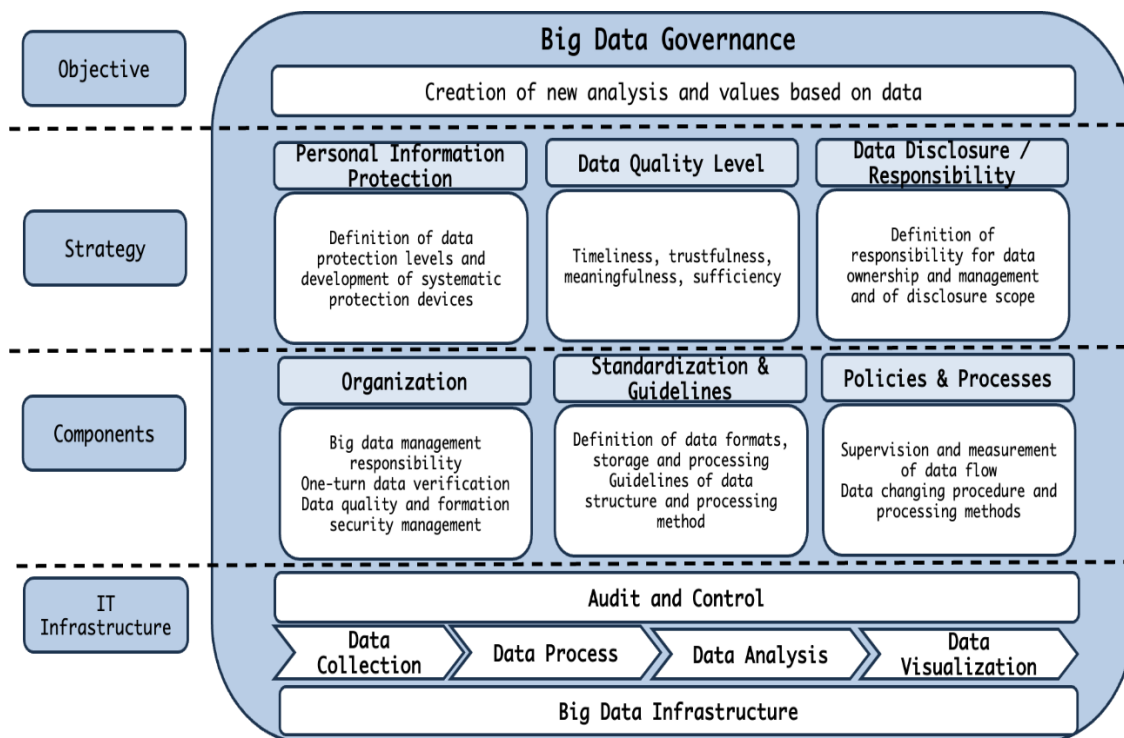


Figure 1. Big Data Management Framework (Kim & Cho, 2018)

This study will review BDA utilization at BPK through four aspects. From an objective perspective, BDA utilization must provide added value to the organization. These objectives must then be translated into strategies. The big data management framework highlights the importance of personal information protection, data quality, and data disclosure/responsibility as management strategies. Strategic operationalization can be carried out through three components: organizational management of big data, standards and guidelines, and policies and processes. The last aspect is IT infrastructure, particularly as it relates to big data. One evaluation is to review how the infrastructure is optimized in BDA.

3. Research Method

This study uses a qualitative approach to answer research questions. Data were collected through in-depth interviews in 2022 with eight BPK auditors who had more than 10 years of work experience. The

selection of BPK auditors as participants was based on the belief that they are an important part of Indonesian public sector audit organizations that have utilized and will continue to utilize BDA in carrying out various audit assignments. The BPK auditor's perspective can provide important initial information for further analysis on other aspects of the organization. Participant acquisition is carried out using the snowball technique, in which one participant directs and recommends other participants. The eight participants who were successfully interviewed had both IT and non-IT backgrounds to represent diverse perspectives. Research questions include the auditor's understanding of big data analytics and aspects of BDA implementation practices, as well as the opportunities and challenges perceived by each participant.

The results of the interviews were then transcribed and coded into groups of sub-themes and themes to answer the research questions. The grouping of themes and sub-themes is done using NVivo. Triangulation of methods and sources was also carried out to ensure the reliability of the data obtained. Method triangulation was carried out by matching the interview results with those from the available document analysis. In addition, the results of interviews with participants from IT and non-IT backgrounds were compared as a form of source triangulation.

4. Results and Discussion

4.1 Analysis Results

According to participants, the use of big data analytics at BPK has occurred at least in the past two years. Several participants emphasized that big data analytics, or what BPK termed BIDICS, is a new technology within BPK's scope. Even though big data was known earlier, the analysis of big data will only start at the end of 2021. Even widespread socialization of big data analytics for auditors had been carried out only in early 2022. This shows that BDA utilization is still in its early phase. Big data analytics is currently applied only to financial audits.

"On big data, as far as what I have seen, it has not been long, it is in 2020, if I am not mistaken" (A2).

"But at the end of 2021, BPK already had big data analytics, so we have been proactive, we have taken data from the ministry" (A5).

BPK's analysis of big data is inseparable from the digital transformation that has occurred within BPK and among auditees. The massive digitization of public sector institutions requires BPK to update its e-audit platform to adapt to big data. E-audit, as a platform used at the beginning of the digital transformation period, was considered unable to keep up with organizational data needs, so a platform was developed through Big Data Analytics (BIDICS) with capabilities that match organizational needs. BIDICS is considered capable of handling larger and more unstructured data, offers richer features, and can load more data.

The development of BDA to deliver new value demonstrates that sustainable goals have guided the organization's big data management. The desire to improve data processing on the platform is then brought down to the strategy level by focusing on improving data quality. From a component perspective, the organization's big data management is the responsibility of the Technology Bureau. This bureau plays a vital role in the management of big data, including data quality management and

information security, standards and guidelines for processing to data storage, and supervision policies and data change procedures.

Specifically, data analysis technology at BPK can be top-down or bottom-up. Top-down technology is a platform (tools) provided by BPK, centrally through the Information Technology Bureau, as a standardized, widely used data analysis tool, enabling the results to be utilized by all auditors. This platform is web-based, making it easier for auditors to use. The processed data is generally structured, standardized, recognized, and frequently used by the auditor. Bottom-up technology is data analysis initiated and carried out by auditors, especially by each audit team, according to the needs and objectives of the audit being conducted.

According to participants, auditors have carried out big data analysis by collecting specific data from various entities, such as goods and services procurement data from multiple ministries, using existing technology to support decision-making. The results of data analysis are generally used as initial data that determine audit steps in the field. This means that BDA is more widely used at the audit planning stage. According to previous research, the data analysis is exploratory in nature because the auditor is carried out inductively through understanding the entity and the environment, identifying and assessing the risks of misstatement, and planning further audit procedures (Byrnes *et al.*, 2014). This proactive action indicates that an IT infrastructure is in place, enabling auditors to collect, process, analyze, and visualize data using big data, especially at the audit planning stage.

"All data on the entity related to the inspection has started to be carried out by data analytics... before going to the field to conduct an audit, the team already had information that was valid and came from data that had already been processed" (A1).

"What needs to be examined can be seen from the Big Data because we can understand the characteristics of the ministries, regional governments, and what the characteristics and risks are, so that they can be mapped. Then, policy makers can determine which areas will be audited" (A4).

Several participants emphasized that BPK will develop big data analytics technology over the next few years. This is in accordance with the direction of BPK's IT development strategy. Current developments focus on stabilization, while future developments may focus on adding features and increasing the readiness of human resources, especially auditors, in BIDICS utilization. Renewal of IT infrastructure, especially to increase platform capacity and capability, also needs to be planned to manage large volumes of data and ensure the quality of the data obtained. The integration of key data, such as local government revenues and spending, can also have a significant impact on future audits.

The existence of strategic and sustainable planning for big data management is important for optimizing the benefits obtained. Organizations must consider the cost-benefit of investing in big data infrastructure, as well as across all aspects of the big data management framework. Previous research emphasizes that in order to reap the benefits of big data, governments need to invest in research, provide incentives for public and private entities to share data, and organize programs to develop specific skills (Gamage, 2016). In addition, the government must also address issues related to privacy, security, access, and data quality.

"In the future, maybe the direction will be like that, because we are still in the initial phase; it has only been two years. So, what I mentioned earlier were the first two things

more about stabilization. Then later the feature enhancements will simultaneously build awareness and willingness from the auditors to implement it" (A6).

"We want to add the menus in BIDICS" (A8).

4.2 Discussion

The use of big data analytics in the audit process has changed the way auditors work. One of the changes participants reported was the broadening of the scope of tests auditors could perform. This is inseparable from the availability of data accessible and analyzable by the auditor. Through BIDICS, auditors can now access agency data that previously could not be obtained when the agency was not the auditee. In addition to expanding access, the data format accessed by the auditor is considered very helpful because it makes further analysis easier.

Various other benefits of using big data analytics were also reported by several participants. In general, effectiveness and efficiency are seen as the main benefits of big data analytics. This is consistent with research that states that increasing effectiveness and efficiency is the main implication of BDA utilization (Hezam *et al.*, 2023). Effectiveness includes compliance with data analysis quality standards to achieve audit objectives, while efficiency includes reducing the time, resources, and effort required of the auditor to conduct the analysis. Of course, this efficiency and effectiveness can also be seen in changes in auditor work patterns, which enable BDA to focus auditors more on critical evaluation and audit considerations, so they are no longer struggling with manual and intensive tasks (Kend & Nguyen, 2020).

"Therefore, a data analytic model was built to be a uniform model that all auditors can use, so this will move resources, will reduce the effort made by the auditor to carry out the analysis" (A6).

"This analysis (BIDICS) makes it easier... usually we started work/analyze when we meet the auditee, but with BIDICS, the data is already there before we go to the entity, the analysis is already there, and we already figured it out" (A8).

In addition to effectiveness and efficiency, auditors' analysis of big data is considered to provide broader benefits beyond just assisting decision-making during the audit process. Through big data analytics, the information obtained by the auditor becomes more comprehensive, providing additional value for the auditor and the entity being examined. Auditors can make predictions through mapping and analysis even before conducting field audits. The audited entity can obtain better recommendations because the auditors have tested an extensive database. This also demonstrates the reliability of the audit process, supported by strong data. These results support the proposition of previous research (Ditkaew & Suttipun, 2023), which emphasizes that BDA can improve audit quality.

"...with big data it can be more predictive, for example, it provides more insight, not just a decision support system" (A2).

"The more databases we test, the conclusions given by the BPK are closer to reasonable, more adequate to provide conclusions so that the regional government or the central government can get input from the BPK, so it is more comprehensive" (A5).

Furthermore, several participants suggested additional potential benefits of optimal use of big data analytics in the future. One of these potentials is the significant opportunity to identify problems, deviations, anomalies, errors, or red flags in the early stages of the inspection. This benefit has been stated by Aboud & Robinson, who revealed that BDA has become an effective tool in efforts to eradicate fraud. Early identification from big data analytics results will assist auditors in mapping audit risk, further increasing the reliability of the audit process, especially in choosing sampling. Through targeted sampling, audit efficiency and effectiveness can be increased by focusing on samples with anomalies, thereby shortening time and improving accuracy.

"But it makes it easier for us to narrow down the sampling method. So, for those that are systemically detected as having an anomaly, we can use them as samples for further investigation... That is all we sampled. That will shorten the time, increase accuracy, be more efficient, and it will be higher" (A4).

"Now the information we get from the crawling data carried out at BIDICS helps us to diagnose or determine if there is a red flag at this client, we must focus on exploring the work they are doing, so that is what happened, so it (BIDICS) really helps" (A7).

In addition to identifying red flags, big data analysis can also accelerate the trend toward population testing. This is because an understanding of broad data can represent an understanding of the population as a whole. Auditors can use their understanding of big data to determine areas to examine or to guide more targeted and measurable sampling. Big data analytics technology can even test populations photographed using certain analytical models, applying algorithmic instructions or formulas. Zam *et al.*, (2019) have emphasized that, by using technology and tools in BDA, analysis can be carried out on all data, yielding more comprehensive results than sampling smaller data sets. This is considered capable of providing a clearer picture of public sector performance, thereby improving the services it provides.

"Firstly, we can see a wider population than before. When the data has not been digitized, we cannot see the population in one table..." (A4).

"Regarding population testing, it can indeed be carried out by big data analytics technology, which does have such capability, one example is the testing of central government data" (A6).

Apart from the many potential benefits of using big data analytics, several challenges concern the participants. The majority of these challenges relate to the use of big data analytics, which is still new. Platforms that are not yet well-established and not very user-friendly, especially for auditors with non-IT backgrounds, are one of the problems expressed by the participants. Another problem is the uneven understanding of auditors regarding the functions and benefits of big data analytics due to limited outreach and related training. Broad access rights to the BIDICS platform remain limited to auditors with major responsibilities within the audit team structure. The problem of limited training and expertise among auditors, as well as the availability, relevance, and integrity of this data, has also been identified by Earley (2015) as an inhibiting factor for optimizing BDA in audit assignments.

"It is still not very user-friendly, only an IT auditor can do it, we still often ask for help from an IT auditor to retrieve the data... What is difficult is related to big data; it is still a small quantity of an application that is not well established yet" (A4).

"The use of BIDICS is actually still limited. By the auditor himself, access to BIDICS is adjusted to the level in his assignment letter when he is registered. It is still limited there as far as I know" (A8).

The problem of limited accessibility is feared to reduce the potential benefits of big data analytics. For example, population testing cannot be carried out if the auditor's access to BIDICS remains limited and the data available is not yet complete. This accessibility problem is also related to data connectivity with the auditee, as demand for data access will intensify in the future. If access to "big data" can be obtained through the BIDICS platform, such as poverty data, population data, education data, health insurance data, and social security data, then the added value increase for the audit will be significant because the audit is carried out by utilizing data related to the biggest budget.

Another challenge revealed was platform reliability. The issue of platform stability is important because it relates to technological sophistication and data security, which Merhi & Bregu (2020) found to be the most important factors affecting the effectiveness and efficiency of big data utilization. In addition, the issue of platform stability is a challenge in itself because it not only affects the results of the analysis but also has an impact on the auditor's desire to use the platform to carry out general analysis, for example, in conducting financial audits or initiating independent analysis with the help of platforms, for example, in conducting performance audits. The need for additional features and analytical models for auditors can increase the reliability of big data analytics, thereby enabling optimal use. The legitimacy of BDA's benefits will encourage wider adoption among auditors. The reliability of the platform is also evident in its ability to accommodate the large volumes of data needed for audits. The availability of big data accessible to auditors will certainly improve audit quality, including the number of recommendations that can be provided to audit entities. The identification of red flags for fraud can be increased when auditors utilize "big data".

Furthermore, the auditor expressed pessimism regarding BPK's optimal utilization of big data analytics in the coming years. Other accessibility issues, such as different data types, data integration, and connections with entity systems, as well as platform reliability issues, including platform capacity and data storage, are considered to hinder the positive impact of BIDICS utilization. Moreover, data obtained from various platforms should be modeled into a standardized format for auditing, so that the auditor does not experience difficulties or spend a long time just processing the extract, transform, and load (ETL).

"The problem in data analytics, to my knowledge, is that if the data is different, it will definitely be difficult. Especially if the data is already running in the entity system, integrating it will be difficult. That is the obstacle for sure because the Ministry must also feel that their application is good. So, it might be difficult there" (A3).

"...But still it is only used in the examination and still cannot jump (directly) to a conclusion. It only makes it easier for us to get data faster and organize the data for sampling" (A4).

In general, the use of BDA in Indonesian public-sector audits was still in its early stages. If viewed from the big data management framework, the four main aspects, namely objectives, strategy, components, and IT infrastructure, have been mentioned by the participants, which means that these aspects have been fulfilled, and big data management has been carried out properly. However, if we take a deeper look at each aspect, we find that several sub-aspects remain challenging for auditors and have not even been explained explicitly by participants, indicating that there is still room to improve big data management in the future.

The majority of the BDA utilization that has been running was in the early stages of the audit. This is still exploratory (inductive) and not yet confirmatory (deductive) (Byrnes *et al.*, 2014). The various benefits perceived by the auditor were also in line with several benefits disclosed by previous studies such as increased effectiveness and efficiency in audit assignments because the automation and modernization of audit procedures allows the auditor to focus more on areas and aspects that require consideration and evaluation (Lazarevska *et al.*, 2022) and gives great potential as an effective tool in dealing with fraud (Aboud & Robinson, 2022). Analytic technologies also enhance the accuracy and efficiency of audits by enabling real-time analysis and predictive insight (Sutisna, 2025).

As for several challenges raised by participants regarding auditor readiness, in line with one of the problems found in previous research (Hezam *et al.*, 2023), namely training and competence of auditors, and stated by Balios *et al.*, (2020), namely the limited number of professionals who have the knowledge and expertise to use the required BDA tools. The human resource aspect must be the main focus for BPK in optimizing investments in BDA, both past and future. This is because the auditor's perception of the ease of using BDA does not directly affect audit quality when actual BDA use serves as a moderator (Al-Ateeq *et al.*, 2022). This implies that the auditor is still unable to optimize the available tools in order to improve audit quality. This result is in line with the challenges of implementing big data at the Malaysian National Audit Department, which include training, organization, the need for BDA adoption, and technology (Zam *et al.*, 2021).

The stability of the BDA platform must also be a concern for BDA's future development and investment. Issues of data integration, connection with entity systems, data storage capabilities, and accessibility must be resolved. This is because the levels of technological sophistication and data security are the most important factors affecting the effectiveness and efficiency of big data use (Merhi & Bregu, 2020). Moreover, robust data governance, auditor training, and regulatory adaptation are among several factors that need to be in place to optimize the contribution of technologies to secure and transparent audit processes (Sutisna, 2025). Providing a BDA platform without further development is, of course, not enough because big data alone will not provide a competitive advantage without the appropriate technology, reliable processing power, and the right algorithms so that it can collect data from various sources and the ability to evaluate large amounts of information (Herath & Joshi, 2023). Available platforms must continue to be developed so they become tools that facilitate and support all the analytical models the auditor desires.

The answers to the many challenges facing the Indonesian public sector audit lie at the level of the organization as a whole. The same challenge was also raised in previous research (Austin *et al.*, 2018). The challenges include finding a suitable set of skills, obtaining and preparing data, resolving cost issues, and changing the organizational culture to be data-driven, which can be addressed by decision-makers at the organizational level (Austin *et al.*, 2018). Organizations must also strengthen collaboration and cooperation with various parties, especially with public sector entities that are audited, so that confidentiality issues, as emphasized in previous research (Merhi & Bregu, 2020), and other

issues related to BDA, such as privacy, security, access, and data quality, as stated by another research (Gamage, 2016) is not an obstacle to BDA optimization. Investments in research and development, incentives for public and private entities to share data, and a series of skills development programs are also among the solutions that decision-makers need to implement to optimize the benefits of BDA (Gamage, 2016).

5. Concluding Remarks and Recommendation

Utilization of big data analytics in public sector audits in Indonesia is still in its early phase. Aspects in the big data management framework, such as goals, strategies, components, and IT infrastructure, have received organizational attention. However, the implementation carried out is generally still exploratory, undertaken in the early stages of the audit assignment. The non-optimal implementation of BDA technology is associated with several challenges that must be resolved, including resource readiness, accessibility, and platform stability. Nevertheless, the opportunities and potential benefits of BDA, as perceived by the auditors, are quite promising, particularly the significant increase in audit effectiveness and efficiency, the potential for population testing, and the ability to detect red flags early.

This research is expected to provide empirical evidence on the processes, opportunities, and challenges of BDA utilization from the perspective of public-sector auditors. This study has a temporal limitation, as the data were collected in 2022. Consequently, the conditions reported may not fully reflect the context at the time of publication; however, some of the insights remain applicable. Moreover, the data in this study were obtained solely from the auditor's perspective and have not yet been examined from the perspectives of the leaders or decision-makers of public sector audit institutions, who can contribute to addressing the challenges. Future research is urgently needed to examine developments in the use of BDA in Indonesian public sector institutions and to provide new perspectives from different participants or research approaches. BPK is expected to focus more on human resources and platform development.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

References

- Aboud, A., & Robinson, B. (2022). Fraudulent financial reporting and data analytics: An explanatory study from Ireland. *Accounting Research Journal*, 35(1), 21–36. <https://doi.org/10.1108/ARJ-04-2020-0079>
- Al-Ateeq, B., Sawan, N., Al-Hajaya, K., Altarawneh, M., & Al-Makhadmeh, A. (2022). Big data analytics in auditing and the consequences for audit quality: A study using the technology acceptance model (TAM). *Corporate Governance and Organizational Behavior Review*, 6(1), 64–78. <https://doi.org/10.22495/cgobrv6i1p5>
- Andiola, L. M., Brink, A. G., Lynch, E., & Ferguson, J. L. (2019). Client Data Files and Auditor Skepticism: How Do “Dirty” Files Influence Auditors’ Skeptical Judgments and Actions? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3395571>



- Appelbaum, D., Kogan, A., & Vasarhelyi, M. A. (2017). Big Data and Analytics in the Modern Audit Engagement: Research Needs. *AUDITING: A Journal of Practice & Theory*, 36(4), 1–27. <https://doi.org/10.2308/ajpt-51684>
- Austin, A. A., Carpenter, T., Christ, M. H., & Nielson, C. (2018). The Data Analytics Transformation: Evidence From Auditors, CFOs, and Standard-Setters. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3214140>
- Balios, D., Kotsilaras, P., Eriotis, N., & Vasiliou, D. (2020). Big Data, Data Analytics and External Auditing. *Journal of Modern Accounting and Auditing*, 16(5). <https://doi.org/10.17265/1548-6583/2020.05.002>
- Byrnes, P., Criste, T., Stewart, T., & Vasarhelyi, M. (2014). Re-imagining Auditing in a Wired World. AICPA Assurance Services Executive Committee (ASEC) Emerging Assurance Technologies Task Force.
- Dagilienne, L., & Kloviene, L. (2019). Motivation to use big data and big data analytics in external auditing. *Managerial Auditing Journal*, 34(7), 750–782. <https://doi.org/10.1108/MAJ-01-2018-1773>
- De Santis, F., & D'Onza, G. (2021). Big data and data analytics in auditing: In search of legitimacy. *Meditari Accountancy Research*, 29(5), 1088–1112. <https://doi.org/10.1108/MEDAR-03-2020-0838>
- Ditkaew, K., & Suttipun, M. (2023). The impact of audit data analytics on audit quality and audit review continuity in Thailand. *Asian Journal of Accounting Research*, 8(3), 269–278. <https://doi.org/10.1108/AJAR-04-2022-0114>
- Domeyer, A., Hieronimus, S., Klier, J., & Weber, T. (2021, September 20). Government data management for the digital age. McKinsey & Company. <https://www.mckinsey.com/industries/public-sector/our-insights/government-data-management-for-the-digital-age>
- Earley, C. E. (2015). Data analytics in auditing: Opportunities and challenges. *Business Horizons*, 58(5), 493–500. <https://doi.org/10.1016/j.bushor.2015.05.002>
- Ferry, L., Radcliffe, V. S., & Steccolini, I. (2022). The future of public audit. *Financial Accountability & Management*, 38(3), 325–336. <https://doi.org/10.1111/faam.12339>
- Gamage, P. (2016). New development: Leveraging 'big data' analytics in the public sector. *Public Money & Management*, 36(5), 385–390. <https://doi.org/10.1080/09540962.2016.1194087>
- Gartner. (2016). Big Data. In Gartner. https://www.gartner.com/en/information-technology/glossary/big-data?_its=JTDcJTlydmlkJTlyJTJNBjTlyMzg1NTZkYzAtMjZkZi00ZTIhLWE4ZTI0ODZiMzU4N2Y3ZTU4JTlyJTJDJTlyc3RhZGUIMjIIM0EIMjIyYHR%2BMTY4NDU5MDMxN35sYW5kfjFmTY0NjVfc2VvXzlhY2lwMjk3ZDJmO DkwNTZhOGeyMTc3ODg3MmZkOGM0JTlyJTJDJTlyc2I0ZUIkJTlyJTJNBNDAXMzEIN0Q%3D
- Gepp, A., Linnenluecke, M. K., O'Neill, T. J., & Smith, T. (2018). Big data techniques in auditing research and practice: Current trends and future opportunities. *Journal of Accounting Literature*, 40(1), 102–115. <https://doi.org/10.1016/j.acclit.2017.05.003>
- Ghia, A., Langstaff, M., Ware, D., & Wavra, R. (2021, March 18). Accelerating data and analytics transformations in the public sector. McKinsey & Company. <https://www.mckinsey.com/industries/public-sector/our-insights/accelerating-data-and-analytics-transformations-in-the-public-sector>
- Herath, S. K., & Joshi, P. L. (2023). A Game Changer for Audit Firms. *International Journal of Auditing and Accounting Studies*, Special Issue on Auditing in the Digital Age, 5(1), 29–48.
- Hezam, Y. A. A., Anthonyamy, L., & Suppiah, S. D. K. (2023). Big Data Analytics and Auditing: A Review and Synthesis of Literature. *Emerging Science Journal*, 7(2), 629–642. <https://doi.org/10.28991/ESJ-2023-07-02-023>
- Kend, M., & Nguyen, L. A. (2020). Big Data Analytics and Other Emerging Technologies: The Impact on the Australian Audit and Assurance Profession. *Australian Accounting Review*, 30(4), 269–282. <https://doi.org/10.1111/auar.12305>
- Kim, H. Y., & Cho, J.-S. (2018). Data governance framework for big data implementation with NPS Case Analysis in Korea. *Journal of Business and Retail Management Research (JBRMR)*, 12(3).
- Lazarevska, Z. B., Tocev, T., & Dionisijev, I. (2022). How to Improve Performance in Public Sector Auditing Through the Power of Big Data and Data Analytics – The Case of The Republic Of North Macedonia. *Journal of Accounting Finance and Auditing Studies (JAFAS)*, 3. <https://doi.org/10.32602/jafas.2022.023>

- Merhi, M. I., & Bregu, K. (2020). Effective and efficient usage of big data analytics in public sector. *Transforming Government: People, Process and Policy*, 14(4), 605–622. <https://doi.org/10.1108/TG-08-2019-0083>
- Noch, M. Y., & Sonjaya, Y. (2024). Leveraging Governmental Auditing for Strategic Decision-Making and Policy Evaluation. *Advances in Managerial Auditing Research*, 2(1). <https://doi.org/10.60079/amar.v2i1.286>
- Pratama, F. W., & Komariyah, E. F. (2023). Examining the Auditors' Acceptance of Big Data Analytics Technology Platform: Evidence from Government Auditors in Indonesia. 26.
- Rahmanto, F., Pribadi, U., & Priyanto, A. (2021). Big Data: What are the Implications for Public Sector Policy in Society 5.0 Era? *IOP Conference Series: Earth and Environmental Science*, 717(1), 012009. <https://doi.org/10.1088/1755-1315/717/1/012009>
- Rozario, A. M., & Issa, H. (2020). Risk-based data analytics in the government sector: A case study for a U.S. county. *Government Information Quarterly*. <https://doi.org/10.1016/j.giq.2020.101457>
- Sutisna, E. (2025). Evaluating Security Risks and the Impact of Analytic Technology on the Audit Process. *Advances in Managerial Auditing Research*, 3(1), 30–43. <https://doi.org/10.60079/amar.v3i1.419>
- Zam, U. M. A. U. M., Saidin, A. Z., & Hussin, H. (2019). EXPLORING DATA ANALYTICS FOR PUBLIC SECTOR AUDITING. *International Journal of Technology Management and Information System*, 1(2), 70–80.
- Zam, U. M. A. U. M., Saidin, A. Z., Kartiwi, M., & Mahmud, M. (2021). BIG DATA ANALYTICS IN THE GOVERNMENT: ISSUES CONCERNING PUBLIC SECTOR AUDITING. *Journal of Engineering Science and Technology Special Issue on ACSAT*, 6(Special Issue), 58–58.

Corresponding author

Rahayu Alkam can be contacted at: rahayu.alkam@unm.ac.id

