

## The Determinant and Impact of Big Data Analytics Adoption on Public Sector Audit Outcomes

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### ABSTRACT

**Objective** –This research investigates the determinants of big data analytics (BDA) adoption in public sector audit, namely system quality, and subsequent impacts on three aspects: audit performance, judgment, and quality. This study also examines the role of audit judgment and audit performance as mediating variables.

**Design/Methodology** –This study used a questionnaire survey involving 137 government auditors in Indonesia. The Structural Equation Model-Partial Least Squares (SEM-PLS) was employed for data analysis.

**Results** –The results reveal that BDA-based auditing adoption is positively determined by system quality. Moreover, BDA-based auditing adoption improves audit performance, judgment, and quality. Additionally, while audit judgment is a mediator between BDA-based auditing and audit quality, audit performance does not.

**Research limitations/implications** –This study has limitations in the number of samples, which makes the generalizability of the study results less strong. It makes readers need to be careful when concluding the results of this study.

**Novelty/Originality** –This study offers a novel approach by examining the use of BDA in public sector audit, which is not frequently discussed, particularly when evaluated through the Information Systems (IS) Success Model by DeLone and McLean (2003); Petter et al. (2008). In addition, this study also presents a novelty in the form of testing the mediation role of audit judgment and audit performance.

**Keywords:** Big data analytics, audit, supreme audit agency, audit performance, audit judgment, audit quality

### 1. Introduction

The emergence of Big Data and the growing use of data analytics in business processes have significantly changed the audit profession. Auditors are now faced with integrating these new technologies into their practices to enhance the audit process and maintain audit quality (Fedyk et al., 2022; Salijeni et al., 2019). Adopting Big Data Analytics (BDA) in the audit context can improve auditor performance, audit judgment, and overall audit quality (Balios et al., 2020; Xing, Zhu, et al., 2020). One of the critical opportunities Big Data presents is the potential for auditors to undertake more advanced predictive and prescriptive-oriented analytics (Appelbaum et al., 2017). This can enable auditors to identify and address potential risks more effectively, ultimately improving their performance and audit quality (Balios et al., 2020). Additionally, using advanced analytical tools like BDA can enable auditors to identify patterns and anomalies in large datasets, potentially uncovering previously overlooked issues (Appelbaum et al., 2017; Salijeni et al., 2019). Some studies have shown that the use of data mining and other analytical tools can enhance the audit process by allowing auditors to uncover insights that were previously difficult to obtain. (Appelbaum et al., 2017; Fedyk et al., 2022).

Considering the advantages of BDA, Indonesian government auditors are actively exploring integrating big data and data analytics into their auditing practices. Since 2020, BDA has been used to identify high-risk areas and guide audit planning and execution in the Indonesian public sector, namely the Supreme Audit Agency (SAA). This action is taken to tackle the suboptimal performance of government auditors in promoting good governance enhancement in public sector institutions in Indonesia

(Nugraheni & Pamungkas, 2021). However, whether this initiation has promoted benefits to auditors and auditing practices in SAA remains to be empirically assessed.

Some studies related to BDA-based audits have been undertaken in several settings. Dagilienė and Kloviėnė (2019) reveal that BDA adoption is influenced by company-specific and institutional factors, with auditors aiming to meet regulatory requirements while delivering added value to clients. This study underscores the dynamic relationship between auditors, clients, and regulators in shaping BDA implementation. De Santis and D'Onza (2021) further elaborate that the legitimization of BDA is more advanced within the auditing profession, particularly driven by the Big Four firms. However, external challenges—such as clients' low digital maturity, the absence of clear audit standards, and skeptical oversight authorities—continue to hinder widespread adoption. Sihombing et al. (2023) contribute a cognitive perspective, showing that auditors using visual analytics perceive lower audit risk and demonstrate greater trust in analytical results than text-based formats. Additionally, unstructured data leads to higher assessed risk and longer audit hours. In a developing country context, Abdelwahed et al. (2024) find that BDA positively influences audit processes, auditor competence, and audit quality, although it does not significantly affect audit fees. However, most studies related to BDA-based auditing involve audit contexts in the private sector, and related studies in public sector settings still receive less attention (Saud et al., 2025). This gap is notable, given the increasing complexity and volume of public sector data, as well as the rising demand for transparency, accountability, and efficiency in government financial management (Haq & Sofyani, 2024). Public sector audits often involve broader stakeholder interests, including taxpayers and policymakers, making the effective use of BDA significant for detecting inefficiencies, preventing fraud, and ensuring responsible use of public funds (Mardjono et al., 2024). Moreover, as governments worldwide adopt digital transformation initiatives, integrating BDA into public audit practices becomes urgent to keep pace with these changes and enhance decision-making based on data-driven insights (Muslimin et al., 2024). Therefore, expanding BDA research into the public sector is crucial to adapt audit methodologies to the specific challenges and accountability frameworks of public governance.

To address the gaps highlighted, the present research aims to investigate the determinants of BDA, that is, system quality, and the adoption impacts on auditor performance, audit judgment, and audit quality in the public sector, specifically Indonesian SAA. This study also tests the mediating effect of audit performance and judgment on the relationship between BDA-based auditing and audit quality. Despite the growing interest in the impact of BDA on auditing, there is a need for further research to understand the mechanisms through which these technologies influence audit quality (Appelbaum et al., 2017). While prior studies might have established a link between BDA-based auditing and audit quality, they may not have fully explored the specific mechanisms driving this relationship (Dagilienė & Kloviėnė, 2019; Salijeni et al., 2019). In addition, the previous studies did not examine the potential mediating role of audit performance and judgment. The mediation analysis aims to uncover how the BDA-based auditing-audit quality relationship exists. Thus, this research questions "Does BDA-based auditing lead to better audit quality because it improves audit performance and judgment?". This adds depth and richness to the study findings.

This study presents valuable insights for the SAA of Indonesia in particular and governmental audit bodies in other countries to better navigate the changing landscape of auditing in the Big Data era. Theoretically, this study contributes to the audit literature by providing empirical evidence on the impact of BDA on key audit outcomes. Also, by testing the mediating effects of audit performance and judgment, this study includes explicit input for improving SAA's audit process. This study also offers significant practical contributions, particularly for the SAA of Indonesia and other governmental audit bodies navigating the era of Big Data. The study could provide valuable guidance for the SAA and other audit institutions in integrating BDA into their audit practices, ultimately improving decision-making and audit outcomes.

## 2. Literature Review, Theoretical Framework, and Hypotheses Development

### 2.1. The Rise of Big Data in Public Sector Audit

The auditing profession is transforming with the exponential growth of data and advancements in analytics. Big Data Analytics (BDA) is revolutionizing audits by processing vast datasets, particularly enhancing accountability and transparency in the public sector (Wahdain et al., 2019; King, Yuan, et al., 2020). Studies highlight BDA's ability to improve risk assessments by detecting patterns and anomalies, thus enabling better resource allocation (Appelbaum et al., 2017; Salijeni et al., 2019). It also facilitates more reliable audit evidence collection by analyzing entire datasets instead of samples (Balios et al., 2020). Additionally, BDA helps uncover fraud and provides insights into complex transactions, vital for maintaining public trust (Dagilienė & Kloviėnė, 2019; Handoko et al., 2020).

### 2.2. Audit Performance and Judgment: A Critical Link

While the benefits of Big Data Analytics (BDA) in auditing are acknowledged, the mechanisms underlying these benefits require further exploration. This study examines audit performance and judgment as key mediators between BDA adoption and audit quality. Auditor performance refers to effectively executing procedures such as data gathering, analysis, and evidence assessment (Alles, 2015; Balios et al., 2020), while audit judgment involves forming conclusions under uncertainty to reduce audit risk, influencing all audit stages (Irawati & Solikhah, 2018). Prior studies suggest BDA enhances these aspects by enabling efficient analysis of larger datasets, improving risk assessments, and reducing biases (Balios et al., 2020; Fedyk et al., 2022). However, limited empirical research explores this relationship in the public sector.

This study addresses this gap by investigating the mediating roles of audit performance and judgment in linking BDA adoption to audit quality, focusing on Indonesia's SAA. The findings aim to offer insights into BDA's transformative impact on enhancing accountability and transparency in public sector audits.

### 2.3. Theoretical Underpinning

This study explicitly underpinned the conceptual framework based on the Information Systems (IS) Success Model by DeLone and McLean (2003) as a point of view. The IS Success Model is a theory in the field of information systems that aims to offer a thorough understanding of what makes an IS successful. It does this by identifying and explaining the connections between six key dimensions that are commonly used to assess the effectiveness of information systems, including three determinants: information quality, system quality, and service quality; IS usage or usage intention, user satisfaction, and net system benefits (Jeyaraj, 2020). The model was initially introduced by DeLone and McLean (1992) In this study, the determinant taken is the system quality since it is the primary concern in the early stages of development of a BDA-based audit system at SAA Indonesia. In addition, the net system benefits proposed in this study include audit performance, audit judgment, and audit quality (Alzoubi,

2016). These three variables are the study's concerns because they are the focus of the audit process and objectives, and also the expected outcomes of the development of BDA-based audits at SAA Indonesia.

Audit Performance refers to how effectively and efficiently auditors conduct their audits (Xing, Zhu, et al., 2020 2020). Big data tools enable auditors to analyze vast amounts of financial data more comprehensively. This can lead to more thorough and efficient audits, improving overall performance (Nwankpa, 2014). The predictive capabilities of BDA allow auditors to uncover hidden trends and patterns, enabling them to identify potential risks or issues that may arise proactively. In addition, it can streamline the audit process, reducing the time needed for data collection and analysis (Moffitt et al., 2018). This allows auditors to focus more on higher-value activities, further enhancing performance (Alles & Gray, 2016; Appelbaum et al., 2017). Additionally, with better data analysis capabilities, auditors can more accurately assess risks and identify anomalies that could indicate issues with financial reporting (Appelbaum et al., 2017).

Furthermore, audit Judgment involves the decisions auditors make during the audit process, including evaluating evidence and assessing financial statements (Knechel et al., 2013). BDA can provide auditors with more detailed and accurate information, potentially leading to better-informed judgments (Handoko et al., 2020). Additionally, advanced analytics in big data methods can help reduce human biases by providing objective data-driven insights, thereby improving the quality of audit judgments (Nwankpa, 2014). Lastly, audit quality refers to the accuracy, reliability, and thoroughness of the audit work (Knechel et al., 2013). High-quality audits ensure that financial statements are free from material misstatements. BDA can improve the accuracy of audits by enabling more precise testing and analysis of financial data (Appelbaum et al., 2017). Detailed data analytics can increase transparency in the audit process, making it easier for public stakeholders and auditors to understand the basis for audit conclusions (Appelbaum et al., 2017). Also, advanced analytics can uncover patterns and anomalies that might be missed with traditional auditing methods, leading to higher-quality audits (Xing, Zhu, et al., 2020 2020).

#### 2.4. Hypothesis Development

System quality reflects the extent to which a system operates reliably and produces accurate output without errors or glitches (Aljumah et al., 2021). This study conceptualizes system quality through three key indicators: the comprehensiveness of the BDA-based audit application's design, its reliability in supporting audit tasks, and the relevance of its functions to the auditor's work (Bouteraa et al., 2023). Additionally, when system functions align with auditors' tasks, such as data analysis and anomaly detection, the technology is useful and supportive, enhancing adoption intention (Sewpersadh, 2025). Previous research has shown that when a system is perceived as reliable and easy to use, users are more likely to trust it and incorporate it into their operational workflow (Petter et al., 2008; Thielsch et al., 2018). Research by Prasetya et al. (2024) and Al Rob et al. (2025) shows that a high-quality system is essential to encourage auditors to adopt BDA technology. In addition, research by Chatterjee et al. (2024) and Al-Okaily and Al-Okaily (2024) confirms that system quality positively impacts adopting data-driven technologies in various sectors. Based on the logic outlined above, the following hypotheses are formulated:

H1: System quality positively influences BDA-based auditing adoption.

BDA enables auditors to perform more sophisticated risk assessments by identifying patterns and trends in the data. This allows them to focus on areas with a higher likelihood of material misstatement (Balios et al., 2020). Automating repetitive tasks through data analytics frees auditors to focus on more complex and judgmental areas, improving overall efficiency and effectiveness (Noordin et al., 2022). A study by Li et al. (2018) found that application-level and feature-level audit analytics usage significantly improved the performance of the internal audit process. Based on the above arguments, the hypothesis is formulated as follows:

H2: BDA-based auditing adoption positively influences audit performance.

BDA tools can process and analyze vast amounts of data quickly and efficiently, providing auditors with the information they need to make sound judgments (Hidayat & Khabibi, 2020). Thus, the adoption of BDA in audit practices has the potential to improve audit quality significantly. Some studies have shown that using BDA can positively impact audit quality. First, BDA enables auditors to gather more profound insights into the client's financial and operational data, leading to a better understanding of the business and its risks (Balios et al., 2020). Second, by providing auditors with objective and data-driven insights, BDA supports more informed and defensible audit judgments. Instead of relying on intuition or limited samples, using BDA in auditing enables the auditors to base their decisions on comprehensive data analysis, increasing confidence in their judgments and conclusions (Handoko et al., 2020). Based on the logic detailed above, the hypothesis is formulated as follows:

H3: BDA-based auditing adoption positively influences audit judgment.

As mentioned earlier, instead of relying on traditional sampling methods, BDA allows auditors to analyze entire datasets (Handoko et al., 2020). This situation provides a more comprehensive and accurate understanding of the audited entity's data, leading to more reliable audit findings (Dagiliené & Klovienė, 2019). In addition, BDA enables auditors to identify and assess risks more effectively by uncovering hidden patterns and anomalies within large datasets (Earley, 2015). This allows for a more targeted and efficient audit process, focusing on areas with a higher likelihood of material misstatement (Salijeni et al., 2019). This strengthens the reliability and credibility of insightful audits, ultimately leading to improved audit quality and enhanced stakeholder confidence. Based on the logic detailed above, the following hypothesis is formulated:

H4: BDA-based auditing adoption positively influences audit quality.

When audit performance is improved, auditors become more effective in identifying and correcting errors or discrepancies (Knechel et al., 2013). Better audit performance involves refining processes and using resources more effectively (Alsughayer, 2021). Improved audit performance also includes better risk assessment procedures (DeFond & Zhang, 2014). Moreover, improved audit performance is often associated with heightened professional scepticism, where auditors critically evaluate evidence and challenge assumptions (Christensen et al., 2016). This leads to more robust and reliable audit conclusions. Based on the discussions detailed above, the following hypothesis is formulated:

H5: Audit performance positively influences audit quality.

Audits often involve complex situations, incomplete information, and subjective interpretations of accounting standards. Thus, auditors rely on their professional judgment to make informed decisions throughout the audit process, from assessing risks to evaluating evidence and forming conclusions (Irawati & Solikhah, 2018). Auditors use judgment to determine the persuasiveness and sufficiency of evidence, considering factors like source reliability, consistency, and corroboration (Irawati & Solikhah, 2018). In addition, since audit risk is constantly evolving, auditors must use judgment to assess new information, adjust audit procedures, and respond to unexpected findings. Sound judgment enables auditors to challenge management assertions, consider alternative explanations, and resist undue influence (DeFond & Zhang, 2014). Well-reasoned and well-supported judgments lead to more reliable audit opinions, enhancing the overall quality of the audit. Therefore, audit judgment is the thread that ties together all aspects of the audit process. Based on the above arguments, the following hypothesis is formulated:

H6: Audit judgment positively influences audit quality.

From the hypotheses developed above, it can be concluded that there is a sequential relationship between the use of BDA in auditing and audit quality through audit performance and audit judgment. From there, two mediation hypotheses can be formulated as follows:

H7: BDA-based auditing positively influences audit quality through audit performance.

H8: BDA-based auditing positively influences audit quality through audit judgment.

Based on the hypotheses developed, we formulate the conceptual framework of this research, as shown in Figure 1. It is important to note that we also included four control variables to test the robustness of the model. They include auditor age, educational level, experience, and educational background. They were selected because, according to several studies (Alissa et al., 2014; Ye et al., 2014), these factors are also considered to influence auditors' job performance.

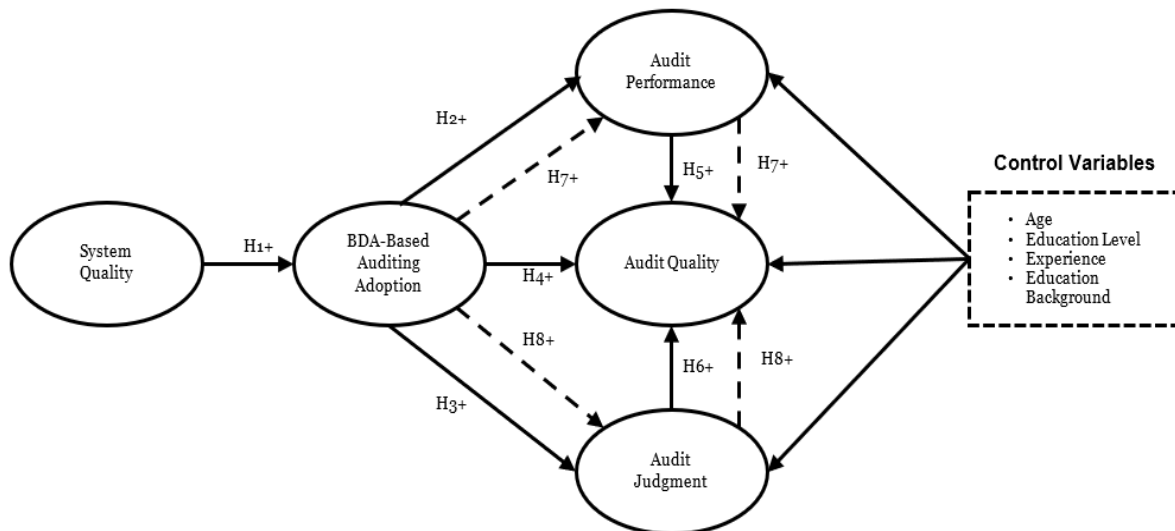


Figure 1: The Conceptual Framework of the Research

### 3. Research Method

This research employs a survey method with statistical hypothesis testing to support a positivist scientific approach. While potential normative bias in respondents' answers is acknowledged, this method is necessary due to the lack of archival data within Indonesia's SAA. The potential bias was tested in the Results Section to ensure it did not significantly impact the study's validity. Participants were auditors at the SAA of the Republic of Indonesia, selected through non-probability, purposive sampling. Criteria included auditors experienced with BDA-based auditing using BIDICS software to ensure relevant responses (Sekaran, 2016).

A power analysis, with a confidence level of 0.80 and two predictors, determined a minimum sample size of 77 (Memon et al., 2018). Of the 137 responses collected, all exceeded the required minimum. Variable measurements were adapted from established research, including system quality (Bouteraa et al., 2023), BDA adoption (Al-Mamary & Al-Shammari, 2023), audit performance (Louis et al., 2022), audit judgment (Irawati & Solikhah, 2018), and audit quality (Le et al., 2022). The questionnaire, reviewed by nine experts for validation, used a 5-point Likert scale, deemed effective for statistical analysis and suitable for Indonesian survey research (Hair Jr et al., 2021; Revilla et al., 2014).

The research proposal underwent ethics committee review, with revisions ensuring compliance with ethical standards, including informed consent, respondent confidentiality, and incentives. Data storage is limited to two years post-study completion. Distribution involved coordinating with SAA public relations offices nationwide, supported by official university letters. Respondents provided written consent via forms and received digital incentives for participation, with stringent measures to protect anonymity and confidentiality.

Table 1: Demographic of Respondents

Criteria	Frequently	Percentage
<i>Gender</i>		
Male	85	62.04
Female	52	37.96
<i>Age</i>		
20-35	72	52.55
36-50	11	8.03
>50	9	6.57
<i>Education Level</i>		
Degree	85	62.04
Master	51	37.23
Doctoral	1	0.73
<i>Educational Background</i>		
Non-IT and Accounting	39	28.47
Accounting	87	63.50
IT	11	8.03
<i>Certification</i>		
Yes	87	63.50
Not yet	50	36.50
<b>Total</b>	<b>137</b>	<b>100.00</b>

The variance-based partial least squares structural equation modelling (PLS-SEM) method is used for hypothesis testing. PLS can perform model measurements (testing the validity and reliability of instruments) while also evaluating structural models (hypothesis testing) (Chin et al., 2003; F. Hair Jr et al., 2014). This method is appropriate for this study due to the non-parametric nature of the Likert scale and the significant possibility of element multicollinearity (Hair et al., 2019; Sholihin & Ratmono, 2021). To obtain better results, additional analyses were performed, including common method variance (CMV), confirmatory tetrad analysis (Pertiaz & Sunaryo), PLS prediction, and nonlinear tests.

#### 4. Results

##### 4.1. Bias Test

To address normative bias, a single-factor analysis was conducted following Tehseen et al. (2017) and Podsakoff et al. (2003). Results show that the largest latent component accounts for only 35% of the variance, below the 50% threshold. However, the findings indicate that only 35% of the latent components are contributed. As a result, it is possible to conclude that CMV poses no significant risk to the study result validity.

##### 4.2. Descriptive Statistics

Table 2 presents the results of descriptive analysis. Audit performance is generally perceived as high (> 4 scale), while audit quality and judgment are moderate. While the BDA-based auditing system quality and its adoption is still moderate (>3<4 scale), it is not yet high in SAA.

Table 2: Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. Deviation
System Quality	1.80	5.00	3.80	0.56
BDA-based auditing	2.00	5.00	3.88	0.66
Audit Performance	3.00	5.00	4.33	0.55
Audit Quality	2.00	5.00	3.91	0.64
Audit Judgment	2.00	5.00	3.80	0.67

##### 4.3. Measurement Model Assessment

Construct validity and reliability testing is performed before hypothesis testing to ensure the measurements' validity (Hair et al., 2019). Validity is classified into convergent and discriminant. Convergent validity refers to the degree to which multiple items agree on measuring the same concept. Table 3 shows that the loading and average variance extracted (AVE) values comply with the general rule of thumb, namely higher than 0.5 (Fornell & Larcker, 1981; Hair et al., 2019).

Table 3: Convergent Validity Test Results

Code	Indicator	Loading
<b>System Quality – AVE: 0.663</b>		
Sysqual1	The big data-based audit application has a comprehensive design	0.753
Sysqual2	The application of big data-based audit applications is reliable in work	0.872
Sysqual4	The application of big data-based audit applications has functions that are relevant to the auditor's work	0.814
<b>BDA-based Auditing – AVE: 0.755</b>		

Code	Indicator	Loading
Actusage1	Preference to use BDA in audit	0.821
Actusage2	Satisfaction with using BDA in audit	0.917
Actusage3	Experience using BDA in audit	0.866
<b>Audit Performance – AVE: 0.608</b>		
Auditperf1	Reporting all audit findings in the audit results report	0.649
Auditperf2	Following audit procedures according to applicable regulations	0.840
Auditperf3	Conduct an adequate review or verification of auditee documents	0.869
Auditperf4	Researching accounting principles that may be controversial applied by the auditee	0.738
Auditperf5	Providing advice to auditees to improve their accountability.	0.785
<b>Audit Judgment – AVE: 0.628</b>		
Audhudgm	Determination of audit materiality	0.812
Audhudgm	Determining the scope of the audit	0.790
Audhudgm	Justify the auditee's internal control strengths/weaknesses	0.886
Audhudgm	Identify possible fraud	0.709
Audhudgm	Providing final audit opinion	0.755
<b>Audit Quality – AVE: 0.782</b>		
Audqual1	Better audit results when using BIDICS than conventional methods	0.811
Audqual2	Satisfaction with the results of my audit work when using BIDICS	0.897
Audqual3	Audit results are more convincing when using BIDICS	0.922
Audqual4	Improved quality of audit implementation when using BIDICS	0.903

Discriminant validity concerns whether a latent variable (or construct) in the model is genuinely distinct from other latent variables (F. Hair Jr et al., 2014). The Fornell-Lacker criterion is widely accepted methods for discriminant validity. The Fornell-Lacker test results show that the square root of each construct's AVE is greater than its correlation with other latent constructs, thus concluding that discriminant validity has been established (Fornell & Larcker, 1981).

Table 4: Discriminant Validity Test Results (Fornell–Lacker)

Construct	Auditperf	Auditqual	Audjudgm	BDA-based Auditing	System Quality
Audit Performance	0.780				
Audit Quality	0.506	0.884			
Audit Judgment	0.561	0.665	0.792		
BDA-based Auditing	0.508	0.721	0.663	0.869	
System Quality	0.527	0.701	0.668	0.774	0.814

Reliability was assessed using Cronbach's alpha and composite reliability, requiring a minimum score of 0.6 (Hair et al., 2019). Table 5 shows that all values exceed this threshold, indicating stable and consistent measurement instruments.

Table 5: Reliability Test Results

Construct	Cronbach's alpha	Composite Reliability
Audit Performance	0.837	0.885
Audit Quality	0.907	0.935
Audit Judgment	0.851	0.893
BDA-based Auditing	0.837	0.902
System Quality	0.745	0.855

4.4. Structural Model Assessment

According to Hair et al. (2019), to obtain an excellent structural model assessment, one must examine the results of multicollinearity, the level of statistical significance, and the magnitude of regression coefficients on direct or indirect relationships or influences, as well as predictive power such as R2 and Q2. First, the variance inflation factor (VIF) is used in this study to determine whether or not there is multicollinearity between constructs in the inner model, which occurs when the VIF value exceeds 3 (Hair et al., 2019). Table 6 shows that the VIF range is less than 3, indicating that multicollinearity does not occur and that the constructs are independent.

Furthermore, Table 6 shows the structural model assessment results. The results show that while other hypotheses are supported, only H5 is not supported, so it is concluded that audit performance does not improve audit quality. Further explanations are detailed in the discussion section. Furthermore, the research model's Adjusted R2 is high, indicating that exogenous variables can explain endogenous variables by 61.8%, which is considered a strong prediction (Chin et al., 2003).

Table 6: Hypothesis Test Results (Structural Model Assessment)

Association	Symbol	$\beta$	t	f <sup>2</sup>	VIF	Conclusion
<b>Direct Effect Analysis</b>						
System quality → BDA-based Auditing adoption	H1	0.774**	21.245	1.493	1.000	Supported
BDA-based Auditing adoption → Auditperf	H2	0,505**	6,853	0.348	1.000	Supported
BDA-based Auditing adoption → Audjudgm	H3	0,665**	12,815	0.785	1.000	Supported

BDA-based Auditing adoption → Auditqual	H4	0,474**	5,228	0.293	1.875	Supported
Auditperf → Auditqual	H5	0,099	1,338	0.016	1.533	Unsupported
Audjudgm → Auditqual	H6	0,298**	3,418	0.103	2.029	Supported
<b>Control Variabels Effect Analysis</b>						
Eduback à Auditqual		-0,038	0,543			
Eduback à Audjudgm		-0,017	0,253			
Edulevel à Auditperf		0,090	0,847			
Edulevel à Auditqual		0,025	0,277			
Edulevel à Audjudgm		-0,098	1,002			
Experience à Auditperf		0,094	0,879			
Experience à Auditqual		-0,042	0,508			
Experience à Audjudgm		-0,084	1,008			
age à Auditperf		-0,182	1,239			
age à Auditqual		-0,042	0,385			
age à Audjudgm		0,205*	1,856			
<b>Indirect Effect (Mediation) Analysis</b>						
BDA-based Auditing adoption → Audjudgm → Auditqual	H7	0,198**	3,221			Supported as Mediator
BDA-based Auditing adoption → Auditperf → Auditqual	H8	0,050	1,236			Unsupported as Mediator

Adj. R<sup>2</sup>: 0.253 (auditperf). 0.436 (auditjudgm). 0.579 (audit qual);

\*p<0.05; \*\*P<0.01

4.5. Robustness Test Results

The Q2 value can also be used to assess the prediction accuracy of PLS path models (Hair et al., 2019). As a general rule, the Q2 value for a specific endogenous construct should be greater than zero to indicate the predictive accuracy of the structural model for that construct. This model is more accurate when the Q2 value is close to one (Chin et al., 2003). The PLS-SEM has lower RMSE and MAE values than the linear regression model (LM), indicating superior predictive power. Based on these two rules, this research meets the requirement that the Q2 value be greater than zero and close to one. Meanwhile, the PLS Predict value for the RMSE and MAE PLS-SEM values is moderately predictive (Table 7).

Table 7: PLS Predict Test Results

	Q <sup>2</sup> predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
Auditperf1	0.048	0.860	0.594	0.870	0.601
Auditperf2	0.159	0.547*	0.470*	0.547	0.435
Auditperf3	0.154	0.521*	0.457*	0.519	0.435
Auditperf4	0.127	0.707	0.517	0.720	0.523
Auditperf5	0.196	0.562	0.462*	0.568	0.439
Auditqual1	0.245	0.589*	0.433*	0.583	0.414
Auditqual2	0.356	0.559*	0.395*	0.545	0.357
Auditqual3	0.335	0.589	0.450*	0.597	0.426
Auditqual4	0.374	0.503*	0.368*	0.497	0.341
Audjudgm1	0.250	0.709	0.551*	0.710	0.547
Audjudgm2	0.314	0.564*	0.404*	0.561	0.402
Audjudgm3	0.278	0.654	0.449	0.656	0.515
Audjudgm4	0.186	0.670	0.498	0.680	0.525
Audjudgm5	0.161	0.881	0.740	0.928	0.766
Actusage1	0.387	0.558	0.399	0.571	0.420
Actusage2	0.560	0.446	0.316	0.452	0.326
Actusage3	0.356	0.585	0.427	0.602	0.438

\*PLS-SEM>LM

Moreover, Confirmatory Tetrad Analysis (Pertiaz & Sunaryo) results should be used to validate measurement model specifications, whether reflective or formative, empirically. The test results from this study provided empirical support for the construct measurement model's reflective mode. Furthermore, the CTA results indicated that the zero was included in the confidence interval. Sarstedt et al. (2021) also recommend considering nonlinear effects and endogeneity when using structural models. The nonlinear test was conducted using the quadratic analysis method. The results show that all exogenous variables have non-significant p-values (Table 8). Based on these findings, the relationship between exogenous and endogenous variables is linear, and the model is considered robust (Hair et al., 2019).

Table 8: PLS Predict Test Results

Association	$\beta$	$t$	$P$
QE (Sysqual) → BDA-based Auditing	-0.013 <sup>ns</sup>	0,541	0,294
QE (BDA-based Auditing) → Auditperf	0.032 <sup>ns</sup>	0,605	0,272
QE (BDA-based Auditing) → Auditqual	0.031 <sup>ns</sup>	0,434	0,332
QE (BDA-based Auditing) → Audjudgm	0.009 <sup>ns</sup>	0,211	0,416
QE (Auditperf) → Auditqual	0.047 <sup>ns</sup>	0,754	0,226
QE (Audjudgm) → Auditqual	-0.004 <sup>ns</sup>	0,059	0,477
QE (Sysqual) → BDA-based Auditing → Auditperf	-0.007 <sup>ns</sup>	0.528	0.299
QE (Systqual) → BDA-based Auditing → Auditqual	-0.006 <sup>ns</sup>	0.522	0.301
QE (Systqual) → BDA-based Auditing → Audjudgm	-0.009 <sup>ns</sup>	0.545	0.293
QE (Systqual) → BDA-based Auditing → Audjudgm → Auditqual	-0.002 <sup>ns</sup>	0.564	0.286
QE (BDA-based Auditing) → Audjudgm → Auditqual	0.003 <sup>ns</sup>	0.207	0.418
QE (BDA-based Auditing) → Auditperf → Auditqual	0.003 <sup>ns</sup>	0.427	0.335
QE (Systqual) → BDA-based Auditing → Auditperf → Auditqual	-0.001 <sup>ns</sup>	0.361	0.359

<sup>ns</sup> = Not Significant

## 5. Discussion

### 5.1. Direct Effect Results

This study reveals that BDA-based auditing adoption is positively determined by system quality, and in turn, it positively influences audit performance, judgment, and quality within the Indonesian SAA. These findings offer valuable insights into the transformative potential of this technology for public sector auditing. System quality significantly enhances the adoption of big BDA-based auditing in SAA since it can ensure that systems are reliable, user-friendly, and efficient (supported H1). When BDA tools perform well and integrate smoothly with existing audit processes, auditors are more likely to trust and use them (De Santis & D'Onza, 2021). High system quality also reduces errors and cognitive load, helping auditors make better judgments (Griffith et al., 2021). As outlined in the DeLone and McLean IS Success Model, strong system quality leads to greater user satisfaction and intention to use, which drives successful adoption in the audit environment (DeLone & McLean, 2003).

In addition, the study results demonstrate that BDA significantly improves audit performance (supported H2). By enabling the analysis of complete datasets, auditors can conduct more comprehensive and efficient audits (Handoko et al., 2020). This reduces the reliance on traditional sampling methods, which are prone to errors and limitations, leading to more accurate and reliable audit findings (Xing, Yuan, et al., 2020). Moreover, automation of repetitive tasks through data analytics frees auditors to focus on complex and judgmental areas, further enhancing efficiency and effectiveness (Fedyk et al., 2022). This finding aligns with previous research highlighting the positive impact of technology adoption on audit efficiency and effectiveness in various contexts (Moffitt et al., 2018; Rosli et al., 2016; Tarek et al., 2017).

In addition, this study provides empirical evidence that BDA enhances audit judgment (supported H3). By gaining deeper insights into audited entity's operations by identifying patterns, trends, and anomalies within large datasets, auditors gain deeper insights into the audited entity's operations (Appelbaum et al., 2017). The BDA approach in audit judgment reduces reliance on intuition and subjective assessments, leading to more objective and informed audit judgments (Balios et al., 2020). Further, by mitigating information asymmetry between auditors and management, BDA fosters a more transparent and accountable audit process, aligning with the principles of agency theory (Balios et al., 2020). This finding underscores the importance of leveraging technology to enhance professional scepticism and objectivity in audit judgment, as suggested by prior studies (Appelbaum et al., 2017; Nunes et al., 2020).

Moreover, the research findings strongly suggest that BDA adoption enhances audit quality in SAA (supported H4). By enabling more comprehensive data analysis, improving risk assessment procedures, and strengthening audit evidence, BDA leads to more reliable, relevant, and insightful audit findings (Balios et al., 2020). This, in turn, enhances stakeholder trust and confidence in the audit process and its outcomes. This finding aligns with the broader push for audit innovation and the adoption of data analytics to address the evolving complexities of the public sector (Al-Shbail & Aman, 2018; Knechel et al., 2013). The research findings also underscore the importance of well-honed audit judgment in ensuring high-quality public sector audits (supported H6). This emphasis on judgment aligns with the often complex and nuanced nature of public sector entities, which are driven by public interest objectives rather than solely financial goals (Bastian, 2014). Specifically, our study highlights the need for auditors to understand the intricacies of public sector operations and funding mechanisms to exercise professional scepticism effectively.

However, the lack of a significant relationship between audit performance and audit quality in this study presents a compelling finding that warrants further exploration (unsupported H5). Several potential explanations may explain to this unexpected result: 1) Measurement Challenges: Measuring audit performance in the public sector can be inherently complex. Traditional metrics

used in the private sector, such as audit time budgets, may not adequately capture the multifaceted nature of public sector audits, which often involve assessing program effectiveness and compliance with laws and regulations; 2) Unique Audit Environment: Public sector audits usually operate within a highly regulated and bureaucratic environment, which can constrain auditors' ability to fully exercise their professional judgment and tailor audit procedures to specific risks. This could potentially dilute the impact of individual auditor performance on overall audit quality; and 3) Emphasis on Compliance: Public sector audits often strongly emphasise compliance with laws, regulations, and reporting requirements. While important, this focus on compliance may overshadow the importance of other aspects of audit performance, such as proactively identifying emerging risks or providing value-added recommendations.

## 5.2. Indirect Effect Results

This study reveals a critical pathway through which BDA adoption enhances audit quality in the public sector by significantly improving audit judgment (supported H7). Audit judgment forms the cornerstone of a high-quality audit. It is the process by which auditors, drawing upon their professional scepticism and expertise, evaluate evidence and make informed decisions throughout the audit process. However, traditional audit approaches often rely on limited samples and subjective assessments, potentially hindering the objectivity and accuracy of audit judgments. The study findings demonstrate that BDA acts as a catalyst for improved audit judgment in several ways. First, BDA provides auditors with a more comprehensive and nuanced understanding of the audited entity's operations (Handoko et al., 2020). This reduces reliance on intuition and limited samples, leading to more objective and informed judgments (Balios et al., 2020). BDA also identifies patterns, trends, and anomalies within large datasets (Appelbaum et al., 2017). This enables auditors to pinpoint potential risks and irregularities that might go undetected, leading to more focused and effective audits. Finally, by providing auditors with access to and the ability to analyze vast amounts of data, BDA helps level the playing field between auditors and management (Balios et al., 2020). This increased transparency fosters a more accountable audit process and reduces the potential for management bias to influence audit judgments.

However, this study found no mediating effect of audit performance on the relationship between BDA adoption and audit quality (unsupported H8). While BDA can improve audit performance, and better performance is generally associated with higher quality, there are two reasons why this mediation might not always hold. First, audit quality goes beyond just task completion. It includes factors like professional scepticism, judgment quality, and the value of insights provided, which might not be directly reflected in performance metrics. Second, the lack of mediation might be specific to the public sector audit environment, where performance pressures differ from private sector audits (Bastian, 2014). In addition, conditions in which the audit process in the public sector may be strongly influenced by political pressure. So, the audit process runs well, but it is only to comply with applicable regulations, so that the impact of such audit performance on audit quality will not occur. However, examining other mediators is interesting to explore further. For example, data-driven culture, technology infrastructure, and data analytics support could mediate. Besides, an auditor's expertise in data analytics might be a more significant mediator than performance.

## 5.3. Demographic of Respondent Effects

This study tested control variables, including age, work experience, education level, and educational background (accounting, IT, or neither). Results indicate that only age positively affects audit judgment, while other factors show no significant impact on audit performance, judgment, or quality. Older individuals tend to exhibit higher emotional maturity, better self-control, and a more cautious approach to risk, contributing to more objective and strategic decision-making. This highlights age as a key factor in enhancing audit judgment alongside adopting BDA-based audit technology.

## 5.4. Implications for Practices

These findings have significant implications for audit practice in the public sector especially. Public sector audit institutions should prioritize adopting and integrating BDA into their audit methodologies. This requires investments in technology infrastructure, staff training, and developing relevant audit procedures. Public sector audit institutions must also invest in developing auditors' data analytics skills. This includes training on data extraction, cleaning, analysis techniques, and data visualization and fostering a data-driven culture within the organization. By embracing BDA, public sector auditors can empower auditors to make more informed, objective, and insightful judgments, ultimately leading to higher-quality audits.

## 5.5. Theoretical Implications and Future Studies

This study offers several important theoretical contributions by applying the IS Success Model by DeLone and McLean (2003) to the context of BDA adoption in public sector auditing, specifically within the Indonesian SAA. The IS Success Model outlines six interrelated dimensions of system success: system quality, information quality, service quality, use, user satisfaction, and net benefits. Focusing on system quality as a core determinant, this study empirically demonstrates its positive influence on the effectiveness of BDA-based auditing, particularly in improving audit performance, judgment, and quality.

By validating system quality as a key driver of BDA adoption and its influence on specific audit outcomes, the study reinforces the IS Success Model's assertion that system attributes play a foundational role in shaping user behavior and organizational benefits. Furthermore, by examining audit judgment and performance as mediators, the research expands the IS Success Model by suggesting nuanced internal mechanisms that link system use to net benefits, especially in highly judgment-driven professional domains like public auditing. Notably, the finding that audit judgment—but not audit performance—acts as a mediator opens space for a more refined theoretical understanding of how IS success manifests in cognitive versus operational outcomes.

This study also extends the application of the IS Success Model to the public sector, a context often underrepresented in IS literature, thereby enhancing the model's relevance and generalizability beyond the private sector. Given the increasing reliance on data analytics in public accountability functions, this research demonstrates the model's utility in assessing technological success within government institutions.

Furthermore, building on the current study findings, future studies could incorporate additional constructs from the IS Success Model, such as information quality and user satisfaction, to capture a more comprehensive understanding of BDA system adoption and effectiveness. Moreover, researchers should explore longitudinal designs to examine how system quality and BDA use influence audit outcomes over time, particularly as digital maturity increases. Another promising direction is to investigate the role of organizational culture, regulatory environment, and individual auditor characteristics as moderating variables, to better understand how external and internal contexts shape the adoption process. Comparative studies between public and private sector auditing bodies could also uncover sector-specific dynamics that affect the success of BDA systems. Lastly, future research

could explore how service quality and support mechanisms influence user satisfaction and sustained use of BDA tools in environments with varying levels of technical infrastructure.

## 6. Conclusion

In summary, this study aims to test the determinant and impacts of BDA technology adoption on audit practices in Indonesian SAA. While the determinant includes system quality, the impacts cover audit performance, judgement, and quality. Also, this study investigates the mediating role of audit performance and audit judgement in the relationship between BDA-based auditing and audit quality. PLS analysis reveals that BDA-based auditing in Indonesian SAA is positively determined by system quality. Moreover, the adoption is able to improve audit performance, judgement, and quality. However, when audit judgment serves as a mediator, audit performance does not. The study results provide beneficial knowledge for the SAA of Indonesia, particularly and governmental audit bodies in other countries generally, to better navigate the changing auditing landscape in the big data era. From a theoretical perspective, this study draws on the IS Success Model by DeLone and McLean (2003), particularly highlighting the importance of system quality as a critical factor influencing system use and its resulting impact on individual and organizational outcomes. By empirically validating the influence of BDA system quality on audit performance and judgment, the study contributes to IS literature by demonstrating how system-related factors translate into improved decision-making and service quality in a public sector audit context. Furthermore, the evaluation of mediating effects enriches the understanding of how BDA-enabled systems influence user behavior and audit effectiveness, offering practical insights for optimizing audit processes in public institutions like the SAA.

This study has several limitations. First, although the questionnaire was distributed to all SAA auditors in Indonesia, totalling over 2000 people, only 137 questionnaires were fully completed. Although this number is acceptable in the PLS testing technique and meet minimum sample sized required, as are various robustness test results, these results should be read with caution since they may limit the generalizability of the findings. Therefore, further research with bigger samples is highly recommended to strengthen the results of this study. Second, because the nature of quantitative research does not allow for detailed explanations of findings, the findings of this study cannot go into greater detail about how variables interact. As a result, qualitative research approaches are strongly recommended to address this weakness.

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