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The Influence of Big Data, CAATs, and Auditor Religiosity on Fraud Detection with Task-Specific Knowledge as A Moderating Variable

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Abstract

Fraud remains a persistent threat to financial governance, requiring auditors to integrate technological tools and professional expertise to enhance fraud detection capabilities. This study examined the effects of Big Data, Computer-Assisted Audit Techniques (CAATs), and auditor religiosity on fraud detection while assessing task-specific knowledge (TSK) as a moderating variable. A quantitative causal-associative research design was employed using primary data collected through an online five-point Likert-scale questionnaire from Indonesian auditors selected through purposive and convenience sampling. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4, including measurement model evaluation, coefficient of determination assessment, effect-size analysis, and hypothesis testing.The findings showed that CAATs had a significant positive effect on fraud detection ($\beta = 0.260$; $p = 0.044$), whereas Big Data ($\beta = 0.039$; $p = 0.417$) and auditor religiosity ($\beta = 0.005$; $p = 0.487$) did not have significant effects. TSK significantly predicted fraud detection directly ($\beta = 0.601$; $p = 0.001$) but did not moderate the effects of Big Data, CAATs, or auditor religiosity. The model explained 66.7% of the adjusted variance in fraud detection. Therefore, audit organizations should prioritize CAATs adoption and strengthen auditors' task-specific knowledge while progressively developing Big Data capabilities and related technical competencies to improve fraud detection effectiveness.

INTRODUCTION

Fraud represents a significant and evolving threat to financial governance in both public and private sectors. (Betri, 2022) defined fraud as an illegal act committed by individuals inside or outside an organization to obtain personal or collective benefits, ultimately causing losses to other parties. The Association of Certified Fraud Examiners (ACFE) consistently reports that global fraud-related losses reach billions of dollars annually, with organizations losing approximately 5% of their revenue on average (Festinger, 2001) . This situation highlights the urgent need to develop more comprehensive and empirically grounded fraud detection capabilities (Heider, 1958) .

The urgency of improving fraud detection capabilities is also reflected in the increasing number of fraud cases in Indonesia. Data from the Indonesia Anti-Scam Center (IASC), operating under the coordination of the Financial Services Authority (Otoritas Jasa Keuangan [OJK]), indicated that by mid-2025, more than 157,000 fraud reports had been received, with total public losses reaching approximately IDR 3.2 trillion. The magnitude of these losses demonstrates that fraud remains a serious threat requiring stronger oversight systems and more effective detection mechanisms. Furthermore, the increasing complexity of fraudulent schemes requires auditors to possess advanced competencies in identifying fraud indicators throughout the audit process.

In response to these escalating risks, the OJK issued OJK Regulation (Peraturan OJK [POJK]) Number 12 of 2024 concerning the Implementation of Anti-Fraud Strategies for Financial Services Institutions. This regulation requires financial services institutions to implement comprehensive anti-fraud strategies as part of their risk management frameworks, with the objective of protecting the financial industry and customers from potential losses arising from fraudulent activities.

Advancements in information technology have created new opportunities to support more effective fraud detection processes. (Chen et al., 2019) , as cited in (Betri et al., 2025) , described Big Data as large-scale and highly complex datasets that require advanced technologies for storage, processing, and analysis. Govinand et al. (2018), cited in Betri et al. (2025), demonstrated that Big Data utilization can enhance forensic auditing capabilities through comprehensive data analysis. However, Sembiring and Widuri (2023) found that Big Data did not significantly influence auditors' fraud detection capabilities, indicating inconsistencies in empirical findings that require further investigation.

Computer-Assisted Audit Techniques (CAATs) have also become important instruments in modernizing audit processes. Lin and Wang (2011) and (McDonough & Braungart, 2002) , cited in Betri et al. (2025), emphasized that CAATs can improve audit efficiency, performance, and fraud detection capabilities. Nevertheless, Choirunnisa and Rufaedah (2022) and Kamal (2022), cited in Betri et al. (2025), reported that the utilization of information technology, including CAATs, does not always have a significant effect on auditors' fraud detection capabilities.

Beyond technological factors, auditors' behavioral and ethical di(Kamalahmadi & Parast, 2016) mensions also play an important role in fraud detection. Glock and Stark (1965), cited in Betri et al. (2025), defined religiosity as an individual's level of understanding and commitment to religious beliefs and practices. In the Indonesian context, where religious values remain influential in social life, auditor religiosity represents a relevant factor for investigation. Fadilah et al. (2020) and (Bandiyono, 2023) , cited in Betri et al. (2025), demonstrated that religiosity positively influences auditors' fraud detection capabilities, as auditors with stronger religious commitment tend to demonstrate higher ethical standards and commitment to truth.

Task-Specific Knowledge (TSK) is an important cognitive component influencing the quality of auditors' judgments. Libby (1995) and Sari (2019), cited in Betri et al. (2025), indicated that TSK consists of accumulated experiences, factual knowledge, and theoretical concepts that assist auditors in effectively planning and conducting audits. Bonner (1990), cited in Betri et al. (2025), explained that task-specific knowledge is a critical component of audit

performance because it influences decision-making during the evaluation process.

The study by Betri et al. (2025), which served as the primary reference for this research, found that TSK functioned as a predictive variable rather than a moderating variable, contrary to the initial hypothesis. This finding represents an important empirical gap and highlights the need to further examine the conditions under which TSK may optimally contribute to fraud detection processes. Therefore, this study re-examined the moderating role of TSK within a fraud detection model integrating technological factors (Big Data and CAATs) and behavioral factors (auditor religiosity) into a comprehensive structural framework, with Indonesian auditors serving as the unit of analysis.

METHOD

Research Design and Approach

This study employed a quantitative causal-associative approach to analyze the effects of independent variables on a dependent variable and examine the role of a moderating variable within the proposed relationship. (Sugiyono., 2022) stated that causal-associative research aims to identify relationships and effects among variables, enabling researchers to develop predictive models of the phenomena being examined. This research design was selected to examine the relationships among Big Data, Computer-Assisted Audit Techniques (CAATs), and auditor religiosity as independent variables; fraud detection as the dependent variable; and Task-Specific Knowledge (TSK) as the moderating variable.

The study used primary data collected through an online questionnaire survey distributed to respondents via Google Forms. The research instrument employed a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire indicators used in this study were adapted from instruments previously developed and validated by Betri et al. (2025).

Population, Sample, and Sampling Technique

The population for this study consists of all auditors working in Indonesia, across both public and private sectors. Given the vast size and geographical dispersion of the auditor population in Indonesia, this study establishes a minimum sample size of 50 auditor respondents. The sampling technique employed is non-probability sampling, utilizing both purposive sampling and convenience sampling approaches. Purposive sampling is used to establish specific criteria ensuring selected respondents align with the research objectives, while convenience sampling facilitates data collection from accessible respondents.

The established respondent criteria are as follows: (1) respondents are active users of Big Data and CAATs in their audit work; (2) respondents possess professional experience as auditors; and (3) respondents understand and have been involved in the fraud detection process.

Variable Operationalization

This study encompasses five variables, comprising one dependent variable, three independent variables, and one moderator variable. The operationalization of each variable is presented below:

Tabel 1. Operasionalisasi Variabel

Variable	Definition	Dimension	Main Indicators
Fraud Detection (Y)	The process of identifying and establishing indications, preliminary clues, or signs associated with fraudulent acts	Detection capability; high vigilance; accuracy; thoroughness	Document examination; identification of the causes of fraud; understanding of fraud; vigilance in decision-making; discovery and retention of documents; identification of reliable evidence; collection, examination, and assessment of evidence; understanding of internal controls
Big Data (X1)	Large datasets with highly complex structures for storage, analysis, and visualization	*Volume; Variety; Velocity; Veracity; Value*	Hadoop database; rapid data growth; richness of information; diversity of sources; speed of data acquisition; real-time processing; rapid updates; high precision; high accuracy; reliability
CAATs (X2)	The use of various technologies to assist auditors in control testing and in the analysis and verification of financial statement data	*Perceived Usefulness; Perceived Ease of Use; Attitude Toward Using; Acceptance*	Assistance in fraud examinations; general understanding; enhanced role; audit time efficiency; cost reduction; credibility; indexed data; storage security; ease of use; ease of understanding; ease of skill acquisition; ability to operate; routine use; performance maintenance; important role; improved performance; increased productivity
Auditor Religiosity (X3)	An individual's interest in, appreciation of, and practice of religious teachings, as reflected in beliefs, attitudes, and behavior	Application of religious values; active involvement; trust in religious leaders	Religious values as behavioral guidance; importance from an early age; respect for religious leaders
Task-Specific Knowledge (Z)	Auditors' retained knowledge related to audit performance, encompassing practical experience and audit concepts that require professional judgment	Knowledge; auditors' capacity to assess fraud	Legal knowledge; adaptation to complex situations; assurance of examination procedures; analysis of fraud indicators; recognition of factors driving fraud; understanding of criminology and victimology; ability to communicate during the process; fraud detection experience; knowledge development; focus on fraud risk factors; identification of high-risk areas

Source: Betri et al. (2025), adapted by the researcher

Data Analysis Technique

This study employs SmartPLS 4 software using the Structural Equation Modeling-Partial Least Squares (SEM-PLS) approach. This method was selected based on its ability to handle complex relationships between latent variables, accommodate non-normal data distributions, and manage relatively small sample sizes (Ghozali, 2018). The analysis comprises: (1) descriptive statistics; (2) data quality assessment via convergent validity testing (AVE ≥ 0.50); (3) reliability testing (Cronbach's Alpha and Composite Reliability ≥ 0.70); (4) coefficient of determination (R^2) analysis; (5) effect size (F^2) analysis; and (6) hypothesis testing via t-tests using the following equation models:

Model I: $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$

Model II (MRA): $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4Z + \beta_5(X_1 \times Z) + \beta_6(X_2 \times Z) + \beta_7(X_3 \times Z) + \varepsilon$

RESULTS AND DISCUSSION

Descriptive Statistics

Based on the results of the descriptive analysis of the questionnaire data, the following table presents an overview of the data characteristics for the research variables:

Table 2. Descriptive Statistics

Variables	Theoritical		Actually		Standard Deviation
	Range	Median	Range	Mean	
BD	18 to 90	54	51 to 86	66.22	7.65
CAATs	17 to 85	51	51 to 85	67.55	11.45
AR	6 to 30	18	16 to 30	23.04	3.95
TSK	14 to 70	42	42 to 69	57.47	6.5
FD	11 to 55	33	31 to 50	42.86	4.44

Source: Primary data, processed (2025)

Descriptive statistics indicate that the actual mean for all research variables exceeds their respective theoretical medians. The Big Data (BD) variable has an actual mean of 66.22 higher than the theoretical median of 54 indicating that auditors' utilization of big data falls into the high category. The Computer-Assisted Audit Techniques (CAATs) variable has a mean of 67.35, exceeding the theoretical median of 51, which indicates that auditors effectively employ computer-assisted audit techniques. The Auditor Religiosity variable shows an actual mean of 23.04 well above the theoretical median of 18 indicating that respondents possess a high level of religiosity in their professional lives. The Task-Specific Knowledge (TSK) variable, with a mean of 57.47 (theoretical median: 42), indicates that the majority of respondents possess adequate knowledge to manage audit tasks efficiently. The Fraud Detection variable, with a mean of 42.86 (theoretical median: 33), indicates that respondents possess strong fraud detection awareness and capabilities.

Measurement Model Evaluation (Outer Model)

Table 3. Convergent Validity Test (AVE)

Variable	AVE	Decision
BD	0.515	Valid
CAATs	0.694	Valid
AR	0.666	Valid
TSK	0.590	Valid
FD	0.518	Valid

Source: Primary data, processed using SmartPLS 4 (2025)

Convergent validity test results indicate that all constructs meet the AVE ≥ 0.50 criterion. The highest AVE value is observed for CAATs (0.694), followed by Fraud Detection (0.518), Auditor Religiosity (0.666), Big Data (0.515), and TSK (0.590). This indicates that the indicators used adequately explain their respective latent constructs. Discriminant validity testing based on the Fornell & Larcker (1981) criterion shows that the correlation value between latent variables is lower than the square root of the AVE for the associated constructs; thus, each latent variable meets the discriminant validity criterion.

Table 4. Reliability Test

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Decision
BD	0.894	0.908	0.913	Reliable
CAATs	0.972	0.977	0.974	Reliable
AR	0.743	0.745	0.856	Reliable
TSK	0.929	0.933	0.94	Reliable
FD	0.866	0.867	0.895	Reliable

Source: Primary data, processed using SmartPLS 4 (2025)

Reliability test results indicate that all constructs meet the criteria for Composite Reliability (CR) ≥ 0.70 and Cronbach's Alpha (α) ≥ 0.70. The highest CR values were observed for CAATs (0.972) and Task-Specific Knowledge (0.929). The highest α values were observed for CAATs (0.977) and Big Data (0.908). This demonstrates high internal consistency across all measurement instruments, allowing the calculated relationships between constructs in the subsequent analysis to be interpreted with a high level of confidence.

Structural Model Evaluation (Inner Model)

Table 5. Coefficient of Determination (R^2)

	R-square	R-square adjusted
FD	0.713	0.667

Source: Primary data, processed using SmartPLS 4 (2025)

The Adjusted R^2 value of 0.667 indicates that 66.7% of the variance in the Fraud Detection variable can be explained by the variables Big Data, CAATs, Task-Specific Knowledge, and Auditor Religiosity. Only 33.3% is influenced by factors outside the model. Based on the criteria of Hair et al. (2013) as cited in Betri et al. (2025) a model with an R^2 value ≥ 0.67 is categorized as strong. Thus, the model in this study falls into the "very strong"

category, as it exceeds the 0.75 threshold.

Table 6. F² Effect Size

	FD
BD	0.001
CAATs	0.137
AR	0
TSK	0.336
TSK x BD	0.001
TSK x CAATs	0.073
TSK x AR	0.011

Source: Primary data, processed using SmartPLS 4 (2025)

Based on F² values, the variables CAATs, Task-Specific Knowledge, and TSK x CAATs exhibit a small effect size (F² > 0.02); meanwhile, the variables Big Data, Auditor Religiosity, and the interactions TSK × BD and TSK × AR show a very weak effect size, with F² values below 0.02

Hypothesis Testing

Table 7. Significance Test Results (t-test)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Results
BD -> FD	0.039	0.044	0.185	0.21	0.417	H1 Refused
CAATs -> FD	0.26	0.251	0.152	1.709	0.044	H2 Accepted
AR -> FD	0.005	0.047	0.148	0.032	0.487	H3 Refused
TSK -> FD	0.601	0.581	0.175	3.432	0.001	-
TSK x BD -> FD	0.023	0.012	0.138	0.166	0.434	H4 Refused
TSK x CAATs -> FD	-0.193	-0.19	0.12	1.607	0.054	H5 Refused
TSK x AR -> FD	0.099	0.12	0.152	0.652	0.257	H6 Refused

Source: Primary data, processed using SmartPLS 4 (2025).

The Influence of Big Data on Fraud Detection

Test results indicate that Big Data does not have a significant effect on fraud detection (OS = 0.039; T = 0.21; p = 0.417). Consequently, H1 is rejected. This finding is consistent with the study by (Novika et al., 2023), which also found that Big Data did not significantly impact auditors' ability to detect fraud. However, this finding differs from the studies by (Handoko et al., 2022), (Syahputra & Afnan, 2020) , (Bandiyono, 2023) , and Sartono et al. (2026), which stated that Big Data has a significant effect.

Viewed through the lens of UTAUT (Venkatesh et al., 2003) , although auditors perceive Big Data as useful, certain factors diminish the motivation for its adoption, including: (1) the complexity of data volume and variety, which hinders interpretation; (2) limited technical skills specific to data analytics; (3) high data velocity, which constrains processing capabilities within limited timeframes; and (4) the high costs associated with acquiring and managing Big Data. (Gaswira & Meutia, 2024) add that despite Big Data's immense potential,

its implementation in forensic auditing in Indonesia still faces various structural and resource-related obstacles.

The Influence of CAATs on Fraud Detection

The second hypothesis (H2) is accepted. The original sample value for CAATs is 0.260, with a t-statistic of 1.709 and a p-value of 0.044 (< 0.05), demonstrating that CAATs have a significant and positive effect on fraud detection. CAATs is the only primary independent variable proven to have a significant effect in this study. This finding is consistent with and reinforces the research by (Samagaio & Diogo, 2022) , which found a positive and significant effect of CAATs usage on fraud detection. The acceptance of H2 can be interpreted through the "performance expectancy" dimension of the UTAUT model (Venkatesh et al., 2003). CAATs have been consistently shown to enhance auditor performance in fraud detection due to their structured nature, relative ease of learning, and ability to be directly integrated into standard audit procedures unlike Big Data, which is technically more complex. The ability of CAATs to automate data testing using software such as ACL Analytics or IDEA enables auditors to efficiently analyze entire transaction populations, reduce the risk of sample selection bias, and improve the accuracy of identifying transaction anomalies indicative of fraud (Betri & Hafidz, 2024). These findings confirm that CAATs are a mature and well-adopted audit technology among Indonesian auditors, capable of delivering tangible and measurable impacts on their fraud detection capabilities.

The Influence of Auditor Religiosity on Fraud Detection

The third hypothesis (H3) was rejected. The original sample value for Auditor Religiosity was 0.005, with a t-statistic of 0.032 and a p-value of 0.487 (> 0.05), indicating that Auditor Religiosity does not have a significant effect on fraud detection. This finding contradicts research by Bandiyono (2023) and (Suci et al., 2022) which identified a positive and significant influence of religiosity on fraud detection capabilities but is consistent with the findings of Betri et al. (2025) regarding a similar population of auditors in Indonesia.

CONCLUSION

This study yielded empirical findings indicating that, among the three technological and behavioral variables examined, only Computer-Assisted Audit Techniques (CAATs) had a significant positive effect on auditors' fraud detection capabilities, with a path coefficient of 0.260, a t-statistic of 1.709, and a p-value of 0.044 (< 0.05). These findings reinforced the position of CAATs as the most mature and readily applicable audit technology instrument among Indonesian auditors. The results were consistent with Samagaio and Diogo (2022), who confirmed the significant positive effect of CAATs on audit effectiveness, as well as (Al Natour et al., 2025; Bandiyono, 2023) , who empirically demonstrated the positive influence of CAATs applications on fraud detection capabilities in forensic accounting contexts within developing countries.

The significance of CAATs in this study can be understood through the performance expectancy dimension of the Unified Theory of Acceptance and Use of Technology (UTAUT) framework (Venkatesh et al., 2003), in which auditors perceive tangible benefits from CAATs in improving audit quality and efficiency. Unlike Big Data, which involves greater technical complexity, CAATs, such as ACL Analytics and IDEA, enable auditors to automate comprehensive data testing, reduce the risk of sample selection bias, and improve the accuracy

of identifying transaction anomalies associated with fraud (Betri & Hafidz, 2024; Lin & Wang, 2011, cited in Betri et al., 2025). The structured nature of CAATs and their ability to integrate directly into standard audit procedures make them operationally more effective than the other technologies examined in this research model.

In addition to these primary findings, the study confirmed three supporting conclusions. First, Big Data did not have a significant effect on fraud detection (H1 rejected; p = 0.417), indicating that the stronger performance of CAATs was not merely a statistical occurrence but reflected differences in adoption maturity between the two audit technologies. CAATs are relatively more established and ready for implementation among Indonesian auditors, whereas Big Data adoption continues to face challenges, including data complexity, limited technical expertise, and high implementation costs. Second, auditor religiosity did not significantly influence fraud detection (H3 rejected; p = 0.487), suggesting that fraud detection effectiveness was more strongly associated with technological capabilities than with individual moral or behavioral dimensions. Third, Task-Specific Knowledge (TSK) did not moderate the relationships between Big Data, CAATs, or auditor religiosity and fraud detection (H4, H5, and H6 rejected). However, the interaction between TSK and CAATs approached statistical significance (p = 0.054), suggesting that the relationship between CAATs utilization and fraud detection may become stronger with larger samples. Overall, TSK functioned as a significant direct predictor of fraud detection rather than as a moderating variable, confirming the findings of Betri et al. (2025).

The theoretical implication of this study lies in confirming that, among the three technological and behavioral pathways examined, CAATs were the only factor consistent with UTAUT predictions (Venkatesh et al., 2003), particularly the proposition that technologies with lower effort expectancy and higher performance expectancy are more likely to generate tangible improvements in task performance. This study contributes to the audit literature by positioning CAATs as an important variable connecting technology acceptance theory with measurable fraud detection outcomes while confirming TSK as an independent predictive variable rather than a moderating variable within fraud detection models in Indonesia.

The practical implications of these findings suggest that audit organizations should prioritize investment in strengthening and expanding CAATs utilization because these tools demonstrated the strongest empirical contribution to fraud detection capabilities. Specifically, public accounting firms and government audit agencies should increase advanced CAATs training, such as training in ACL Analytics and IDEA, to ensure that these technologies are integrated more effectively into audit procedures. Furthermore, because the TSK × CAATs interaction approached the significance threshold (p = 0.054), audit organizations should ensure that auditors who utilize CAATs also possess adequate Task-Specific Knowledge (TSK), as the combination of technological capability and task expertise may enhance fraud detection effectiveness. Big Data capability development should continue as a long-term strategic investment, considering that its implementation challenges differ fundamentally from those associated with CAATs, which have reached a higher level of maturity. Future research should further investigate the interaction between TSK and CAATs using larger samples and broader auditor populations across Indonesia while incorporating additional moderating or mediating variables, such as auditor workload, whistleblowing mechanisms, and CAATs experience, to improve the generalizability and depth of understanding regarding

the role of CAATs in fraud detection.

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