



RESEARCH ARTICLE

The Influence of Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism on Fraud Detection: Evidence from the Audit Board of Indonesia Representative Office of Bengkulu Province

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Abstract

Fraud detection remains a significant challenge in the public sector, particularly as financial transactions become increasingly complex, necessitating the integration of technology and auditor competencies. Although the Audit Board of the Republic of Indonesia (BPK RI) has implemented Big Data Analytics, effective fraud detection still requires adequate investigative skills and professional judgment. This study aims to examine the influence of Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism on Fraud Detection among auditors at the BPK RI Representative Office of Bengkulu Province. A quantitative approach was employed, utilizing questionnaire data from 45 auditors. The data were analyzed using multiple linear regression with IBM SPSS Statistics. The results indicate that Big Data Analytics has a positive and significant effect on Fraud Detection ($\beta = 0.253$; $p = 0.023$), as do Forensic Accounting Skills ($\beta = 0.358$; $p = 0.016$) and Professional Skepticism ($\beta = 0.357$; $p = 0.010$). Simultaneously, the three independent variables significantly influence Fraud Detection ($F = 49.589$; $p < 0.001$), with an adjusted R^2 of 0.768. Professional Skepticism demonstrates the highest t-statistic among the three variables, indicating its relatively strong contribution to fraud detection in this study. These findings suggest that effective fraud detection in the public sector requires the integration of data analytics technology, forensic accounting competencies, and professional skepticism. Therefore, audit institutions should strengthen the utilization of analytical technology while continuously developing auditors' investigative skills and professional judgment.

Keywords

Big Data Analytics; Forensic Accounting Skills; Professional Skepticism; Fraud Detection.

1 | INTRODUCTION

Fraud continues to pose a significant challenge across both public and private sectors, leading to substantial financial losses and a troubling decline in public trust toward governmental institutions. As financial transactions evolve into increasingly digital and intricate forms, traditional audit practices often fall short in detecting sophisticated fraudulent schemes that can easily bypass standard checks. This reality necessitates that auditors enhance their detection skills by merging advanced technologies with essential professional expertise. The advent of Big Data Analytics (BDA) has notably reshaped the auditing landscape. BDA empowers auditors to handle extensive amounts of structured and unstructured data, facilitating the identification of atypical transaction patterns and enabling more informed risk-based audit decisions. Research indicates that BDA plays a crucial role in elevating audit quality and bolstering auditors' effectiveness in detecting fraud by delivering timely and thorough evidence (Al-Ateeq *et al.*, 2022). However, relying solely on technological advancements is insufficient for achieving successful fraud detection. The ultimate effectiveness of audits hinges on auditors' ability to interpret analytical results with precision and apply sound professional judgment. This synergy between technology and human insight is essential for developing robust strategies that can effectively combat the evolving landscape of financial misconduct.

In addition to technological capability, Forensic Accounting Skills (FAS) have become increasingly vital in the realm of fraud investigations. These skills encompass a blend of accounting, auditing, analytical, and investigative competencies, empowering auditors to identify indicators of fraud and assess complex financial evidence effectively. Research has consistently demonstrated that enhanced forensic accounting skills significantly improve the effectiveness of fraud detection (Al Natour *et al.*, 2023; Budiantoro *et al.*, 2022). This underscores the necessity for auditors to not only possess technical knowledge but also to apply critical thinking and analytical skills in their work. Furthermore, Professional Skepticism (PS) plays a crucial role in the auditing process. It encourages auditors to critically evaluate audit evidence and maintain a heightened awareness of the potential for material misstatements arising from fraudulent activities. Auditors who exhibit a high degree of professional skepticism are typically more successful in recognizing fraudulent behaviors during audits (Beka, 2025).

While previous research has explored the relationships between Big Data Analytics, Forensic Accounting Skills, Professional Skepticism, and fraud detection, most studies have tended to focus on these variables in isolation or within varying organizational contexts. There remains a gap in empirical evidence examining the combined influence of these three critical factors within Indonesia's public sector, particularly among auditors of the Audit Board of the Republic of Indonesia (BPK RI). Moreover, despite the implementation of the Big Data Analytics and Intelligent Computing System (BIDICS) by BPK RI, ongoing corruption cases highlight that mere technological implementation may not suffice to bolster fraud detection efforts (Betri *et al.*, 2025). This scenario emphasizes the importance of investigating how technological capabilities and auditor competencies work together to enhance the effectiveness of fraud detection strategies.

Therefore, this study aims to investigate the influence of Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism on fraud detection among auditors at the BPK RI Representative Office of Bengkulu Province. The research employs a quantitative design, utilizing questionnaire data collected from 45 auditors who are actively engaged in the auditing process. This approach allows for a systematic examination of the relationships between the identified variables and their collective impact on fraud detection capabilities. The auditors of the Audit Board of the Republic of Indonesia (BPK RI) Representative Office of Bengkulu Province were specifically chosen as research subjects due to their direct involvement in auditing public financial management and accountability. Their critical role in ensuring transparency and integrity within the public sector underscores the necessity for effective fraud detection methods. Given the complexities of financial transactions today, the ability to identify fraudulent activities is not merely advantageous but essential for maintaining public trust and ensuring the proper use of government resources.

In executing their responsibilities, auditors can leverage Big Data Analytics to analyze vast amounts of financial data, facilitating the identification of anomalies that may indicate fraudulent behavior. Furthermore, Forensic Accounting Skills empower auditors to discern subtle signs of fraud and to evaluate intricate financial evidence thoroughly. Meanwhile, Professional Skepticism encourages auditors to maintain a questioning mindset, critically assessing audit evidence and remaining vigilant about potential misstatements resulting from fraud. Consequently, examining these three factors Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism within the context of the BPK RI Representative Office of Bengkulu Province is particularly relevant for understanding their interrelationships and their effects on enhancing fraud detection capabilities. By exploring how these elements interact, this study aims to provide a comprehensive understanding of the dynamics at play in effective fraud detection. This research contributes significantly to the existing literature by integrating both technological and behavioral perspectives in explaining fraud detection processes. The findings are anticipated to enrich the body of knowledge surrounding public sector auditing while offering practical insights for audit institutions. These insights can guide efforts to strengthen digital audit capabilities, enhance forensic accounting competencies, and foster a culture of professional skepticism among auditors, ultimately leading to more robust fraud detection practices (Chukwu *et al.*, 2019).

2 | BACKGROUND THEORY

This study is grounded in Cognitive Fit Theory and Attribution Theory, which shed light on how advancements in technology and individual competencies impact auditors' abilities to detect fraud. Cognitive Fit Theory asserts that the quality of decision-making improves when information is presented in a manner that aligns with users' cognitive processes. In the realm of auditing, the integration of Big Data Analytics (BDA) enables auditors to efficiently analyze large datasets, thereby enhancing their capacity to identify fraudulent activities. This alignment between data presentation and cognitive processing is essential for effective decision-making in complex auditing environments. Attribution Theory complements this perspective by emphasizing that auditors' decisions are influenced by internal factors such as knowledge, competence, and professional judgment. These traits are reflected in forensic accounting skills and professional skepticism, both of which are critical for effective fraud detection. Forensic Accounting Skills involve a range of competencies that empower auditors to investigate financial discrepancies and critically assess evidence. Research has shown that robust forensic accounting skills significantly enhance the effectiveness of fraud detection (Al Natour *et al.*, 2023; Budiantoro *et al.*, 2022).

Furthermore, BDA improves auditors' abilities to pinpoint anomalies and assess financial risks through advanced data processing techniques. Previous studies indicate that BDA positively influences fraud detection by offering timely and thorough audit evidence (Al-Ateeq *et al.*, 2022). In tandem, Forensic Accounting Skills bolster auditors' investigative and analytical capabilities, allowing them to uncover fraudulent activities more efficiently. Additionally, Professional Skepticism fosters a mindset in auditors that encourages critical evaluation of audit evidence and heightened awareness of potential fraud, leading to more accurate audit judgments (Beka, 2025). From these theoretical perspectives and empirical findings, this study proposes the following hypotheses

H1: Big Data Analytics positively affects fraud detection. This hypothesis is based on the premise that effective utilization of BDA enhances auditors' ability to recognize fraudulent activities through superior data analysis.

H2: Forensic Accounting Skills positively affect fraud detection. This hypothesis suggests that auditors equipped with stronger forensic accounting competencies will be better at identifying signs of fraud and conducting thorough investigations.

H3: Professional Skepticism positively affects fraud detection. This hypothesis posits that auditors who maintain a skeptical attitude towards their work will be more effective in uncovering fraudulent behaviors and making sound audit judgments.

The interaction between technology and individual competencies is crucial in determining the effectiveness of fraud detection in auditing. By examining these factors through the lenses of Cognitive Fit Theory and Attribution Theory, this study seeks to enhance understanding of how auditors can strengthen their fraud detection capabilities in an ever-evolving financial landscape. The anticipated findings aim to provide practical guidance for audit institutions, assisting them in refining digital audit capabilities, enhancing forensic accounting skills, and cultivating a culture of professional skepticism among auditors (Chukwu *et al.*, 2019; Dianto, 2023; Prasetya *et al.*, 2023).

3 | METHOD

This study employed a quantitative research design to examine the influence of Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism on fraud detection among auditors. The research was conducted at the Audit Board of the Republic of Indonesia (BPK RI) Representative Office of Bengkulu Province. The study population consisted of all auditors working at the institution. Using purposive sampling, 45 auditors who met the research criteria participated as respondents by completing a structured questionnaire. The research utilized primary data collected through a questionnaire based on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement indicators for Big Data Analytics, Forensic Accounting Skills, Professional Skepticism, and Fraud Detection were adapted from established studies and adjusted to the research context. Before hypothesis testing, the instrument was evaluated through validity and reliability tests to ensure measurement quality. Data were analyzed using IBM SPSS Statistics. Descriptive statistics were first employed to describe respondent characteristics and variable distributions. Instrument quality was assessed through validity and reliability tests, followed by classical assumption tests, including normality, multicollinearity, and heteroscedasticity. Multiple linear regression analysis was then conducted to examine the proposed hypotheses. Statistical significance was evaluated using the coefficient of determination (R^2), F-test, and t-test at a 5% significance level.

4 | RESULTS AND DISCUSSION

4.1 Results

A total of 45 valid questionnaires were analyzed. The research instrument met the validity and reliability requirements, and the classical assumption tests indicated that the regression model satisfied the assumptions of normality, multicollinearity, and heteroscedasticity. Therefore, the data were considered appropriate for multiple linear regression analysis. The regression results revealed that Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism each have a positive and significant effect on fraud detection. These findings indicate that all proposed hypotheses (H1, H2, and H3) are supported. Furthermore, the simultaneous test showed that the three independent variables jointly influence fraud detection, suggesting that both technological capability and auditor competency play important roles in improving fraud detection effectiveness. The positive effect of Big Data Analytics supports Cognitive Fit Theory, which suggests that decision quality improves when analytical information is aligned with users' cognitive processes. The implementation of Big Data Analytics enables auditors to process large volumes of financial data efficiently, identify unusual transaction patterns, and improve audit quality through data-driven decision-making. These findings are consistent with previous studies reporting that the use of advanced analytical technology enhances fraud detection effectiveness.

The findings also demonstrate that Forensic Accounting Skills significantly improve fraud detection. Auditors with stronger investigative, analytical, and accounting competencies are better able to evaluate financial evidence and recognize fraud indicators. This result supports Attribution Theory, which explains that individual competence influences professional decision-making and is consistent with previous empirical studies emphasizing the importance of forensic accounting in fraud investigations. Furthermore, Professional Skepticism has a positive and significant influence on fraud detection. Auditors who maintain a questioning mindset and critically evaluate audit evidence are more capable of identifying material misstatements caused by fraud. This finding reinforces the role of professional skepticism as a fundamental aspect of audit quality and supports previous studies emphasizing its contribution to effective fraud detection. Overall, the findings indicate that the integration of digital technology, forensic accounting competence, and professional skepticism strengthens auditors' ability to detect fraud in the public sector. These results provide empirical evidence that technological innovation should be accompanied by continuous competency development to improve audit effectiveness and support public accountability.

Table 1. F-Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	406.085	3	135.362	49.589	0.000b
Residual	111.915	41	2.730		
Total	518.000	44			

Source: Processed primary data, 2026 (Appendix 11)

The F-test results show an F-statistic of 49.589 with a significance value of .000 ($p < .05$), indicating that the independent variables jointly have a significant effect on Fraud Detection. Therefore, the hypothesis stating that Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism simultaneously have a significant effect on Fraud Detection is accepted. The relatively high F-value indicates that the independent variables included in the regression model have good explanatory power in predicting variations in Fraud Detection. Table 1. also indicates that the regression model is statistically significant, with an F-value of 49.589 and a p-value of .000, which is lower than the significance level of .05. These findings demonstrate that the regression model is fit and reliable for explaining the relationships among the variables examined in this study.

The Normal P-P plot of regression standardized residuals shows that the residual points are distributed closely around the diagonal line, indicating that the regression residuals are approximately normally distributed. Thus, the normality assumption of the regression model is fulfilled.

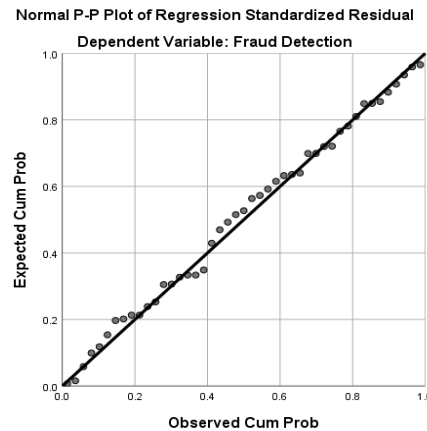


Figure 1. Normal P-P plot of regression standardized residual.

Figure 1 illustrates a detailed comparison of performance over time between the experimental and control groups. This visual representation highlights the differences in outcomes, showcasing how the experimental group responded to the interventions as opposed to the control group, which did not receive the same treatment. Such comparisons are vital in understanding the effectiveness of the applied methods and provide a clearer picture of the impact over the designated time period.

Table 2. Model summary of multiple regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.885	0.784	0.768	1.652

Note: Predictors include Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism. The dependent variable is Fraud Detection.

The regression analysis demonstrates that all independent variables significantly influence Fraud Detection. Big Data Analytics positively affects fraud detection ($\beta = .253$, $t = 2.367$, $p = .023$), indicating that the utilization of advanced data analytics enhances auditors' ability to identify fraudulent activities. Forensic Accounting Skills also have a positive and significant effect ($\beta = .358$, $t = 2.521$, $p = .016$), suggesting that auditors with stronger investigative and analytical competencies are more effective in detecting fraud. Furthermore, Professional Skepticism positively influences Fraud Detection ($\beta = .357$, $t = 2.692$, $p = .010$), demonstrating that a questioning mindset and critical evaluation of audit evidence improve auditors' fraud detection capabilities. The Adjusted R^2 value of 0.768 further indicates that the three independent variables jointly explain a substantial proportion of the variance in Fraud Detection, highlighting the importance of integrating technological capability with auditor competence to improve fraud detection effectiveness.

4.2 Discussion

The findings from this study offer significant insights into the roles of Big Data Analytics (BDA), Forensic Accounting Skills (FAS), and Professional Skepticism (PS) in enhancing fraud detection among auditors at the Audit Board of the Republic of Indonesia (BPK RI) Representative Office of Bengkulu Province. Each factor demonstrates a unique contribution to effective fraud detection, revealing the necessity for a multifaceted approach in contemporary auditing practices. The positive impact of BDA is particularly striking. With the increasing complexity of financial transactions, traditional auditing methods often fall short in identifying sophisticated fraudulent schemes. BDA equips auditors with the necessary tools to analyze extensive datasets, enabling them to uncover anomalies that may signal fraudulent activities. This aligns with the findings of Al-Ateeq et al. (2022), who argue that advanced analytical techniques significantly enhance the ability of auditors to detect fraud. Furthermore, the Association of Certified Fraud Examiners (ACFE, 2023) underscores the importance of integrating BDA into auditing processes to combat occupational fraud effectively.

FAS also emerges as a critical factor in fraud detection. Auditors who possess strong forensic skills are better positioned to investigate financial discrepancies and assess evidence critically. This reinforces the conclusions drawn by Al Natour et al. (2023), highlighting the need for auditors to blend technical knowledge with analytical and investigative capabilities. The ability to identify subtle indicators of fraud is essential, especially in an environment where financial misconduct can be intricate and deceptive. Budiantoro et al. (2022) further affirm that proficiency in forensic accounting is vital for conducting thorough investigations and evaluations of financial data. The role of PS stands out as particularly influential. Auditors who maintain a skeptical mindset and rigorously evaluate audit evidence are more adept at

recognizing fraudulent behaviors. This observation is consistent with Beka (2025), who emphasizes that professional skepticism is fundamental to effective auditing. A skeptical approach encourages auditors to question assumptions and scrutinize evidence, ultimately leading to more accurate fraud detection outcomes. The interaction between PS and the other two factors BDA and FAS creates a robust framework for auditors, underscoring the importance of combining technological advancements with human insight.

While BDA enhances data processing capabilities, the interpretation of results relies heavily on auditors' judgment and analytical skills. This synergy is essential for developing effective fraud detection strategies. Dianto (2023) points out that integrating these aspects fosters a deeper understanding of fraud detection processes, which is crucial for improving auditing practices. The findings suggest that audit institutions should not solely focus on technological investments but also prioritize the development of auditors' competencies. The implications of this study extend beyond the immediate context of the BPK RI. Continuous professional development is imperative for auditors as financial landscapes evolve. Training programs that focus on both technological tools and forensic accounting practices are essential for enhancing auditors' effectiveness in detecting fraud. Kinanti (2025) highlights the necessity for auditors to adapt their skills to meet the changing demands of fraud detection.

This study emphasizes the critical interplay between Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism in enhancing fraud detection capabilities among auditors. By fostering an environment that values both technological innovation and professional growth, audit institutions can significantly improve their effectiveness in combating fraud. The insights gained from this research can inform audit professionals and institutions worldwide as they strive to uphold integrity and accountability in financial management.

5 | CONCLUSIONS AND FUTURE WORK

This study examined the influence of Big Data Analytics, Forensic Accounting Skills, and Professional Skepticism on Fraud Detection among auditors at the Audit Board of the Republic of Indonesia (BPK RI) Representative Office of Bengkulu Province. The findings reveal that each of these factors has a positive and significant effect on Fraud Detection, both individually and collectively. This indicates that the integration of technological capability and auditor competence is crucial for enhancing fraud detection effectiveness. Among the three independent variables, Professional Skepticism emerged as the most influential factor in improving fraud detection. Auditors who maintain a questioning mindset and critically evaluate audit evidence are more adept at identifying fraudulent activities. Additionally, the effective use of Big Data Analytics enhances auditors' ability to analyze large volumes of data, while Forensic Accounting Skills improve their capacity to investigate and interpret fraud-related evidence. The findings provide empirical support for Cognitive Fit Theory, emphasizing that the alignment between analytical technology and audit tasks enhances decision quality. Furthermore, Attribution Theory highlights the importance of auditors' competence and professional attitudes in influencing audit performance. Thus, this study concludes that effective fraud detection in the public sector relies not only on the adoption of advanced analytical technologies but also on the ongoing development of auditors' forensic competencies and professional skepticism. Future research should focus on conducting data collection outside peak audit periods or extending the questionnaire completion period to enhance respondent participation and data quality. Additionally, adopting a longitudinal research design will provide a more comprehensive understanding of the dynamic relationships between Big Data Analytics, Forensic Accounting Skills, Professional Skepticism, and Fraud Detection over time.

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