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Research paper



Do Personality Traits Matter in Fraud from Indonesian Commercial Banks

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Abstract

The rapid development of banking digitalization has improved efficiency and service convenience for customers, but it has also increased opportunities for fraud committed by both internal and external parties. Fraud cases involving bank employees and third parties not only cause financial losses but also undermine public trust in the banking sector. In this context, internal auditors play a critical role in fraud detection; however, their effectiveness may be influenced by individual characteristics and organizational conditions. This study aims to examine the effects of Big Five personality traits, banking digitalization, and red flag understanding on fraud detection, with professional skepticism as a mediating variable and work pressure as a moderating variable. A mixed-method approach was employed. Quantitative data were collected through questionnaires administered to internal auditors of commercial banks in Indonesia and analyzed using SmartPLS, while qualitative data were obtained from written interviews and content analysis of fraud-related news from online media. The rapid development of banking digitalization has improved efficiency and service convenience for customers, but it has also increased opportunities for fraud committed by both internal and external parties. Fraud cases involving bank employees and third parties not only cause financial losses but also undermine public trust in the banking sector. In this context, internal auditors play a critical role in fraud detection; however, their effectiveness may be influenced by individual characteristics and organizational conditions. This study aims to examine the effects of Big Five personality traits, banking digitalization, and red flag understanding on fraud detection, with professional skepticism as a mediating variable and work pressure as a moderating variable. A mixed-method approach was employed. Quantitative data were collected through questionnaires administered to internal auditors of commercial banks in Indonesia and analyzed using SmartPLS, while qualitative data were obtained from written interviews and content analysis of fraud-related news from online media.

Keywords: *Big Five Personality; Banking Digitalization; Red Flags; Detecting Fraud; Pressure.*

1. Introduction

The Indonesian banking sector, especially commercial banks, has undergone a significant transformation with the implementation of digitalization that facilitates financial services such as Mobile Banking, Internet Banking, ATM, E-Wallet, and QRIS (QR Code Indonesian Standard). However, behind this convenience arises a serious challenge, where there are increasing fraud cases that harm banks and reduce public trust. The first case occurred at Bank BRI Tanjung Pinang, where marketing deceived debtors so that when repaying, the debtor could not take the collateral documents that had been submitted. This case is related to the extroverted personality of the auditor, who tends to prioritize interpersonal relationships so that it is easier to believe the information provided without sufficient verification. The second case occurred at Bank Riau Kepri, where a teller stole 7.4 billion customers' money. A digital system that is not strictly supervised allows employees to transfer money without a clear trace, making it easier for fraud to occur. The third case of Bank BNI employees disbursing fictitious loans worth 725 million. Employees were manipulated so that PT FBI, who did not apply for a loan, suddenly had a disbursement. Involved peoplemay be affected by neuroticism and high work pressure. If internal auditors aren't firm enough, they can fail to detect fraud even if red flags appear. The fourth case is related to the crime of skimming on BRI customers.(Yun, 2021), showing the importance of system toughness and professional skepticism from internal auditors.

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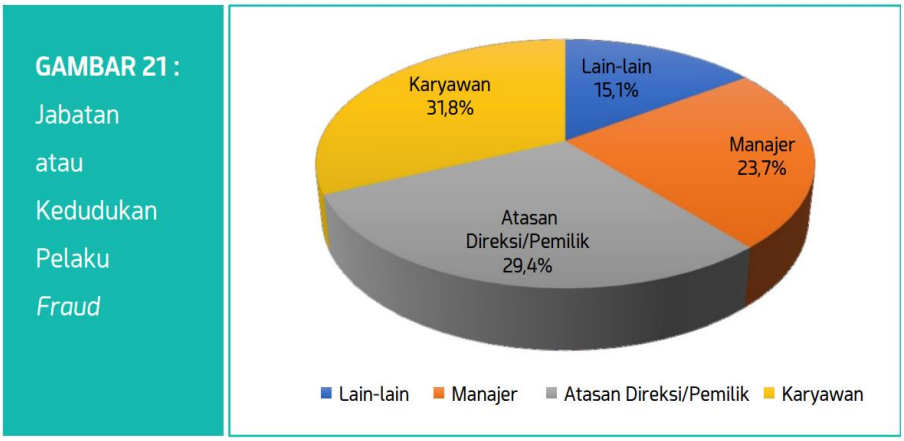


Fig. 1: Position or Position of the Fraud Perpetrator.

Based on the results of fraud in Indonesia, it shows that fraudsters often come from employees 31.8%, supervisors of directors/owners 29.4%, and managers 23.7%. This shows that fraud is committed by individuals who have a high position of power or control in the company. They use the authority and information they have to carry out actions that are detrimental to the company.

The state-of-the-art study conducted states.(Wahidahwati & Asyik, 2022)that the higher the professional skepticism of an internal auditor, the greater his ability to detect fraud. According to company leaders and senior auditors, they have a higher level of professional skepticism compared to their younger counterparts. (Rimende, 2021; Tarigan, 2023). Research reveals that time pressure can hinder an individual's ability to detect fraud, although experienced individuals tend to be more able to maintain skepticism even under pressure. (Handoko, 2022). The importance of understanding red flags in detecting fraud is also emphasized, where auditors must be able to identify suspicious patterns. This requires professional skepticism so that auditors. (Kranacher, 2011) Do not easily believe in data without verification. Forensic accounting training significantly improves auditors' ability to recognize, analyze, and respond to red flags. (Umar et al., 2019). Although fraud-related training has been conducted by banks through platforms such as Zoom, forensic accounting training has not been widely implemented, and not all internal auditors have forensic accounting certifications, so fraud detection has not been optimal. (Khamainy et al., 2022).

The auditor's personality (openness to experience, neuroticism, conscientiousness, and extroversion) influences fraud detection. (Alizadegan, 2023; van Kuijck & Paresi, 2020a). A high agreeableness personality type tends to be ineffective in detecting fraud because of its conflict-avoidant nature. Internal auditors are expected not to avoid conflicts, but to be more confrontational. In contrast to the results of research conducted on external auditors, the personality types of conscientiousness, openness to experience, and extroversion can detect fraud. (Bologna, 1995; Dal Magro & da Cunha, 2017; Nicolăescu, 2013; Wilks, 2004). This research fills a gap in the literature related to auditor personality, understanding red flags, and the digitization of banking through professional skepticism. (Handoko, 2022) with time pressure as a moderation variable (V. S. E. Janrosl et al., 2025). In research related to fraud detection, there are various theories and models that have been developed.

Based on the image below, the results of the analysis using VOSviewer show that research related to fraud detection sourced from auditor personalities, banking digitization, and understanding of red flags is still very limited.

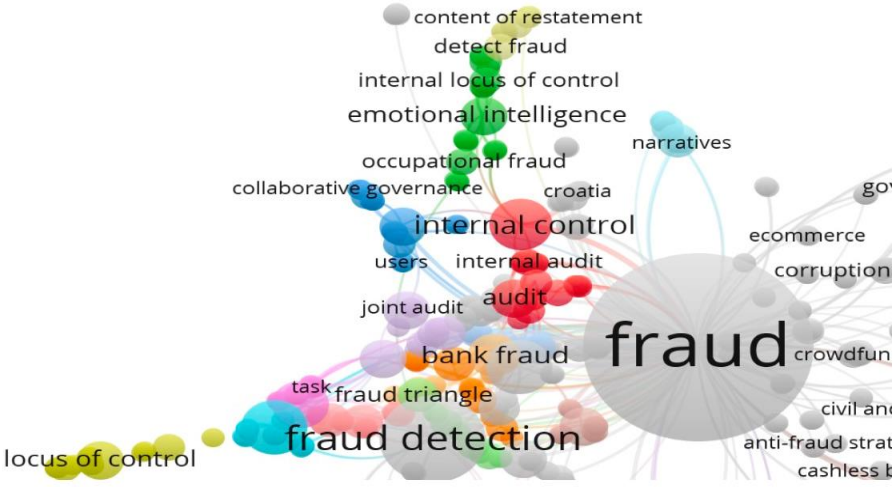


Fig. 2: Vos Viewer Results from Bibliometrics.

The novelty of this research lies in the development of the previous Doctoral Dissertation Research, which focused on the personality type of external auditors in detecting fraud. Previous research found auditor personality types that can detect fraud, namely conscientiousness, openness to experience, and extroversion. This research develops these findings by shifting the focus from external auditors to internal auditors (V. S. E. Janrosl et al., 2025). This shift in focus provides a new understanding of how the personality of an internal auditor can affect fraud detection. The second novelty is the implementation of banking digitalization by adding indicators of system resilience that have not been widely discussed. In the study, it was explained that the use of ML (Machine learning) can detect fraud (Adhitya & Chrismastianto, 2017; Setyaningsih & Vanda, 2018). The novelty of these three studies was carried out on commercial banks in Indonesia, which covers the national area, so as to provide specific insights related to the benefits of banking digitalization and the causes of fraud. The

fourth novelty is the use of source triangulation, where quantitative data is validated through written interviews with regional heads, customer service heads, teller heads, and internal auditors of commercial banks.

2. Literature Review

The personality of the individual reflected in the Big Five Personality Traits plays an important role in the professional context. Extroversion describes the personality of an individual who is energetic, active, and easily interacts with the social environment. Individuals with high levels of extroversion tend to have good communication skills, be confident, and work collaboratively in a team.(V. S. E. Janrosl et al., 2023). In professional contexts, particularly audit and fraud investigations, these characters support the process of information exchange, discussion of findings, and joint decision-making. Extroversion indicators include sociality, teamwork, assertiveness, and productivity, which reflect the level of involvement of individuals in organizational activities. Agreeableness reflects a personality that is friendly, cooperative, caring, and has empathy for others. Individuals with high agreeableness tend to be able to build harmonious working relationships, maintain trust, and minimize conflict. In a work environment that demands integrity, this trait plays an important role in creating an ethical climate. Indicators of agreeableness include openness, patience, altruism, and reliability, which describe the ability of individuals to cooperate and maintain interpersonal relationships. Conscientiousness describes an organized, disciplined, conscientious, and responsible individual.(Samagaio & Felício, 2022). This character is particularly relevant in jobs that require precision, adherence to procedures, and consistency in the execution of tasks. In fraud detection, conscientiousness contributes to thoroughness in examining evidence and adherence to professional standards. Indicators of these variables include team collaboration, discipline, rigor, and responsibility. Neuroticism refers to an individual's tendency to experience negative emotions such as anxiety, irritability, and depression. High levels of neuroticism can affect emotional stability and decision-making quality, especially in high-stress situations. In a professional context, this condition has the potential to reduce objectivity and work effectiveness. Indicators of neuroticism include anxiety, irritability, and depression. Openness to experience describes a personality that is open to new ideas, creative, innovative, and adaptive to change. Individuals with a high level of openness tend to be able to understand new patterns and think critically in the face of the complexity of problems. In fraud detection, this character is important to recognize the ever-evolving mode of fraud. The indicators include ideas, creativity, curiosity, and adaptability to change.

Beyond personality factors, banking digitalization plays a role in increasing efficiency, transparency, and speed of services through the use of digital banking services, electronic payment systems, and strengthening system security and resilience. This digital transformation also requires increased awareness of technology-based fraud risks. Therefore, understanding red flags is crucial, namely the ability to recognize the early signs of fraud, which include pressure, opportunity, rationalization, capability, and ego as driving factors for fraud. This understanding is reinforced by professional skepticism, which is reflected in a critical and objective attitude towards information, in-depth clarification, independence in decision-making, and the ability to conduct technology-based testing and audits. Furthermore, the ability to detect fraud is realized through the application of investigative techniques, data analysis, improvisation, adoption of new technologies, and comprehensive information understanding. However, the relationship between individual factors, technology, and the ability to detect fraud can be influenced by time pressures, which are characterized by time constraints, decreased work quality, and less effective communication, thus potentially affecting the accuracy and objectivity in the fraud detection process.

3. Data and Methodology

This research method uses the Sequential Explanatory Mixed Method, which is an approach that combines qualitative and quantitative approaches in research. The process begins with the collection of field data based on theoretical and empirical studies to analyze the relationship between indicators and latent variables, as well as the relationship between existing variables. After that, a research hypothesis test was carried out to test the relationship between variables. The population in this study is internal auditors who work in commercial banks registered in Indonesia, amounting to 639 internal auditors. The sampling technique in this study uses the Slovin formula, so that a sample of 246 internal auditors was obtained in this study. The sampling method uses probability sampling with a simple random sampling technique. The problem-solving approach of this research was carried out by integrating data through questionnaires, written interviews with 8 informants consisting of branch heads, regional heads, internal auditors, the head of customer service, and the head of banking tellers. Furthermore, data collection was carried out from social media. Data processing using Nvivo, the researcher encoded interview data and data from social media. Data processing uses SmartPLS software for data obtained from questionnaires.

4. Results and Discussion

a.Respondent Profile

The profile of respondents in this study by Gender can be seen in the table below:

Table 1: Respondents by Gender

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Men	119	59.5	59.5	59.5
	Women	81	40.5	40.5	100.0
	Total	200	100.0	100.0	

Source: SPSS processed (2025).

In Table 1 above, it can be seen that there are 119 (59.5) male auditors and 81 (40.5) female auditors. It can be concluded that there are more male auditors than women.

Table 2: Respondents by Assignment

Internal Auditor at the Bank		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BNI	30	15.0	15.0	15.0
	BRI	27	13.5	13.5	28.5

BCA	47	23.5	23.5	52.0
WEAVER	29	14.5	14.5	66.5
BSI	43	21.5	21.5	88.0
BTN	24	12.0	12.0	100.0
Total	200	100.0	100.0	

Source: SPSS processed (2025).

Table 2 data, it shows the number of internal auditors from several commercial banks in Indonesia. The highest number of respondents was from Bank BCA with 47 people or 23.5%, followed by Bank BSI with 43 people or 21.5%, while the least number of respondents from Bank BTN's internal auditors was 24 people or 12%. The results show that the study has included respondents from various banks in Indonesia with a representative composition.

5. Structural model analysis

1) Outer model testing

The outer model test begins with the process of estimating or estimating parameters. The convergent validity test was carried out by looking at the value of the loading factor in each construct.

5.1. Convergent validity testing

An indicator is declared valid if it has a loading factor value above 0.70. Loading factor values between 0.50 and 0.60 are still acceptable (Ghozali, 2020)Calculating the data using the PLS algorithm method, the loading factor value of each variable indicator can be seen in the following Figure 3:

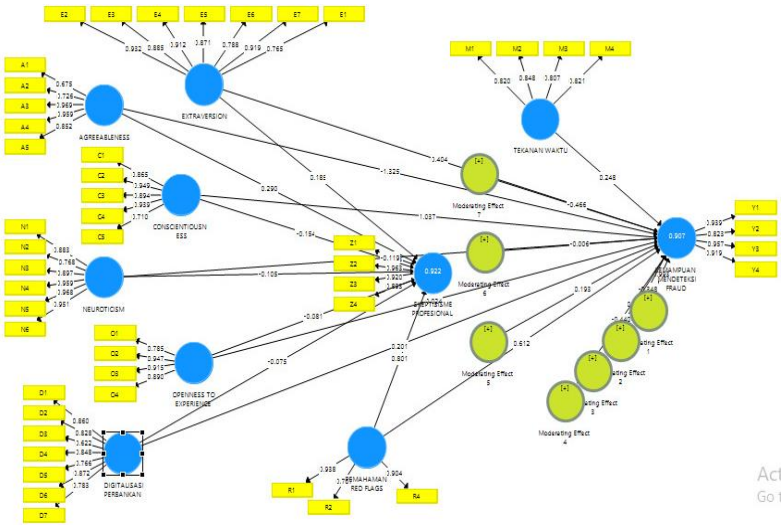


Fig. 3: Validity Test Results Based on Outer Loading.

Based on Figure 1, each indicator has a loading factor value between 0.60 and 0.70, so the indicator is declared valid.

Table 3: Correlation Matrix between Latent Variable Scores

	E	A	C	N	0	DP	PRF	TW	SP	KMF
X1.1.1	0,765									
X1.1.2	0,932									
X1.1.3	0,885									
X1.1.4	0,912									
X1.1.5	0,871									
X1.1.6	0,788									
X1.1.7	0,919									
X1.2.1		0,675								
X1.2.2		0,726								
X1.2.3		0,969								
X1.2.4		0,959								
X1.2.5		0,852								
X1.3.1			0,865							
X1.3.2			0,949							
X1.3.3			0,894							
X1.3.4			0,939							
X1.3.5			0,710							
X1.4.1				0,883						
X1.4.2				0,768						
X1.4.3				0.897						
X1.4.4				0,959						
X1.4.5				0,968						
X1.4.6				0,951						
X1.5.1					0,785					
X1.5.2					0,947					

X1.5.3					0,915					
X1.5.4					0,890					
X2.1						0.860				
X2.2						0.828				
X2.3						0.622				
X2.4						0,848				
X2.5						0,776				
X2.6						0,872				
X2.7						0,783				
X3.1							0,938			
X3.2							0,767			
X3.3							0,904			
M1								0,820		
M2								0,848		
M3								0,807		
M4								0,821		
Z1									0,993	
Z2									0,963	
Z3									0,920	
Z4									0,895	
Y1										0,939
Y2										0,823
Y3										0,957
Y4										0,919
AVE	0,678	0,688	0,749	0,685	0,750	0,657	0,855	0,734	0,754	0,699
Cronbach's Alpha	0,913	0,896	0,916	0,884	0,857	0,859	0,970	0,952	0,940	0,956
rho_A	0.927	0,914	0,941	0,889	0,869	0,865	0,993	0,964	0,933	0,988
Composite Reliability	0,956	0,966	0,948	0,984	0,983	0,899	0,985	0,969	0,989	0,972

Based on Table 3 above, it is known that all indicators are declared valid; this can be seen in the loading factor value greater than 0.6, which means that the indicator is declared valid, so it is suitable for use in this study. In addition to the loading factor value to meet the convergent validity, it is necessary to know the Average Variance Extracted (AVE) value. If the Average Variance Extracted (AVE) value must be greater than 0.5, it meets the convergent validity. In Table 3 above, it is known that the AVE value of each construct is > 0.50, so that the construct has met the convergent validity.

5.2. Reliability testing

The construct reliability test in PLS can use 2 methods, namely Cronbach's alpha and composite reliability. A latent variable is said to have good reliability if Cronbach's Alpha and Composite Reliability values are above 0.70. Based on Table 3 above, it is known that Cronbach's Alpha and Composite Reliability values for all variables are above 0.70. It can be concluded that all latent variables in this study have met the reliability criteria.

2) Test R-Square

The R-squared test aims to measure the contribution rate of independent variables in explaining dependent variables.

Table 3: R-Square Test

	R Square	R Square Adjusted
Fraud Detection Capabilities	0,907	0,900
Professional Skepticism	0,922	0,919

Source: Smart PLS (2025).

Based on the output results, it can be found that the R-square value is 0.922 and the Adjusted R-square is 0.919 which means that the variable of professional skepticism can be explained by the variables of the auditor's personality construct with 5 personality types (extraversion, agreeableness, conscientiousness, neuroticism and openness to experience), banking digitalization, understanding of red flags and pressure was 92.2% while the remaining 7.8% was influenced by other variables that were not included in the research model. The R^2 values of 0.67, 0.33, and 0.19 indicate that the model is "good", "moderate", and "weak". Because the R^2 value in this study is 0.92 greater than 0.67, it can be concluded that the model used in this study is relatively good.

The R Square value of the fraud detection variable of 0.907 means that 90.7% of the variation in fraud detection capabilities can be explained by the auditor's personality with 5 personality types (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), banking digitalization, understanding red flags, and pressure. The Adjusted R Square of 0.900 in this study is 0.90 greater than 0.67, so it can be concluded that the model used in this study is relatively good.

3) Mediation testing

Mediation testing was conducted to test whether professional skepticism mediated the influence of auditor personality (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), digital banking, and understanding red flags on fraud detection.

Table 4: Indirect Effect Test

Relationship	Indirect Effect	P Value	Conclusion
Agreeableness -> Professional Skepticism-> Fraud Detection Capabilities	2.205	0.014	Accepted
Conscientiousness -> Professional Skepticism-> Fraud Detection Capabilities	3.213	0.001	Accepted
Banking Digitalization-> Professional Skepticism-> Fraud Detection Capabilities	1.443	0.075	Rejected
Extraversion> Professional Skepticism> Fraud Detection Capabilities	2.274	0.012	Accepted
Neuroticism> Professional Skepticism> Fraud Detection Capabilities	0.695	0.244	Rejected
Openness to experience> Professional Skepticism> Fraud Detection Capabilities	0.157	0.438	Rejected
Understanding Red Flags> Professional Skepticism> Fraud Detection Capabilities	16.737	0.000	Accepted

Source: Smart PLS (2025).

Based on the table above, the results of the indirect influence test showed that professional skepticism played a different role as a mediating variable in each determinant. The agreeableness personality type had a significant indirect influence on fraud detection through professional skepticism, with a statistical value of 2.205 and a p-value of 0.014, which shows that auditors with a friendly and cooperative character are able to improve their ability to detect fraud through an increase in professional skepticism. Similarly, the conscientiousness personality type showed a significant indirect influence on fraud detection through professional skepticism, with a statistical value of 3.213 and a p-value of 0.001, indicating that disciplined, conscientious, and responsible auditors tended to have stronger professional skepticism, which had an impact on the effectiveness of fraud detection. Furthermore, the extraversion personality type was also shown to have a significant indirect effect on fraud detection through professional skepticism, with a statistical value of 2.274 and a p-value of 0.012, which confirms that communicative and proactive auditors are better able to optimize professional skepticism in detecting fraud. In contrast, digital banking did not show a significant indirect influence on fraud detection through professional skepticism, with a statistical value of 1.443 and a p-value of 0.075, indicating that the existence of digital technology does not necessarily increase the professional skepticism of auditors. In addition, the neuroticism personality type also did not have a significant indirect effect on fraud detection through professional skepticism (statistical value 0.695; p-value 0.244), suggesting that negative emotional tendencies do not strengthen the role of professional skepticism in fraud detection. The openness to experience personality type also showed insignificant indirect influences (statistical value 0.157; p-value 0.438), so creativity and openness to new ideas have not been directly internalized in the auditor's professional skepticism. Meanwhile, the understanding of red flags has a very strong and significant indirect influence on fraud detection through professional skepticism, with a statistical value of 16,737 and a p-value of 0.000, which confirms that the ability to recognize early indicators of fraud substantially increases professional skepticism and auditors' effectiveness in detecting fraud.

4) Moderation Testing

The moderation test was conducted to test whether the pressure was significant in moderating the influence of auditor personality (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), understanding red flags, and the digitization of accounting on fraud detection. Table 4 presents the results of pressure testing in moderating the influence of auditor personality on fraud detection.

Table 5: Values T Statistics of Moderating Variables

	Original Sample (O)	Std Deviation (STDEV)	t-Statistics	P Value	Conclusion
A*PRESSURE -> FDC	0.950	0.952	0.041	0.000	Accepted
C*PRESSURE -> FDC	0.944	0.945	0.043	0.000	Accepted
E*PRESSURE -> FDC	1.055	1.052	0.045	0.000	Accepted
N*PRESSURE -> FDC	1.352	1.352	0.097	0.000	Accepted
O*PRESSURE -> FDC	1.107	1.105	0.047	0.000	Accepted
DP*PRESSURE -> FDC	1.101	1.095	0.047	0.000	Accepted
URF *PRESSURE -> FDC	0.987	0.983	0.043	0.000	Accepted

Source: Smart PLS (2025).

The results of the study show that pressure is a variable The results of this study show that pressure is Variable that moderates personality types' agreeableness and conscientiousness, Extraversion, neuroticism, and openness to experience against fraud detection. Pressure moderates the understanding of red flags and banking digitalization towards fraud detection.

5) Hypothesis Testing

Hypothesis testing was carried out by looking at the t-statistic value generated from the bootstrapping process. The hypothesis is accepted if the t-statistical value is greater than 1.96 with a significance of 5% (one-tailed). The following table is presented with t-statistics:

Table 6: T-Statistics Values

Relationship	Indirect Effect	P Value	Conclusion
Agreeableness -> Fraud Detection Capabilities	2.854	0.004	Accepted
Agreeableness -> Professional Skepticism	2.145	0.032	Accepted
Conscientiousness-> Fraud Detection Capabilities	3.052	0.002	Accepted
Conscientiousness-> Professional Skepticism	1.705	0.044	Accepted
Banking Digitalization-> Fraud Detection Capabilities	2.259	0.024	Accepted
Digitalization of Banking-> Professional Skepticism	1.443	0.150	Rejected
Extraversion> Fraud Detection Capabilities	2.079	0.038	Accepted
Extraversion> Professional Skepticism	2.429	0.016	Accepted
Neuroticism> Fraud Detection Capabilities	0.685	0.494	Rejected
Neuroticism> Professional Skepticism	4.102	0.000	Accepted
Openness to experience> Fraud Detection Capabilities	0.154	0.157	Rejected
Openness to experience> Professional Skepticism	1.993	0.047	Accepted
Pressure> Fraud Detection Capabilities	1.107	0.269	Rejected
Understanding Red Flags> Fraud Detection Capabilities	4.900	0.000	Accepted
Understanding Red Flags> Professional Skepticism	0.046	17.363	Rejected

Source: Smart PLS (2025).

Based on the test results in Table 7, it is known that auditors with agreeableness, extraversion, and conscientiousness personality types affect fraud detection. Understanding redflags affects fraud detection (Samagaio & Felício, 2022). Banking digitalization has a significant effect on fraud detection. Auditors with agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience personality types affect professional skepticism (van Kuijck & Paresi, 2020b). The understanding of red flags has a significant effect on fraud detection. The agreeableness, extraversion, and conscientiousness personality types are influential in improving auditors' ability to detect fraud. This means that auditors who are friendly, disciplined, meticulous, and open in communication are more sensitive in detecting signs of fraud. Auditors who have a strong understanding of red flag indicators are better able to detect fraud. Red flags here are improper financial statements, unreasonable management behavior, or suspicious transactions (E. Janrosl et al., 2023). All personality dimensions (agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience) affect auditorskepticism (Dal Magro & da Cunha, 2017). This means that the auditor's personality greatly determines the level of prudence, healthy doubt, and thoroughness in auditing. The understanding of red flags has a significant effect on fraud detection. The better auditors understand red flags, the better their chances of detecting fraud appropriately. (Crego & Widiger, 2015)(Gizta, 2020).

6. Qualitative Analysis

Qualitative analysis is a set of methods used to explore and understand the meaning given by individuals or groups related to a social problem. In this study, the data analysis process was assisted by the NVivo application through several stages, namely: (1) organizing and preparing data before analysis, including transcribing interviews, sorting, and arranging data into categories according to information sources. (Creswell, 2016; Shang et al., 2023). (2) Read all the data thoroughly to gain a general understanding and grasp the meaning of the available information. (3) Coding, which is breaking down written or image data into segments such as sentences or paragraphs, grouping them into certain categories, and then giving special labels to each category. (4) Develop the main themes based on the coding results. (5) Present the results of the analysis in the form of qualitative reports through narrative. (6) Make an interpretation of research findings, which can be in the form of meaning by comparing research results with relevant theories or literature. The following presents a classification table of the Pearson-Jaccard coefficient. Based on interviews conducted with 7 informants consisting of Regional Heads of Bank BSI, Heads of BNI and BRI Branches, BCA Auditors, BNI IT Department, and BTN Tellers.

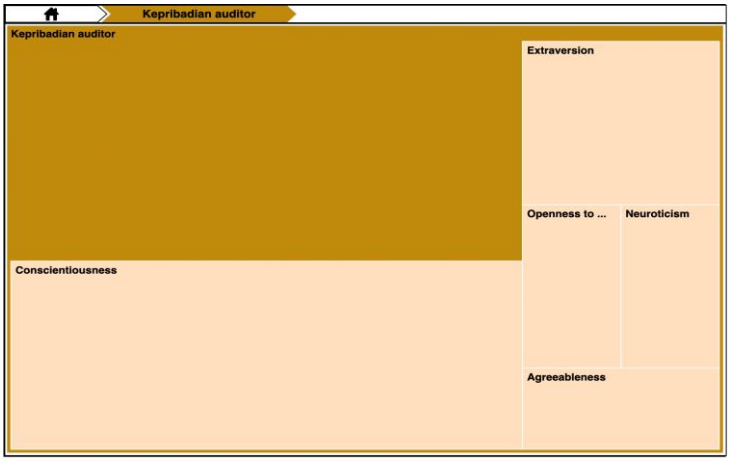


Fig. 4: Auditor Personality Hierarchy Diagram.

Based on the hierarchy diagram of the Auditor's Personality, it is known that the personality types of extraversion and conscientiousness are ideal personality combinations for internal auditors of banking. According to Informants 1 and 4, this is because auditors are required to have a critical way of thinking, be able to trace various information, and examine every matter related to company policies as long as they are still within the internal scope of the organization. If an auditor is rigid and less sociable, then the process of collecting audit evidence will be more difficult. For example, a simple example of a time management audit. In a work unit, employee "A" is known to be often late. During breaks, auditors join other employees for lunch, a common routine. In the casual conversation, colleague "B" told other employees about "A's habit of being late, including the auditors. The verbal information can then be an initial clue for the auditor to conduct further inspections through the "A" attendance check.

According to informants 2, 3, and 7, the combination of personality types, openness to experience, and conscientiousness is suitable for an auditor. A friendly and cooperative auditor can establish more open communication with the audited party, making them more sensitive to signs of impropriety or lies. Therefore, although a skeptical attitude is still necessary, a warm and sociable personality can be an added value in audit effectiveness, especially in the context of fraud detection. According to informants 5 and 6, conscientiousness personality is considered the most ideal personality type for auditors because it reflects precision, order, and high responsibility in carrying out work. These characteristics are very important considering that the auditor profession demands a high level of accuracy and precision in every audit procedure. In addition, agreeableness personality is also considered to support auditor performance, because it reflects a friendly, cooperative attitude, and is able to build good interpersonal relationships. This trait is necessary when the auditor interacts with the auditee or collaborates with fellow members of the audit team.

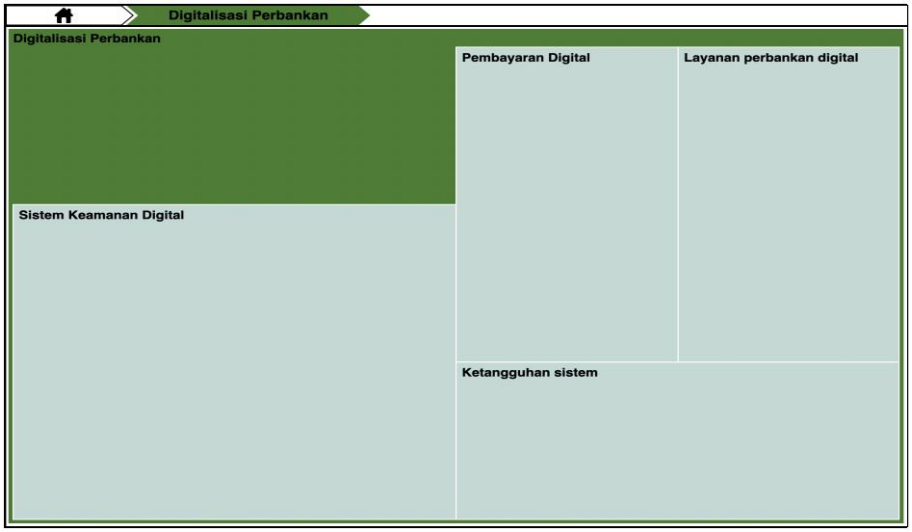


Fig. 5: Banking Digitalization Hierarchy Diagram.

The results of interviews with seven informants show that digital payments run with structured role access support and approval mechanisms. The resilience of the system is strengthened by automatic monitoring, fraud detection, and regular evaluation. Digital banking services are supported by the coordination of various work units and the improvement of the quality of human resources. Digital security is the main foundation through access control, audit trails, multi-layered approvals, and anti-fraud education. Thus, the findings of the informants as a whole show that banking digitalization has been carried out in an integrated, safe, supervised, and continuous manner, in accordance with the hierarchy diagram of banking digitization.

Informants 1 & 2 explained that many parties have access to digital payment systems (IT, CS, audit, marketing, SPV, junior managers). This shows that the digital payment process requires cross-functional coordination to support the smooth running of services such as QRIS, Mobile Banking, and Internet Banking. Informant 3 emphasized that digital payments can only be processed after passing through a layered approval mechanism for sensitive transactions. This suggests that digital payment systems are not only easily accessible but must be protected by strong authorization controls. User access, stakeholder roles, and approval mechanisms indicate that banks have implemented strict control structures to maintain the integrity of digital payment transactions.

System Resilience includes system reliability, recovery, monitoring, early detection, and operational stability. The results of interviews with informants 5 & 6 mentioned the existence of automatic monitoring features, log audits, and fraud detection to detect suspicious activities (access outside working hours, journal changes, abnormal transactions). This shows that the system is designed to survive and handle risks quickly. Informant 7 emphasized the existence of remediation follow-up, periodic monitoring, and follow-up audits if there are weaknesses in internal control. This reflects the system hardening and continuous improvement process that increases the robustness of the system. Banks implement anomaly detection, trail audits, periodic monitoring, and continuous improvement, all of which are key elements of a resilient and sustainable banking system.

Digital Banking Services include mobile Banking, Internet Banking, service features, user experience, and process efficiency. According to informants 1 and 2, who play a role in supporting digital banking services such as customer service, IT, marketing, audit, manager. Informant 3 explained that sensitive modules are held by IT, auditors, and management to maintain quality and control over digital services. Furthermore, Informant 7 linked the follow-up of system weaknesses to staff training. It can be concluded that the quality of digital services is strengthened by a clear role structure, understanding of modules, and increased staff capacity so that services become safer, faster, and more responsive.

The Digital Security System includes access control, trail audit, fraud detection, multi-layered approvals, and data security. According to informant 3, it explains strict access control with the principle of "least privilege", layered approvals, and management of large transactions by several levels of management. This mechanism is the main pillar of digital transaction security. Informants 5 and 6 provide examples of security features such as access detection outside of working hours, suspicious activity alerts, fraud detection algorithms, and trail audits. This strengthens data integrity and minimizes the risk of fraud. Informant 7 highlighted the follow-up to system weaknesses, namely strengthening access control, updating SOPs, involving external auditors, and retraining staff.

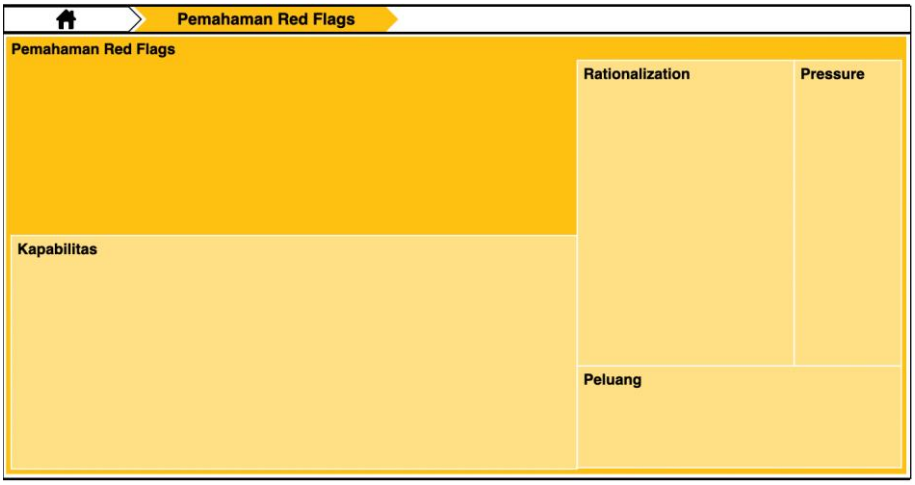


Fig. 6: Red Flags Comprehension Hierarchy Diagram.

Rationalization arises when an individual justifies their actions to commit fraud. The findings from the interviews with informants 2, 3, and 6 emphasized the importance of understanding fraud patterns from previous fraud cases. Efforts to study the modus operandi make the auditor able to recognize the general justifications that are usually made by the perpetrator. Informant 5 emphasized the importance of understanding SOPs and regulations so that auditors can distinguish which behaviors are deviant and which can still be tolerated. Understanding this SOP helps auditors identify forms of justification or irrelevant reasons from fraudsters. Steps to improve understanding, such as training, case studies, and trail audits, help auditors recognize patterns of justification that are prevalent in fraud cases, so that red flags on the rationalization aspect can be identified more quickly. Pressure is an impulse that makes a person feel compelled to commit fraud, such as financial pressure, lifestyle, or job demands. Informant 4 explicitly stated that the auditor assessed the auditee's financial needs and lifestyle by checking the OJK's SLIK, including online loans, e-commerce loans, and bank loans. This data shows whether there is financial pressure that has the potential to encourage auditees to commit fraud. Informants 6 and 3 state that a conscientious and skeptical auditor can observe changes in auditee behavior that may arise as a result of financial stress or work pressure. Analysis of the auditee's financial condition, lifestyle, and behavior helps the auditor detect sources of pressure that are early indicators of potential fraud.

Capability is an individual's ability to commit fraud, including system access, technical knowledge, and strategic positioning. Based on the results of interviews with informants 2 and 3, it was explained that the auditor used data-based audit technology to detect transaction anomalies. This shows that the auditor understands that fraudsters usually have certain technical capabilities or access to manipulate the system. Informant 1 mentioned that an understanding of sensitive modules, SOPs, and fraud patterns makes the auditor able to identify whether someone has the competence or access that allows them to commit fraud. Informant 5 emphasizes random and continuous trail audits as a way to detect individuals who have access to and the ability to hide trails. The interviews show that auditors understand the importance of studying the access structure, the technical capabilities of employees, and how a person's capabilities can be a big factor in the occurrence of fraud.

Opportunity is a condition that provides an opportunity for someone to commit fraud, such as weak internal controls, unrestricted access, and a lack of supervision. Findings from interviews with informants 2, 3, and 6 state that the use of data-driven audits and cross-unit collaboration (IT, compliance, internal audits) is a way to close the gap in the opportunity for fraud. The existence of routine monitoring, workshops, and increased understanding of the system also narrows the chances of fraud. Informant 5 added a random and continuous trail audit to ensure no employee took advantage of the system's weaknesses during a time of loose supervision. Informant 4, through SLIK OJK, helps auditors ensure that employees do not exploit system loopholes or cooperate with external parties to manipulate financial data. All of these strategies aim to narrow the chances of fraud by increasing control, creating transparency, and ensuring that the system is not easily manipulated.

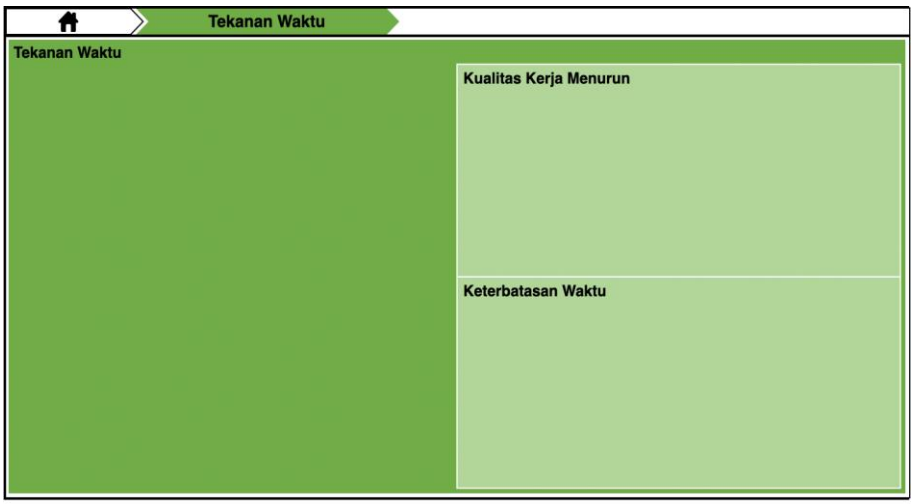


Fig. 7: Time Pressure Hierarchy Diagram.

Based on the results of interviews with informants 2 and 3, the time pressure in the implementation of audits can be seen from the trial audit routine that is carried out every month. The auditor must examine all transactions of each officer and ensure their compliance with the SOP within a limited time. This process further adds to the time burden when suspicious transactions are found, because auditors must perform additional verification through the auditor's APK and rematch it with the officer's transaction. A tight audit schedule and a high frequency of inspections indicate that there are time constraints that can affect the focus of the auditor's work. Meanwhile, the results of interviews with informants 6 and 7 revealed that the pressure in the auditor's work is not only time-related, but also psychological pressure when the audit findings concern colleagues or even superiors. In situations like this, auditors can experience professional dilemmas that have the potential to reduce the quality of work, such as reduced accuracy, delay in disclosing findings, or objectivity in conducting analysis. This condition makes the support and commitment of top management to audit integrity very important so that auditors are able to carry out their duties professionally even in stressful situations.

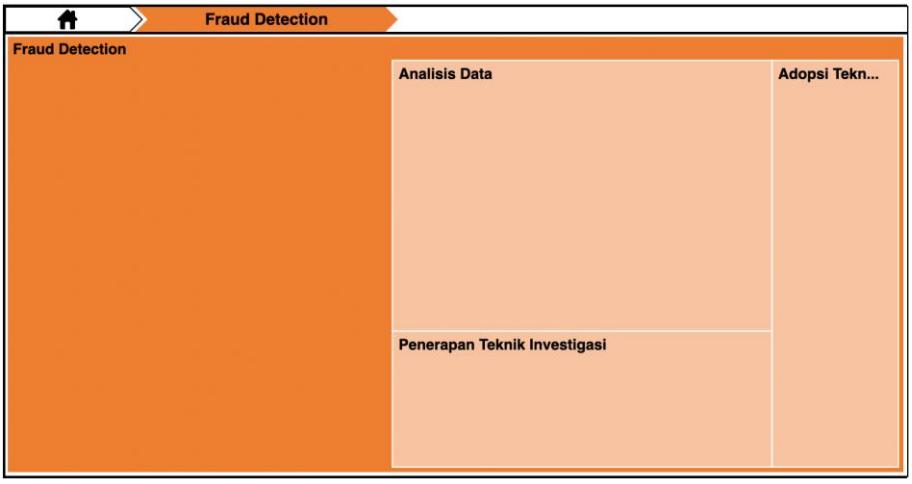


Fig. 8: Fraud Detection Hierarchy Diagram.

The qualitative findings from the interviews strongly support the results of the quantitative analysis, which show that the ability to detect fraud is significantly influenced by data analysis, investigative techniques, and technology adoption, which in the quantitative model is conceptualized as the main indicator of fraud detection variables. The results of the interviews revealed that auditors systematically initiated the detection process through data analysis and trail audits to identify anomalies, in line with quantitative findings that affirmed the importance of professional skepticism in critically evaluating information. In addition, the informant's emphasis on the importance of objectivity and independence in the application of investigative techniques corroborates quantitative results demonstrating a significant role of professional skepticism as a mediating variable in the relationship between individual characteristics and the ability to detect fraud. Furthermore, although the digitization of banking quantitatively does not show a significant indirect influence through professional skepticism, the results of the interviews confirm that the adoption of technology remains a crucial operational need in dealing with the complexity of digital-based fraud modes. This indicates that technology plays a role as a technical enabler in the audit process, but its effectiveness still depends on the auditor's analytical ability and skepticism. Thus, the triangulation of quantitative and qualitative findings confirms that

effective fraud detection is determined not only by the availability of technology but by the integration between individual competence, professional skepticism, and appropriate technological support.

Table 7: Classification of Pearson Coefficients

Interval Coefficient	Relationship Level
0.80-1.000	Very Powerful
0.60-0,799	Strong
0.40-0.599	Quite Powerful
0.20-0.399	Low
0.00-0.199	Very Low

The results of the researcher's interviews with informants who have been processed with the NVivo 14 software were further analyzed. The value of the Jaccard Coefficient is used to measure the degree of similarity between two sets. In this context, it is used to see how strong the relationship or similarity between personality type and the ability to detect cheating is.

Table 8: Items Clustered by Coding Similar Big Five Personality

Code A	Code B	Jaccard's coefficient	Conclusion
Nodes\\Personality	Nodes\\ Fraud Detection Capabilities	0,84333	Very Powerful
Nodes\\Personality\Openness To Experience	Nodes\\ Fraud Detection Capabilities	0,844	Very Powerful
Nodes\\Personality\Conscientiousness	Nodes\\ Fraud Detection Capabilities	0,800	Very Powerful
Nodes\\Personality\Extraversion	Nodes\\ Fraud Detection Capabilities	0,71429	Strong
Nodes\\Personality\Agreeableness	Nodes\\ Fraud Detection Capabilities	0,76667	Strong

Source: Nvivo (2025).

Based on the results of the Big Five Personality analysis of fraud detection ability, a Jaccard coefficient value of 0.8433 was obtained, which shows a very strong relationship between the auditor's overall personality type and the ability to detect fraud. In more detail, the openness to experience personality type had the highest Jaccard score of 0.844, indicating a very strong association between the auditor's openness, creativity, and adaptability with the effectiveness of fraud detection, followed by conscientiousness with a value of 0.800, which reflects the important role of thoroughness, prudence, and discipline in identifying irregularities. Furthermore, the agreeableness personality type showed a Jaccard value of 0.77, which indicates that the auditor's friendly, cooperative, and empathic nature contributed significantly to building open communication with the auditee to make it easier to identify indications of fraud, while extraversion obtained a value of 0.71 which also reflected a strong relationship, especially in the context of the auditor's ability to dig up information through social interaction. Qualitative findings from the interviews supported these quantitative results, where informant 1 judged that auditors with extroverted characteristics were more effective in obtaining relevant informal information, for example, through informal interactions with employees, thus helping to disclose indications of violations such as non-compliance with time management. Informants 1, 2, and 3 also emphasized that auditors with a high level of conscientiousness tend to be more careful in reviewing log trail audits and recording any discrepancies with SOPs in the audit report, while the combination of conscientiousness and openness to experience is considered to be highly supportive of critical thinking and innovative thinking skills in recognizing unusual patterns of fraud. Interestingly, although professional skepticism remains the main foundation of the audit, these findings suggest that balanced agreeableness is actually a plus because it allows auditors to build a more open relationship with the audit client, thereby increasing sensitivity to suspicious behavior. In the recruitment practice of internal auditors of banking, these results are reflected in the use of personality tests such as Big Five, MBTI, or DISC as part of the selection process to assess the suitability of a candidate's character with the demands of the auditor's profession that emphasizes rigor, integrity, and objectivity, where auditors with high conscientiousness are better able to find minor discrepancies that lead to fraudulent disclosures, while auditors with agreeableness and extraversion who proportional is more effective in obtaining supporting information through interpersonal communication. Overall, the results of this study confirm that auditors' personalities—particularly conscientiousness, openness to experience, extraversion, and agreeableness—contribute significantly to the effectiveness of fraud detection, while high levels of neuroticism have the potential to interfere with the objectivity and quality of audit decision-making.

Table 9: Items Clustered by Coding Similar Fraud Detection Capabilities

Code A	Code B	Jaccard's coefficient	Conclusion
Nodes\\Fraud Detection Capabilities	Nodes\\Digitizing Banking	0,857143	Very Powerful
Nodes\\ Fraud Detection Capabilities	Nodes\\Red Flags Understanding	0,771429	Strong
Nodes\\ Fraud Detection Capabilities	Nodes\\Job Pressure	0,77777	Strong
Nodes\\ Fraud Detection Capabilities	Nodes\\System toughness	0,78888	Strong

Source: Nvivo (2025).

Based on the results of the cluster analysis, banking digitization shows a very strong relationship with the ability to detect fraud as shown by the Jaccard coefficient value of 0.857143, while the understanding of red flags has a strong relationship with the Jaccard value of 0.771429, and the robustness of the system also shows a strong relationship with the Jaccard value of 0.78888, which confirms that a reliable system is very supportive of early detection of potential fraud. Overall, these three variables have a strong to very strong relationship with the ability to detect fraud, so that increasing digitalization, understanding fraud indicators, and strengthening the system are crucial factors in improving the quality of fraud detection in the banking sector. These quantitative findings were reinforced by the results of the interview, in which Informant 1 explained that the management and maintenance of digital accounting systems, such as mobile banking, internet banking, ATMs, e-wallets, and QRIS, can only be accessed by certain divisions and managerial ranks to minimize the risk of misuse. The fraud detection process is carried out when the auditor finds activities that deviate from the SOPs or normal work patterns, which are then traced through an audit trail of each officer's transactions and matched with comparative data owned by the auditor. In addition, the auditor also assesses the financial condition and lifestyle of officers who are considered not to be in accordance with their profile as bank employees, including by checking the OJK's SLIK to identify loan patterns and financial behavior. Performance evaluations are conducted routinely every month through trail audits, where early signals of suspicious transactions have generally been detected through an internal audit application before further verification. However, the results of the interviews also revealed the main challenges in the digital era, namely the increasing mode of financial fraud and the increasingly sophisticated practice of impersonating bank officers, thus encouraging the strengthening of consumer protection and personal data regulations. Informant 4 added that limited cross-system access, application capabilities that are not optimal, and auditors' understanding of complex digital systems are obstacles in themselves,

especially when the improvement in system security is not proportional to the speed and sophistication of fraudsters, so that the risk of fraud becomes more disguised and takes place faster.

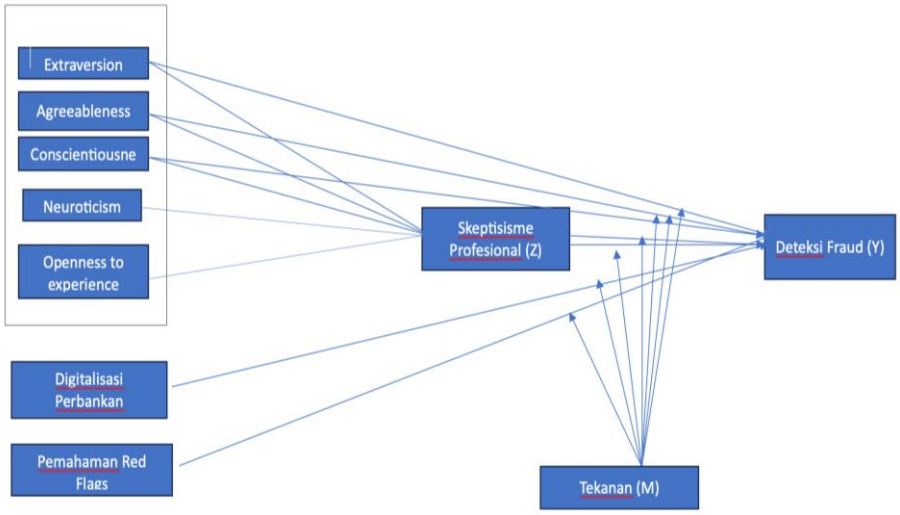


Fig. 9: Banking Fraud Detection Model.

Based on the fraud detection model above, it can be explained that to become an internal auditor of banking, an auditor with a personality of agreeableness, extraversion, and conscientiousness is needed, who can detect fraud, while all personality types in the Big Five affect professional skepticism. This professional skepticism then acts as an intervening variable that increases the auditor's ability to detect fraud. Pressure has also been shown to moderate the relationship between personality type and understanding of red flags for fraud detection. In contrast, the digitalization of banking has not shown a significant indirect influence through professional skepticism. Digitalization has a direct effect on detecting fraud.

7. Conclusion

This study concludes that the ability to detect fraud in the banking sector is significantly influenced by individual, cognitive, and technological factors. Auditors' personalities, particularly conscientiousness, openness to experience, extraversion, and agreeableness, have a strong to very strong relationship with fraud detection skills, while neuroticism tends to hurt objectivity and quality of decision-making. In addition, professional skepticism has been shown to play a significant mediating role in the relationship between several personality types and red flag understanding of fraud detection ability, although it does not consistently mediate the influence of banking digitalization. The results of the cluster analysis also show that banking digitalization, understanding red flags, and system resilience have a strong to very strong relationship with fraud detection, which is strengthened by qualitative findings that the audit process based on data analytics, audit trail, and digital system support is the main foundation in detecting fraud in the digital era. However, this study also reveals challenges in the form of limited cross-system access, technological complexity, and digital competency gaps for auditors that can hinder the effectiveness of fraud detection.

The implications of this study confirm that increasing the effectiveness of fraud detection in the banking sector cannot rely on technological sophistication, but must also be balanced with strengthening aspects of auditor behavior and competence. These findings imply the importance of considering personality traits, especially conscientiousness, openness to experience, extraversion, and agreeableness in the recruitment and development process of internal auditors, along with ongoing training to strengthen professional skepticism and understanding of red flags. In addition, banks need to ensure the resilience of digital systems through improving cybersecurity, integrating audit systems, and utilizing data analytics and digital forensics to respond to the complexity of technology-based fraud modes. The support of top management and organizational policies that ensure auditor independence is also crucial so that the fraud detection process can run objectively, accurately, and adaptively to evolving digital risks.

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