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Evaluating the impact of CAATs adoption on fraud detection: an integrated approach using DeLone & McLean and task-technology fit models

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Abstract: The rapid advancement of technology necessitates that the audit profession adopt innovative tools such as Computer-Assisted Audit Tools (CAATs). This study integrated the DeLone and McLean (D&M) model and the Task-Technology Fit (TTF) model to evaluate the alignment between auditors' tasks and the capabilities of CAATs, as well as to assess the impact of CAATs' quality on fraud detection. A quantitative approach was employed, utilizing primary data from 135 auditors at public accounting firms in Greater Jakarta. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that CAATs' information quality significantly impacts usage and satisfaction, whereas system quality does not. Meanwhile, CAATs' service quality enhances satisfaction but does not affect usage. Furthermore, the TTF model strongly supports auditors' intention to use CAATs, which is primarily driven by technological characteristics rather than task characteristics. Thus, although auditors' satisfaction with CAATs influences fraud detection, the intention to use CAATs does not. These findings offer valuable insights for audit firms and policymakers to focus on optimizing the quality of CAATs and their compatibility with audit tasks to maximize their effectiveness in detecting fraud, rather than solely promoting adoption.
Keywords: *CAATs, Fraud detection, DeLone & McLean model, Task-technology fit model.*

1. Introduction

The auditing profession is experiencing a significant transformation due to quick improvements in information technology, which impacts the efficiency and effectiveness of an audit process. This technological evolution marks a shift from traditional manual auditing methods toward more automated and sophisticated techniques [1]. In line with this transformation, CAATs represent a fundamental innovation in the auditing field. CAATs help auditors perform more complex, data-centric audits [2]. Various CAATs tools can support different audit procedures, including substantive testing, transaction examinations, verifications, and control evaluations [3]. This has strengthened the necessity for adopting CAATs, which enable auditors to analyze large datasets, thereby improving audit accuracy and scope [4].

Fraud detection represents an important responsibility for auditors, as failing to identify undetected fraud promptly can cause significant harm to numerous stakeholders [5]. To help detect fraud, the information system can help enhance auditors' ability to examine client data for material misstatements, control deficiencies, and fraudulent activities [6]. In this case, CAATs play a pivotal role in helping auditors identify irregular practices, detect misstatements, and support the application of analytical procedures developed to locate fraudulent actions. Regardless, as highlighted by Suhayati and Thufailah [7] professional skepticism remains crucial in interpreting data generated by CAATs and is still needed for evaluating physical audit evidence. Therefore, effective fraud detection results from a combination of technological tools, auditor judgment, and organizational support.

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This study implied the D&M model [8] to evaluate the impact of the dimensions of CAATs' quality, which are system quality, information quality, and service quality, on fraud detection. The D&M model provides a thorough framework by assessing system quality, information quality, service quality, user satisfaction, and net benefits [8, 9]. To complement this, the TTF model [10] is integrated to evaluate how CAATs align with the needs and responsibilities of external auditors in performing activities to detect fraud. Thus, this research provides extensive insights to the impact of CAATs on auditor performance in detecting fraud and their suitability for the external auditors' tasks in the digital era.

Despite the recognized importance of CAATs, as far as we are concerned, only a few studies have attempted to explore the effectiveness of integrating the D&M and TTF models in the context of adopting CAATs for fraud detection. Past research has been done to study the adoption of CAATs and their impact on audit efficiency and effectiveness, but there is still a deficiency in understanding how well CAATs can align with the nature of audit work. Hence, the objective of this study is to overcome this issue by proposing an integrated framework based on the D&M and TTF models, offering conceptual and practical contributions to the auditing field.

2. Literature Review and Hypotheses Development

2.1. Computer Assisted Audit Techniques

CAATs refer to specialized tools and methods auditors employ to retrieve and examine client audit-related data [11]. CAATs improve audit quality by supporting comprehensive and accurate assessments, including confirmation tests, audit analyses, and data verification [12, 13]. Past research on CAATs focused primarily on Audit Command Language (ACL) and was based on a survey of government auditors [11]. The research results show that auditors operating CAATs in their audit work can benefit from using them. However, there is low interest in using CAATs because auditors have low technical ability. This low interest may be due to a lack of training to support auditors in processing complex data with CAATs [14].

According to audit standards, CAATs can enhance the efficient and effective conduct of the audit process. In SAS No.99, auditors should implement CAATs when performing various audit procedures, such as evaluating potential fraud, identifying journal entries, and collecting other audit evidence [15]. The standard states that auditors can use CAATs to conduct more thorough checks on the accuracy of electronic data received from clients [16].

Auditors must conduct fraud brainstorming and examine audit risks associated with fraud [17]. The PCAOB's standard on material misstatement risk recommends that auditors use CAATs to analyze fraud risk more quickly and conduct more testing by collecting more audit evidence and testing all financial line items at risk [18]. Although the standard encourages auditors to use CAATs in their work, various studies show that CAATs adoption is still relatively low [19, 20]. A recent study shows that the quality information provided by CAATs to detect material misstatement, control deficiencies, and fraud can increase the use of CAATs [6]. In this study, we chose to focus on evaluating the adoption of CAATs to detect fraud by the auditors because we consider fraud a risk that frequently arises during audits.

2.2. Fraud Detection

Fraud refers to a deliberate deception aimed at gaining financial or personal benefits and can be found in all economic sectors [21]. Several actions are categorized as fraudulent, including falsifying records, corruption, bribery, document manipulation, and misappropriation of assets [22]. The fraud triangle theory [23] explains the reasons for fraud in an organization. According to this theory, there are three reasons why fraud occurs in an organization: pressure from the environment and oneself, opportunities to commit fraud, and rationalizations for fraud. This study offers a conceptual approach to further examine auditors' adoption of CAATs for detecting fraud.

Within the fraud triangle framework, opportunities for fraud typically arise when prevailing circumstances allow individuals to engage in fraudulent conduct. Lack of oversight, poor separation of duties, or weak monitoring processes can be weaknesses in the clients' internal control system [23]. CAATs can be used to improve auditors ability to spot potential fraudulent activity and risks early in the audit process. A recent study finds that with technology, auditors' can recognize irregular data patterns and suspicious transactions that are commonly linked to fraud [13, 24].

2.3. DeLone and McLean Information System Success Model

Initially, the D&M model first proposed six elements that can influence and measure how successful an information system is. The six elements used are information quality, system quality, satisfaction of users, impact on individuals, and impact on organization [8]. Research conducted using the first proposed D&M model suggested adding an information system service quality measure to enhance further impact on information system use and satisfaction [36]. An adjustment was made to update the original model, adding service quality to ensure the benefit of the information system [25]. A more recent study conducted by Petter, et al. [9] shows that information system success can be determined by 5 (five) indicators such as task characteristics, user characteristics, project characteristics, and organizational characteristics.

Over the years, the D&M model has emerged as the most frequently cited framework in academic literature concerning information systems success [26]. Numerous studies have demonstrated the model's adaptability by integrating it with other established IS frameworks. For example, the D&M model has been combined with the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine consumer behavior in mobile commerce applications [27]; integrated with the Technology Acceptance Model (TAM) to investigate the intentions to adopt audit software [28] and merged with the TTF model to explore the influence of mobile banking services [29]. The latest research shows that combining the D&M model and the TTF model provides a more complete understanding of how technology use affects performance [30]. This integration helps overcome the D&M model's lack of focus on how well technology suits job characteristics and the TTF model's need to consider system, information, or service quality [30]. Building on this foundation, the present study further integrates the D&M model with the TTF model to analyze the adoption of CAATs among auditors.

2.4. Task-Technology Fit Model

The TTF model explains the matching of capabilities and how well a particular digital technology aligns with the task's requirements. It is a variance model that outlines the interaction among three key components: the technology's functionalities, the task's requirements, and the influence on the use of the specific technology [10]. Following past literature, the TTF model has been applied in different domains, such as studying the effectiveness of managerial decision-making [31] and integrating the TTF model with the initial trust model (ITM) to analyze bank adoption.

Recent studies in the audit field show that technology can greatly benefit users (auditors) because it helps accelerate the audit process, allowing audit tasks to be completed in a shorter amount of time [3]. In addition, researchers also found that technology can enable auditors to improve the accuracy and completeness of audit procedures, thus reducing human error [32]. Consequently, this study aims to analyze the fit between task and technology characteristics that can encourage the effective use of CAATs.

2.5. Research Model

This research combines the D&M model [25] and the TTF model [33] to examine the adoption of CAATs and their impact on fraud detection, which is portrayed in Figure 1. The D&M model examines the influence of system, information, and service quality on auditors' intention to use and satisfaction in detecting fraud using CAATs. On the other hand, the TTF model will test the impact of task characteristics, technology characteristics, and the use of CAATs. Auditors perform diverse tasks during the audit process that require supporting audit tools. Therefore, we see the importance of the fit between tasks and technology in increasing the use of CAATs.

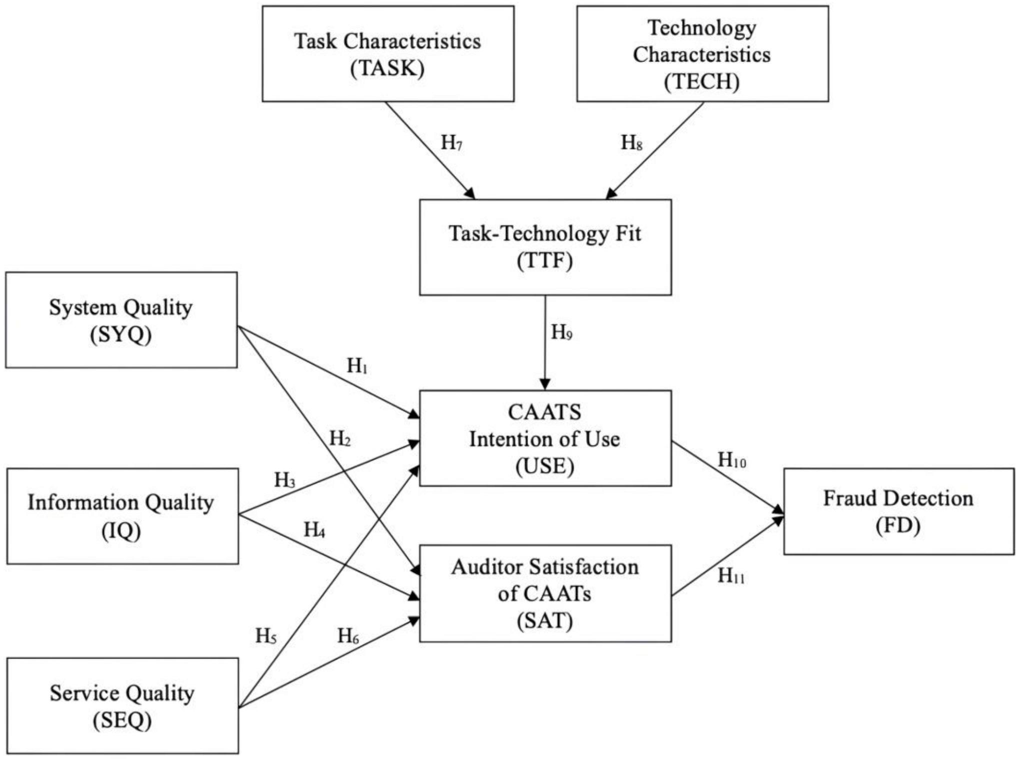

Figure 1.
Research model.

2.6. Hypotheses Development
2.6.1. System Quality

System quality refers to an information system's key features that affect its performance [25]. The quality of information systems can be evaluated in various aspects, including system features, reliability, and other technical issues [34]. System quality focuses on improving information systems by emphasizing the outcomes of user-system interactions [28]. An information system is considered high quality when it can satisfy the needs and expectations of its users [9]. Following past literature, system quality significantly affects auditors' intention to use CAATs [28]. Although an effective and well-functioning system could lead to increased use of information systems, other researchers found no correlation between system quality and intention to use the information system [35].

The impact of system quality on user satisfaction becomes significant when users experience ease in using the information system in the research adapted from field accounting [36]. The above description indicates that auditors will use CAATs if they offer a high-quality system, and user satisfaction will increase. Therefore, it is reasonable to hypotheses that system quality related to CAATs will affect auditors and satisfaction through the formulated hypotheses as follows:

H_1: System quality influences the auditors' intention to use CAATs.
H_2: System quality influences the auditors' satisfaction when using CAATs.

2.6.2. Information Quality

Information quality is defined as an output generated by an information system that can be assessed based on the accuracy, relevance, and clarity of the output [25]. The quality of information is often considered a key factor influencing user satisfaction [34]. As the information quality of an information system improves, users' confidence in the system tends to increase [37]. According to the research conducted by Handoko, et al. [28] the quality of information is a critical factor that influences users' willingness to use the information system based on the given information by the system.

Information quality influences the intention of information system users to use it based on the efficiency of the information system producing high-quality information to perform tasks efficiently [38]. Some studies in the audit field showed positive findings regarding the influence of information quality on user satisfaction [6]. The explanation above suggests that users are more interested in utilizing information systems if they can help provide accurate and high-quality information. This, in turn, enhances user satisfaction. It is reasonable to propose that the information quality of CAATs influences both the satisfaction and usage of these tools by auditors. This leads to the formulation of the following hypotheses:

H_3: *Information quality influences the auditors' intention to use CAATs.*

H_4: *Information quality influences the auditors' satisfaction when using CAATs.*

2.6.3. Service Quality

Service quality is the help the IT department or the service provider gives to people who utilize information systems [25]. Adapted from the marketing study, service quality is considered essential due to several factors affecting user willingness to use information systems, including the reliability of responses to service requests and the prioritization of user needs [39]. Furthermore, service quality is critical to user satisfaction, as information systems can deliver enhanced and streamlined support for managing user issues [40]. The impact of service quality on user satisfaction and intention to use demonstrated positive findings in a study conducted by Bradford, et al. [6]; conversely, other studies have concluded that service quality demonstrates no significant impact on user satisfaction or intention to use information systems [28]. Based on the preceding explanation, users are more likely to use information systems when they know they can give efficient and practical support, raising their willingness to use information systems and satisfaction. Accordingly, it is plausible to hypothesize that the service quality of CAATs influences both their usage and user satisfaction among auditors. This reasoning underpins the formulation of the following hypotheses.:

H_5: *Service quality influences the auditors' intention to use CAATs.*

H_6: *Service quality influences the auditors' satisfaction when using CAATs.*

2.6.4. Task and Technology Characteristics

A task refers to a specific activity performed by an individual to convert inputs into outputs, and the characteristics attributed to such tasks can be aligned with the activities end users anticipate performing through the use of information technology [10]. The success of an information system can be influenced by various task characteristics, including task compatibility, task difficulty, and task interdependence [9]. Prior research indicates a positive relationship between task characteristics and TTF [41].

On the other hand, technologies are viewed as instruments that individuals use to carry out their tasks [10]. This includes computer systems such as hardware, software, and data and user support services, like training and help desks, which are designed to assist users in completing their tasks effectively [10]. According to research conducted by Tam and Oliveira [29] technology characteristics positively influence TTF, as design features and other functional attributes contribute to the effective use of the technology and user satisfaction. On the other hand, a recent study indicates that technology characteristics do not have a positive influence on TTF [42]. Drawing from the above discussion, the following hypotheses are proposed:

H_7: Task characteristics influence the task-technology fit in the use of CAATs.
H_8: Technology characteristics influence the task-technology fit in the use of CAATs.

2.6.5. Task-Technology Fit

The TTF model provides valuable insights into how effectively a technology aligns with the particular tasks it is intended to support [10]. The TTF model helps highlight that the closer a technology's features align with the task's needs and the user's abilities, the more effective and beneficial that technology will be [43]. The impact of TTF on information system usage can be determined by the usefulness and advantages that users can achieve [9]. In the TTF model, technology helps the auditor to effectively conduct the audit process [44, 45] and speeds up the audit procedure by helping in finishing audit tasks such as processing document confirmation [46]. Following past literature, TTF significantly impacts information system usage [42]. These findings align with a study conducted by Tam and Oliveira [29] which demonstrates a significant impact of TTF on the usage of information systems. This study predicted that a strong fit between auditors' tasks and CAATs will enhance their willingness to use the technology. Hence, the following hypothesis:

H_9: TTF influences the task-technology fit in the use of CAATs.

2.6.6. Fraud Detection

In the D&M model, net benefits reflect how information systems impact various stakeholders' success [34]. The selection of impact measurement levels depends on the information systems' specific use and intended purposes [28]. Previous research on auditors, which assessed the benefits of CAATs, such as enhanced audit effectiveness and efficiency, has yielded positive results [11]. These findings are also supported by the research conducted by Widuri and Gautama [13] which shows that CAATs can help detect several types of fraud by analysing invoices and client records. Building on this basis, we will further explore the audit-related benefits of CAATs, explicitly focusing on their role in improving fraud detection. CAATs can help auditors effectively examine and analyze audit data to identify potential fraud [6]. Additionally, CAATs help recognize data often linked to fraud, which the auditor will investigate [5]. We concluded that using CAATs in their audit procedures can help identify, analyze, and recognize fraud. It is expected that the auditor's satisfaction with CAATs impacts fraud detection. Drawing from the above discussion, the following hypotheses are:

H_{10}: Auditors' intention to use CAATs influences fraud detection.
H_{11}: Auditors' satisfaction of CAATs influences fraud detection.

3. Methodology

3.1. Data and Sample

This study applies a quantitative research methodology, using an online survey approach to gather data based on auditors' perceptions of using CAATs. It involves auditors employed by public accounting firms in the Greater Jakarta area of Indonesia, including the cities of Jakarta, Bogor, Depok, Tangerang, and Bekasi. The study's sample selection focuses on the Greater Jakarta area because most Indonesian auditors work in this region, according to the IAPI directory report 2025 [47]. Furthermore, the Greater Jakarta area hosts the headquarters of the Big 4 public accounting firms, making it a highly representative and strategic area to be used as the population in this study [47]. Data was collected from April to May 2025 using online distribution techniques, including broadcast messaging and multiple digital platforms, to ensure broad and efficient reach to auditors in the Greater Jakarta area.

The sample will be selected using simple random probability sampling, a technique that provides every individual within the population an equal and independent chance of being selected for participation. The researcher implemented a Hair, et al. [48] and Roscoe [49]approach because the auditors' population size could not be determined with certainty. According to Hair, et al. [50] the minimum sample size should have an observation-to-variable ratio of 5:1, although ratios of 15:1 are favored for greater precision in detecting the actual effect. According to Hair, et al. [48] when using

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multivariate analysis, the sample size should be at a minimum of 10 times the most significant number of variables. Additionally, the minimum sample size used in a research should be at least 100 [49]. Hence, in this study we used a sample of 135 people for measurement and testing. Previous studies investigating the D&M model and TTF mode have employed a sample size of approximately 138 respondents, sufficient to ensure the reliability and validity of the findings [29].

3.2. Measure of Variables

This study employs an integrated framework combining the D&M model and the TTF model to examine the impact of CAATs on fraud detection. The framework includes D&M model dimensions such as system quality, information quality, service quality, user satisfaction, and use, alongside TTF dimensions, including task characteristics, technology characteristics, and task-technology fit, which influence the 'use' construct in the D&M model. All measurement items (see Appendix A) were adapted from prior studies with minor adjustments to suit the context of this research, giving the indicators used as listed in Table 1.

Table 1.
Variable Indicators.

Variables	Indicators
System quality of CAATs (SYQ)	CAATs accelerate the results of my required audit analysis. Compared to other methods I have used, CAATs have been able to speed up the completion of my work. CAATs have various features that can be relied upon to help improve the efficiency of audit implementation.
Information Quality of CAATs (IQ)	CAATs provide relevant information to my audit objectives. The information presented by CAATs fits my job necessities. CAATs provides accurate information for my audit needs.
Service Quality of CAATs (SEQ)	The technical support center is easy to contact if I have any problems. The problems I experienced were quickly resolved by the technical support center. The IT department or staff of the service provider has a good understanding of how CAATs work. My experience with the technical support center increases my trust in the services of the CAATs that I use.
Auditors Task Characteristics (TASK)	I need to process audit data anytime according to my audit needs. I need to process audit data anywhere according to my audit needs. I have a tight deadline to complete my work.
Technology Characteristics (TECH)	CAATs can be used anytime. CAATs can be used anywhere. CAATs effectively complete work within a limited time.
Task-Technology Fit (TTF)	I can perform data processing using CAATs anytime. I can perform data processing using CAATs anywhere. I can complete my audit work effectively within limited time using CAATs. With CAATs, I can analyze audit data in a short time.
Auditors' intention to use CAATs (USE)	The frequency of CAATs use is relatively high on every audit assignment. I often use CAATs in carrying out audits. Conducting an audit requires CAATs to help process data effectively. I use CAATs for various types of audit procedures.
Auditors' satisfaction to CAATs (SAT)	I am satisfied with the information generated by CAATs. The information provided by CAATs fits my requirements. I am satisfied with the usefulness of CAATs in audit work. Overall, I am satisfied with CAATs.
Fraud Detection (FD)	CAATs help me detect potential fraud effectively. I can detect fraud accurately with the help of CAATs. CAATs help me notice the unusual audit data. Based on my experience, CAATs can increase my awareness of fraud risks.

3.3. Data Analysis Techniques

We conducted our statistical analysis using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique, which is well-suited for studies with small sample sizes [51]. As a non-parametric method, PLS-SEM does not mandate the data to adhere to a normal distribution, making it suitable for various research contexts [52]. In this study, we used SmartPLS version 4.0 to analyze data statistics. Once the respondents' data were collected, we performed several steps, including assessing descriptive statistics, measurement, and structural models, followed by explaining the related hypotheses.

4. Results and Discussions

4.1. Descriptive Statistics

Descriptive statistics analysis has been performed to summarize a data set based on observable characteristics. Below are the descriptive statistics of 135 auditors working in a public accounting firm based in the Greater Jakarta area of Indonesia.

Table 2.
Descriptive statistics.

Categories		**Sample (N = 135)**					
		Frequency	**Percentage**	**Mean**	**Median**	**Standard Deviation**	**Variance**
Gender	Female	68	50.4%	1.496	1.000	0.502	0.252
	Male	67	49.6%				
Age	20 - 25 years old	99	73.3%	1.370	1.000	0.710	0.504
	26 - 30 years old	26	19.3%				
	31 - 35 years old	6	4.4%				
	> 35 years old	4	3.0%				
Position	Junior Auditor	91	67.4%	1.393	1.000	0.612	0.375
	Senior Auditor	35	25.9%				
	Manager	9	6.7%				
Public Accounting Firm Area	Jakarta	123	91.1%	1.244	1.000	0.815	0.664
	Bogor	1	0.7%				
	Depok	2	1.5%				
	Tangerang	8	5.9%				
	Bekasi	1	0.7%				
Work Experience	≤ 5 years	110	81.5%	1.237	1.000	0.563	0.317
	6 - 10 years	20	14.8%				
	11 - 15 years	3	2.2%				
	≥ 16 years	2	1.5%				

As shown in Table 2, the gender distribution is nearly balanced. Slightly over half of the respondents identified as female (50.4%), while the remaining identified as male (49.6%). Most of the respondents are between the ages of 20 and 25 (73.3%), suggesting that the majority of the participants are from the millennial and Generation Z. Position-wise, the majority of the respondents are junior auditors (67.4%) with five years or less of working experience (81.5%), indicating a concentration of early-career professionals. Moreover, the public accounting firms skew toward Jakarta (91.1%), where most auditors are. These predominant categories are also reflected in the median value, where gender, age, position, public accounting firm area, and work experience are all valued at 1.

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The standard deviation and variance show that most data are clustered around the mean. The highest appears in the public accounting firm area, with standard deviation and variance at 0.815 and 0.664, respectively. This indicates a broader spread of respondents across different firm locations. In essence, the survey includes a diverse group of individuals with 100% valid data.

4.2. Measurements Model

4.2.1. Convergent Validity

Convergent validity is used to assess to which an indicator is positively associated with other indicators in the same construct, including the assessment of outer loadings and average variance extracted (AVE) [48].

Table 3.
Convergent validity.

Variables	Indicators	Outer loading	AVE
System Quality	SYQ1	0.831	0.648
	SYQ2	0.828	
	SYQ3	0.753	
Information Quality	IQ1	0.797	0.636
	IQ2	0.831	
	IQ3	0.764	
Service Quality	SEQ1	0.784	0.659
	SEQ2	0.780	
	SEQ3	0.828	
	SEQ4	0.852	
Auditors Task Characteristics	TASK1	0.825	0.569
	TASK2	0.768	
	TASK3	0.661	
Technology Characteristics	TECH1	0.839	0.638
	TECH2	0.866	
	TECH3	0.678	
Task-Technology Fit	TTF1	0.790	0.580
	TTF2	0.834	
	TTF3	0.717	
	TTF4	0.696	
Intention to Use CAATs	USE1	0.737	0.593
	USE2	0.674	
	USE3	0.824	
	USE4	0.835	
Satisfaction to CAATs	SAT1	0.798	0.560
	SAT2	0.726	
	SAT3	0.725	
	SAT4	0.741	
Fraud Detection	FD1	0.845	0.646
	FD2	0.843	
	FD3	0.751	
	FD4	0.772	

Table 3 presents the results of the outer loadings and the AVE value for all indicators. According to Siswoyo [53] the standard threshold of outer loadings should be above 0.7, but values of 0.5 or higher are still acceptable. As shown above, all outer loading values exceed 0.5, with the lowest and the highest being 0.661 and 0.866, respectively. This indicates that all indicators used to assess each construct are valid. Furthermore, the AVE values for the constructs are 0.5 or higher, proving that they exhibit appropriate convergent validity, as they explain over half of the variance in their respective indicators [48].

4.2.2. Internal Consistency Reliability

Internal consistency reliability analysis is used to measure the extent to which all indicators in a construct are related to each other [54]. The assessment encompasses Cronbach's alpha and composite reliability calculation, yielding the following results.

Table 4.
Internal consistency reliability.

Variables	Cronbach's alpha	Composite reliability
SYQ	0.727	0.846
IQ	0.714	0.840
SEQ	0.832	0.885
TASK	0.620	0.797
TECH	0.709	0.840
TTF	0.765	0.846
USE	0.778	0.853
SAT	0.738	0.836
FD	0.817	0.879

As recommended by Hair, et al. [48] the threshold for Cronbach's alpha and composite reliability is between 0.7 and 0.9. However, values ranging from 0.6 to 0.7 are considered acceptable within the context of exploratory research. As displayed in Table 4, Cronbach's alpha indicates adequate reliability across all constructs. Although the Cronbach's alpha of the auditor task characteristics construct is 0.620, this value remains within the acceptable range. Subsequently, the composite reliability for all constructs fell within the range of 0.7 to 0.9, suggesting that all constructs are reliable. Therefore, the measurement demonstrates adequate internal consistency reliability and is deemed suitable for further analysis.

4.2.3. Discriminant Validity

Discriminant validity ensures a construct is empirically diverse from others in the model Hair, et al. [48]. The assessment was conducted using the heterotrait-monotrait (HTMT) ratio method, the results of the study are presented on the table below.

Table 5.
Heterotrait-monotrait (HTMT) ratio.

	SYQ	IQ	SEQ	TASK	TECH	TTF	USE	SAT	FD
SYQ									
IQ	0.837								
SEQ	0.497	0.400							
TASK	0.786	0.594	0.337						
TECH	0.672	0.518	0.365	0.756					
TTF	0.638	0.585	0.474	0.564	0.897				
USE	0.593	0.552	0.305	0.757	0.671	0.643			
SAT	0.569	0.740	0.709	0.503	0.684	0.823	0.567		
FD	0.415	0.602	0.477	0.344	0.611	0.569	0.447	0.792	

The threshold value for the HTMT ratio in assessing discriminant validity is recommended to be below 0.85, but values below 0.90 are still warranted [55]. Table 5 reveals that all HTMT values are below the 0.9 threshold, confirming that each construct is empirically diverse. In this instance, the HTMT ratio between TTF and TECH approaches the upper threshold yet remains within the warranted range. Therefore, the model demonstrates adequate discriminant validity across all constructs.

In addition to the HTMT method, the Fornell-Larcker criterion and cross-loading analyses were conducted to validate the measurement model further. The results from these supplementary tests were consistent with those obtained from the HTMT method, confirming the model's validity. For brevity, only the HTMT results are presented in this paper. However, the complete results from the Fornell-Larcker criterion and cross-loading analyses are available upon request.

4.3. Structural Model

4.3.1. Coefficients of Determination

Coefficients of determination, also known as R-squared, are a measure of the variance in a construct that is explained by the model [65]. In this context, the R-square values are designated at a certain level: 0.25 as weak, 0.50 as moderate, and 0.75 as substantial [48].

Table 6
R-square and R-square adjusted

Model	R-square	R-square adjusted
SAT	0.478	0.466
USE	0.370	0.351
TTF	0.479	0.471
FD	0.396	0.386

Table 6 presents the R-square values for the endogenous constructs, including auditors' satisfaction with CAATs, auditors' intention to use CAATs, TTF, and fraud detection. As seen in the above table, the R-squared values fall within a moderate range, with the highest at 0.471 and the lowest at 0.351. Although the adjusted R-squared values are slightly lower than the R-squared values, the results imply that the model can sufficiently explain the variance in the dependent constructs.

4.3.2. Path Coefficients

Path coefficients are used to represent the relationship between hypotheses regarding the constructs, with a p-value serving to assess the significance levels [48].

Table 7
Path coefficients.

Hypotheses	Path	Coefficient	Mean	Standard Deviation	T- statistics	P-value
H1	SYQ -> USE	0.172	0.177	0.106	1.620	0.105**
H2	SYQ -> SAT	0.003	0.008	0.089	0.035	0.972**
H3	IQ -> USE	0.170	0.178	0.085	1.990	0.047*
H4	IQ -> SAT	0.390	0.391	0.079	4.943	<0.001*
H5	SEQ -> USE	-0.024	-0.026	0.130	0.181	0.856**
H6	SEQ -> SAT	0.455	0.457	0.063	7.274	<0.001*
H7	TASK -> TTF	0.090	0.099	0.080	1.123	0.262**
H8	TECH -> TTF	0.643	0.641	0.079	8.130	<0.001*
H9	TTF -> USE	0.404	0.403	0.112	3.612	<0.001*
H10	USE -> FD	0.096	0.100	0.093	1.031	0.303**
H11	SAT -> FD	0.579	0.584	0.073	7.928	<0.001*

Note: *p<0.05 indicates significance; **p>0.05 indicates non-significance.

A p-value smaller than 0.05 is considered to have a significant effect between constructs while using a significance level of 5%. Although this study hypothesized that there is a significant influence between constructs, the result shows in Table 7 that there are five unsupported hypotheses with a p-value ranging from 0.105 to 0.972. Those are system quality on intention to use CAATs (H1), system quality on auditors' satisfaction in using CAATs (H2), service quality on intention to use CAATs (H5), auditors' task characteristics on TTF (H7), and intention to use CAATs on fraud detection process (H10). Meanwhile, other six reveals supported hypotheses: information quality on intention to use CAATs (H3), information quality on auditors' satisfaction in using CAATs (H4), service quality on auditors'

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satisfaction in using CAATs (H6), technology characteristics on TTF (H8), TTF on intention to use CAATs (H9), and auditors' satisfaction in using CAATs on fraud detection (H11). Furthermore, in order to facilitate comprehension, the research model is presented in Figure 2 alongside the p-value.

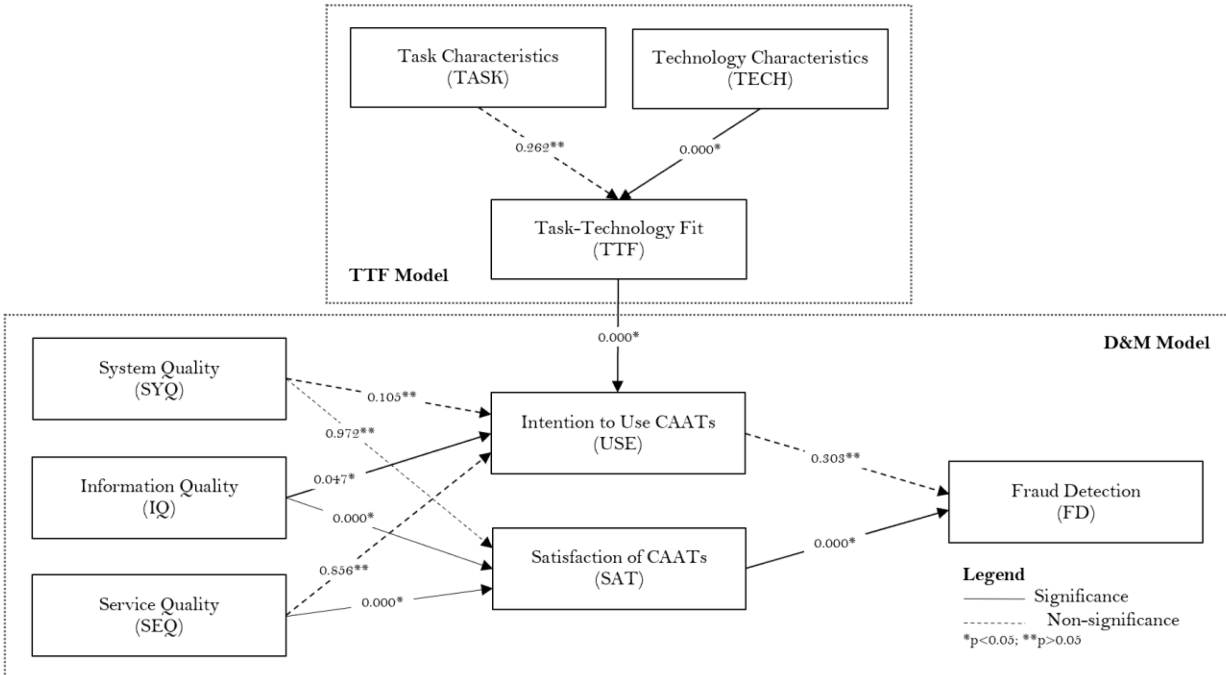

Figure 2.
Research model with p-value.

4.4. Discussion

In this research, the D&M model was applied to assess the use of CAATs in auditors' routine financial statement audits and their subsequent effect on fraud detection. The D&M model traditionally posits that system quality, information quality, and service quality drive user acceptance of information systems [8]. Intriguingly, our study found some unique patterns. Both information quality and service quality positively influence auditors' satisfaction with CAATs to detect fraud. However, when it comes to auditors' intention to use CAATs for fraud detection, only information quality plays a significant role. Interestingly, system quality did not show any significant effect on either their intention to use or their satisfaction with CAATs.

Hypothesis H1 resulted in a coefficient and a p-value of 0.172 and 0.105, respectively, indicating that system quality does not significantly affect the auditors' intention to use CAATs. Consequently, H1 is rejected. This demonstrates that the technical attributes of CAATs, specifically their reliability and responsiveness, may not be key determinants of their use. This finding can be contextualized by auditors' current perceptions of CAATs' system quality efficiency in enhancing audit efficiency. Our research found that the system quality of CAATs has not yet delivered significant time reductions in audit execution. Perhaps auditors believe that CAATs cannot be universally applied across all audit procedures, restricting their capability to realize their full potential. Other reasons supporting this may be that information technology does not support the ease of use of advanced features [6]. This finding is in line with Al Farizi, et al. [56] which stated that the system's quality is not positively correlated with the use of information systems.

Following our observation of the insignificant impact of auditors' intention to use CAATs in the context of system quality, support was also not found for H2. It is revealed that system quality does not have a significant effect on the auditors' satisfaction with using CAATs, with a coefficient of 0.003 and a p-value of 0.972. This finding is noteworthy given that prior literature consistently demonstrates a strong positive relationship between system quality and auditor satisfaction because of its ease of use and adaptability [36, 57]. Auditors may not perceive the usefulness of CAATs because the firm mandates their use. Hence, the auditors' logic regarding CAATs is that they were obligated to use them despite their satisfaction and usefulness to their job.

The results for H3 yielded a coefficient and a p-value of 0.170 and 0.047, respectively, demonstrating that information quality has a positive and significant effect on the auditors' intention to use CAATs. Accordingly, H3 is accepted. This study assessed the information quality generated by CAATs, focusing on relevance and accuracy. Auditors are likely to perceive CAATs as more valuable and, hence, increase their usage when the information produced aligns with their specific job requirements, particularly for tasks such as analytical procedures and substantive testing [58]. The value auditors find in the information significantly boosts the adoption rate of CAATs. This shows that the perceived usefulness of CAATs can directly contribute to an increased adoption rate of CAATs. Additionally, high-quality information can encourage using CAATs as it supports the decision-making process [59] enabling auditors to provide better analytical reasoning for their audit work. This finding is also supported by Bradford, et al. [6] and Hidayat and Akhmad [60] positing that good information impacts the user's desire to use the information system.

While information quality significantly affects the use of CAATs, its impact extends further by contributing to auditors' overall satisfaction. Support was also found for H4, which showed a positive and significant effect of information quality on the satisfaction of auditors using CAATs, with a coefficient and a p-value of 0.390 and <0.001, respectively, indicating H4 is also accepted. Increased CAAT usage in auditors' daily work enables them to perceive CAATs usefulness. Consequently, developing a sense of satisfaction. Auditors may perceive that the availability of high-quality information contributes to enhanced efficiency in performing audit tasks. Support for this perspective is found in the research by Bradford, et al. [6] and Hidayat and Akhmad [60] which stated that information systems are capable of producing timely, accurate, appropriate, and relevant information and that it will be influential to user satisfaction. Auditor satisfaction with CAATs can be attributed to the usefulness of the generated information and how well it aligns with the needs of their audit work.

Support was not found for H5. The study shows a coefficient of -0.024 and a p-value of 0.856, resulting in a rejection of H5. These findings indicate that service quality had an insignificant impact on auditors' intention to use CAATs. Previous research by Handoko, et al. [28] shows that service quality does not significantly differ based on auditors' urge to utilize CAATs. Our sample predominantly consisted of junior auditors with less than five years of experience who likely have not received the in-depth training necessary to maximize CAATs' utility. Consequently, the perceived effectiveness of the IT service aspects of CAATs appears to be insufficient to substantially bridge the gap in auditors' actual utilization. Past study shows that the presence of training to use CAATs can significantly impact the relationship between service quality and information system utilization [40][2].

Interestingly, we found support for H6, even though service quality did not directly influence auditors' intention to use CAATs. Our results show a significant and a positive impact of service quality on auditors' satisfaction with CAATs, backed by a coefficient of 0.455 and a p-value of <0.001. Following the previous discussion regarding the less experienced auditors, despite the gap in knowledge to maximize the use of CAATs, auditors are more concerned about the service quality to increase their satisfaction towards CAATs. We observed that auditor satisfaction can be achieved with available support and services that can provide assurance and solve problems encountered by auditors when using CAATs. These findings align with previous research, showing that a cooperative relationship between users and service providers can increase user satisfaction [35, 40].

To extend the analysis further, the TTF model was employed to examine whether the compatibility between the functionalities of CAATs and the nature of auditing tasks significantly influences their use. The TTF model is based on the idea that information systems provide value by providing support for a

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particular task, and that users will evaluate this to decide whether to adopt the systems [33]. According to Furneaux [43] both task and technology characteristics significantly affect the degree of fit, thus impacting the willingness to use CAATs. These results are in line with the findings for H8 and H9, but contradict the H7. Therefore, this study may offer a different perspective on the fit between task and technology characteristics.

In the context of task characteristics denoted by H7, a value of 0.090 for the coefficient and 0.262 for the p-value are presented, indicating that the task characteristics of auditors do not significantly affect TTF. Consequently, H7 is rejected. An analysis of the indicators employed reveals that auditors may not explicitly consider the routines of CAATs' use and response to data processing as primary factors when assessing the suitability of the task and the information system used. Instead, based on practical observations, external auditors may prioritize the system's functionality to assess its capability to execute the audit task. Furthermore, a considerable part of an audit's workload is inherently complex, requiring human judgement for decision-making within the context, which corroborates the finding that the result is insignificant. Therefore, this study provides a contribution to the extant literature on the issue by highlighting that the perceived utility of CAATs may be more substantially associated with their technological capabilities than with the nature of the relevant tasks.

Hypothesis H8, on the other hand, valued a coefficient and a p-value of 0.643 and <0.001, respectively, indicating that technology characteristics of CAATs have a significant effect on TTF. As a result, H8 is accepted. This finding is consistent with an earlier study by Furneaux [43] which assessed m-banking. Furthermore, studies in the management field show similar findings that indicate a positive impact of technology characteristics on TTF [61]. In regard to the audit, auditors may view CAATs as a suitable tool for their responsibilities, emphasizing the need for efficiency and the ability to process data in a timely manner. Practical-based, CAATs has been used to integrate and process data from various platforms with different formats, which indicates that these tools are flexible to fit the specific needs of audit. Therefore, although task characteristics may not be related to TTF, the capabilities of the technology itself appear to play a significant role in shaping such outcomes.

Furthermore, Hypothesis H9 showed that the TTF of auditors' tasks and CAATs positively and significantly affect the auditors' intention to use CAATs. The statistical analysis yielded a coefficient and a p-value of 0.404 and <0.001, respectively, concluding that H9 is accepted. The result indicates that when auditors perceive a good fit between their tasks and the technology, their intention to use CAATs increases significantly. This finding is supported by Jaber and Abu Wadi [2] which stated that auditors are well-advised to employ CAATs in their audit process, given that the predominance of data is in electronic form. Thus, this study suggests that leveraging CAATs for data processing under tight deadlines will yield enhanced benefits and efficiency. It also aligns with the study by Achhaiba, et al. [62] which found that TTF has a significant impact on users' intention to use the technology.

Finally, hypothesis H10 and hypothesis H11 is defined to evaluate the extent to which the use of CAATs and the level of user satisfaction influence the effectiveness of fraud detection, which serves as the final outcome in the proposed research model. The study by Nugroho, et al. [4] posited that the utilization of CAATs can assist auditors in detecting material misstatements, which usually serve as red flags of potential fraud. If CAATs generate reliable and valuable results, auditors are more likely to consider the tools as beneficial, thereby increasing their satisfaction. Thus, this may lead to continuous use to support fraud detection activities. In this study, the proposed relationships are empirically tested to determine whether the use of CAATs and user satisfaction significantly contribute to achieving the audit objective of detecting fraud. The results of these analyses are explained in the following section.

In this context, hypothesis H10 led to the determination of a coefficient and a p-value of 0.096 and 0.303, respectively, suggesting that auditors' intention to utilize CAATs does not significantly affect the detectability of fraud. Hence, H10 is rejected, which contradicts the conclusion in another study by Nugroho, et al. [4]. Based on the indicators assessed, it can be argued that the evaluation of fraud detection is not predominantly influenced by the usage frequency or the efficiency of CAATs. Rather, it is more plausibly determined by the information provided through the applied information system.

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Additionally, as discussed in the previous hypothesis, the majority of the sample is junior auditor with less than five years of experience. From practical experience, junior auditors are typically not responsible for doing analytical tasks using CAATs, which will be used to make professional judgments for generating reliable financial statements. Rather, they are more likely to do inspection of documentary evidence. Consequently, the utilization of CAATs does not significantly impact fraud detection.

Intriguingly, hypothesis H11 suggested that auditors' satisfaction with CAATs has a significant influence on fraud detection, with respective coefficients and p-values of 0.579 and <0.001. Therefore, H11 is accepted. This result suggests that auditors who are satisfied with CAATs are more likely to detect fraud effectively. By analyzing the adopted indicator, information satisfaction with CAATs may lead external auditors to enhanced accuracy and awareness of potential fraud. Moreover, satisfaction with CAATs can increase willingness to use these tools regularly. This, in turn, will encourage external auditors to explore more functions, thus enabling auditors to get an in-depth analysis of audit data. Simultaneously, this will also contribute to a greater understanding of how to apply CAAT effectively to achieve more reliable fraud detection outcomes.

5. Conclusion

This study aims to assess the integrated framework of the D&M model and the TTF model in the context of fraud detection, which is one of the main responsibilities of auditors. Previous research has studied the application of CAAT to audit efficiency and effectiveness, as well as the fit between auditor task characteristics and technology characteristics, separately. This research offers a complex analysis by combining the two frameworks and focusing on their impact on fraud detection.

The research concluded that system quality does not have a significant impact on the use and satisfaction of CAATs. Conversely, the quality of information has been demonstrated to have a significant impact on the use and satisfaction of CAATs. However, service quality was found to have a significant impact on satisfaction, while its effect on use was found to be negligible. Nevertheless, it has been observed that task characteristics do not appear to have a significant effect on TTF, in contrast to technology characteristics, which have been shown as having a significant effect on TTF. In particular, TTF exhibited a substantial impact on the utilization of CAATs. Finally, it is noteworthy that the utilization of CAATs does not exert an influence on the process of fraud detection. Contrarily, it is the satisfaction of CAATs that exerts an influence on the process of fraud detection.

The limitations of this study include the specific research area in the Greater Jakarta area of Indonesia, which may not be representative of other regions in Indonesia with different conditions. In addition, this study was conducted with a small sample of data. Furthermore, this study only used two indicators of each construct which may not be able to fully examine the adoption of CAATs in auditing. Therefore, it is imperative to conduct further research to provide a more comprehensive understanding. This study proposes several suggestions for future research:

1. To achieve optimal results, it is necessary to use a larger data sample with wider variance, especially in the context of age, region, and position.
2. Complete indicators of each construct in the model should be used to gain in-depth understanding of the benefits of CAATs on fraud detection, as well as the relationship between auditor task characteristics and CAATs characteristics.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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Appendix A.
Items.

Variable	Indicators	Adapted from
System Quality	1. Response Time 2. Reliability	Bailey and Pearson [63]
Information Quality	1. Relevance 2. Accuracy	Petter, et al. [9]
Service Quality	1. Empathy 2. Availability of services	Hair, et al. [50]
Task Characteristics	1. Routineness 2. Time Critically	Goodhue [33]
Technology Characteristics	1. Routineness 2. Time Critically	Goodhue [33]
Task-Technology Fit	1. Routineness 2. Time Critically	Goodhue [33]
Auditors' Intention of Use	1. Amount of Use 2. Nature of Use	Tam and Oliveira [29]
Auditors Satisfaction	1. Information Satisfaction 2. General Reaction/Overall Satisfaction	Iivari [64] and DeLone and McLean [25]
Fraud Detection	1. Effectiveness 2. Awareness	Bradford, et al. [6] and Widuri and Gautama [13]

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