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THE INFLUENCE OF CULTURE, TECHNOLOGY, ORGANIZATION AND
ENVIRONMENT ON THE ADOPTION OF COMPUTER ASSISTED AUDIT
TECHNIQUES

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Abstract

This study empirically examines the influence of Culture, Technology, Organization, and Environment on the intention of external auditors to use Computer Assisted Audit Techniques (CAATs). The respondents of this research were external auditors who work in public accounting firms in DKI Jakarta. The sampling technique used was the Convenience Sampling Method. The primary data were collected by distributing questionnaires. Data was obtained from 102 respondents. Multiple linear regression model was used for data analysis. The results showed that Culture, Technology, Organization, and Environment have a significant influence on external auditors' intention to use CAATs.

INTRODUCTION

This research examines the influence of audit firms' cultural, technological, organizational, and environmental aspects on the adoption of Computer Assisted Audit Techniques (CAATs). The development of information technology (IT) in a company does not align with the changes of IT based audit practices, especially in the big data era. As a key to business innovation processes, IT based audit practices enable auditors to monitor or review their tasks effectively (Ramen, Jugurnath, & Ramhit, 2015). Fischer (1996) stated that audit firms have been adopting audit technology since

1980s to improve audit effectiveness and efficiency. However, previous studies indicate that the use of audit technology is still limited, and the audit techniques used by external auditors remain unsophisticated (Ahmi & Kent, 2013; Fischer, 1996; Hogan, Rezaee, Riley, & Velury, 2008). These claims are supported by WorldBank (2011) report which indicates that in terms of fraud detection and the opinion for “going concern” assumptions, Indonesian auditors tend to use unsophisticated procedures. Given these conditions and without the non-rigorous process, it is challenging to provide an accurate audit opinion as stakeholders believe that they are not adequately informed. This leads to the dubious quality of auditing.

To overcome the audit quality issues, auditors need to implement “best audit practice”. “Best audit practice” includes the use of technology implemented during the audit process to improve audit quality (Kinney Jr, 1986). For example, PricewaterhouseCoopers (PwC) has been using audit technology in their services ensuring that best practice is applied to the entire audit process (Winograd, Gerson, & Berlin, 2000). Moreover, Yoon, Hoogduin, and Zhang (2015) argue that external auditors may need to use big data as audit evidence, as big data are considered appropriate and sufficient to be included as audit evidence.

Audit technology that is also known as computer assisted audit techniques (CAATs) is the technology that supports auditors in the process of audit (Braun & Davis, 2003). The use of CAATs has been evolving overtime. When it was first introduced, CAATs refers to the use of word processing, electronic spreadsheets, generalized audit software (GAS), and electronic working papers (Ahmi & Kent, 2013; Debreceny, Lee, Neo, & Toh, 2005; Ismail & Abidin, 2009). A more recent CAATs is continuous monitoring or continuous auditing that was introduced by Alles, Kogan, and Vasarhelyi (2002). The use of technology in audit practices is outlined in the US Auditing Standards. For example, to identify risk and fraud, the US Statement of Auditing Standards (SAS) No 316.52 states that auditors need “to employ computer assisted audit techniques (CAATs) to gather more extensive evidence about data contained in significant accounts or electronic transaction files” (AICPA, 2006). Moreover, SAS No 316.61 recommends auditors to use CAATs when conducting an audit in an IT environment. In the Indonesian context, the Indonesian Public Accountants Professional Standards (SPAP) section 327.12 states that if a computerized accounting system does not produce physical audit evidence, then it is not practical for auditors to perform manual testing so that the auditor should consider the use of CAATs. However, the codification of technology adoption with regard to auditing standards may not always motivate firms to adjust their technology (Widuri, OConnell, & Yapa, 2016).

Previous studies have examined the adoption of various types of CAATs and most of these studies have focused on individual intention of CAATs adoption by using Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT) as the underpinning theories (Ahmi & Kent, 2013; Bedard, Jackson, Ettredge, & Johnstone, 2003; Curtis & Payne, 2008; Widuri, Sari, Wicaksono, Sun, & Sari, 2017). Limited studies discuss the adoption of CAATs in an organizational level, such as Ramen et al. (2015), Widuri et al. (2016) and Rosli, Siew, and Yeow (2016). Their studies use Technology, Organizational and Environment (TOE)

framework for explaining CAATs adoption factors in organizations. However, Ramen et al. (2015) included Cultural aspect as an additional factor, because they believed that the cultural aspect is one important factor which needs to be considered. This present study replicates Ramen et al. (2015) with some modifications. There are different regulations and business environments in this study and Ramen et al.'s study.

Using primary data obtained from 102 respondents, we find that cultural aspect that is represented by audit firm's vision and mission is influential in decision making process with regard to the adoption of CAATs. It is concluded that audit firms need to revise their vision and mission to adapt to the changes of IT development. In terms of technological aspect, the respondents indicate that CAATs use reduces the level of error in audit processes. Therefore, the perception of respondents toward CAATs is positive. CAATs adoption in small audit firms is challenging, since they need to invest in IT infrastructure. Hence, the financial resources are perceived influential for small audit firms in adopting CAATs. High-rank audit firms' management, such as partner, also influences the CAATs adoption process. The respondents indicate that when there is a lack of support from partners, it is difficult to adopt CAATs in their audit firms. In terms of environment aspect, it is found that clients, vendors, and competitors encourage audit firms to adopt CAATs.

This research responds to the call for further research at the organizational-level CAATs adoption to provide a better understanding of how cultural, technological, organizational, and environmental aspects influence the decision of audit firms to adopt CAATs. Rosli et al. (2016) suggest that a more in-depth analysis regarding the CAATs adoption at organizational level should be presented. Another contribution is that this research provides evidence of how cultural aspects also contribute significantly to CAATs adoption decision, especially in the Indonesian context.

The remainder of the paper is organized as follows. Section 2 presents the existing literature on CAATs adoption and TOE framework, followed by hypotheses development. The research methods and sample selection are described in Section 3. Descriptive statistics and test results are reported in Section 4. Section 5 provides the conclusion of the paper.

LITERATURE REVIEW

Most previous studies in audit technology (such as CAATs or GAS) acceptance and adoption use UTAUT (Bierstaker, Janvrin, & Lowe, 2014) or TAM (Widuri & Sari, 2017) theories as frameworks. These theories focus on individual-level of acceptance and adoption processes. Individual adoption process is "the process through which an individual passes from first knowledge of an innovation, to a decision to adopt or reject, to implementation of this decision (Brancheau & Wetherbe, 1990). However, it is interesting to note that IT adoption consists of the internal (i.e. organizational) and external (i.e. social order) characteristics that drive the entity to accept and implement an innovation (Premkumar, Ramamurthy, & Nilakanta, 1994). Sirois and Simunic (2010) provide an example by indicating that investments of technology in audit firms need strategic decisions. Therefore, the level of decision, whether the audit firms need to

adopt CAATs, is at an organizational-level. This condition calls for other studies that focus on the organizational-level rather than individual. Thus, research focusing on the organization level is needed.

Studies about the organizational-level audit technology adoption have been conducted, for example, Ramen et al. (2015), Rosli et al. (2016) and Widuri et al. (2016). Rosli et al. (2016) and Widuri et al. (2016) studied the technology adoption in auditing using the Technology, Organization and Environment (TOE) framework. The framework was developed by Tornatzky and Fleischer (1990) and has been applied extensively in various Information System studies. For example, the framework was used on electronic data interchange (EDI) adoption (Kuan & Chau, 2001), e-business (Zhu & Kraemer, 2005; Zhu, Xu, & Dedrick, 2003), and electronic customer relationship management (Te-Ming, Lin-Li, & Wen-Feng, 2005). Although specific factors used within three contexts, i.e. technology, organization and environment, varied across different studies, overall support for the TOE framework was indicated.

The technological context describes the “internal and external aspects of technology in the company” (Oliveira & Martins, 2011). This includes the technology used in the company and also in the market. In the context of this current study, a company may use CAATs if the IT of the client’s company is up to date. Compliance with audit tasks and ease of use should also be considered as technological drivers in the use of CAATs. Widuri et al. (2016) stated that the compatibility with client’s IT is a major factor in the adoption of CAATs. The auditor uses CAATs if their clients use complex IT. Their study also found that the use of CAATs helps them perform the audit when the client uses cutting edge ERP system. Rosli et al. (2016) found that the use of CAATs assists auditor to work efficiently and perceive that the benefit of GAS usage outweighs the investment and maintenance costs. The study also indicates that CAATs is easy to use and compatible with the auditing standards.

The organizational context was defined as firm size, the complexity of managerial structure, human resources quality, and the amount of resource available internally (Tornatzky & Fleischer, 1990). Within the context of the current study, the relevant factors include the size of audit firm (Big-4, medium and small), auditor interest in using GAS, the capability of IT of the auditor and IT capital budget owned by audit firm. Widuri et al. (2016) suggested that large audit firms lead in the adoption of audit technology because GAS is more widely used by Big 4 or larger audit firms than small audit firms. Their result proved that the size and category of the audit firms affect the adoption of GAS because they attract large companies with complex IT systems. Furthermore, the IT skills of audit firms’ employees and management support in GAS adoption are perceived important (Rosli et al., 2016).

Environmental context is the part where the company runs its business, such as industry, competitor, access to resources, and dealings with the government (Tornatzky & Fleischer, 1990). In the context of the audit, the level of support from professional bodies and regulations, GAS supplier, client’s size and industry can drive auditors to have an interest in using IT. Previous studies indicate that client's expectation and professional body’s

support are the critical factors affecting the adoption of technology (Rosli et al., 2016; Widuri et al., 2016).

Ramen et al. (2015) argued that the adoption of CAATs is influenced by culture within the organization. Furthermore, Nurcahyo, Della, Irawan, and Ronaldy (2018) indicate that organizational culture provides significant impact to employee engagement. Therefore, this study adds cultural aspect to enhance TOE framework. The cultural aspects are drawn from Denison’s Organizational Culture Model (Denison & Mishra, 1995). The Denison model consists of four cultural traits of effective organization, which are (1) Involvement, which refers to a sense of ownership and responsibility among firm’s managers and employees who are committed to their work; (2) Consistency, which refers to firms that have “strong” cultures that are highly consistent, well-coordinated, and well-integrated; (3) Adaptability, which refers to the ability of a firm to adopt internal change in response to external conditions; and (4) Mission, which refers to a clear sense of purpose and direction that defines organizational goals and objectives. Their study concludes that the adoption of CAATs will fail when the audit firms provide poor supports, such as financial resources, audit firm size, auditor’s competency, and culture traits. Figure 1 illustrates the research model derived from the literature.

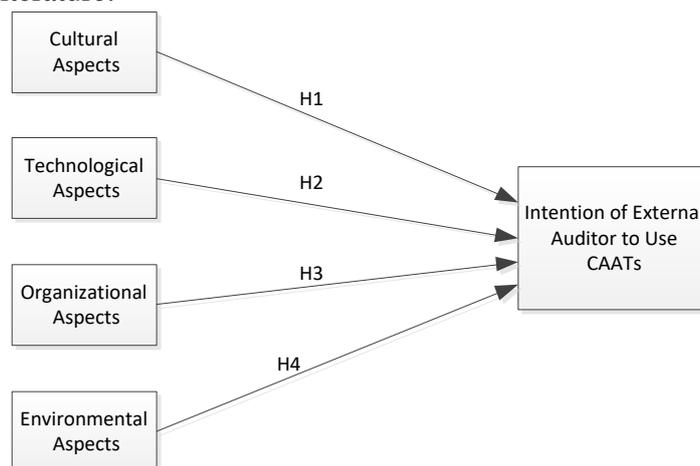


Figure 1. Research Model

The following hypotheses are generated:

- H₁: Cultural aspects positively influence the intention of external auditors to use CAATs.
- H₂: Technological aspects positively influence the intention of external auditors to use CAATs
- H₃: Organizational aspects positively influence the intention of external auditors to use CAATs
- H₄: Environmental aspects positively influence the intention of external auditors to use CAATs

MATERIALS AND METHODS

The primary data of this research was collected using a questionnaire distributed to the respondents. The questions in the questionnaire are derived from Ramen et al.’s (2015) study with some modifications. The respondents of this research were external auditors from accounting firms in Jakarta.

Since the number of population (external auditors) is unknown, this current research uses Roscoe's rules of thumb regarding the sample size (Hill, 1998). The sample size of this research is 97 and the sampling technique used is convenience sampling.

A linear regression model was employed to assess whether there is a relationship between the intention of external auditors to use CAATs and the explanatory variables used in the study. The model is as follows:

$$\text{INTENTION} = \alpha + \beta_1\text{CULT} + \beta_2\text{TECH} + \beta_3\text{ORG} + \beta_4\text{ENV} + e$$

INTENTION	: Intention of external auditors to use CAATs
CULT	: Culture variable
TECH	: Technology variable
ORG	: Organization variable
ENV	: Environment variable
E	: Error

The methods used to analyze the data are testing the data quality by conducting reliability and validity test. Furthermore, for ensuring that the statistical results can be interpreted accurately, the classical assumption tests were conducted including the normality, heteroscedasticity, and multicollinearity tests. Finally, hypothesis testing was tested using analysis of multiple linear regression model by measuring its goodness of fit through the coefficient of determination test (R^2 test), simultaneous significance test (F-significance test), and statistical test of individual parameters (T-statistic test). These tests were performed using IBM SPSS Statistics 23 software.

RESULTS AND DISCUSSIONS

The researchers chose external auditors who work at Public Accounting Firm in Jakarta as the respondents. Furthermore, the researchers distributed the questionnaire by visiting the audit firms or distributing it via e-mail. The total questionnaires collected were 120 questionnaires. Most respondents of this research are from non-Big 4 audit firms, which are 87 respondents with the percentage of 85.3%, while respondents from Big 4 audit firms are 15 respondents with the percentage of 14.7%. The majority of the respondents are senior auditors (49%) and the rest are junior auditors (48%) and audit managers (2%).

Prior to testing the hypotheses, this study conducted a preliminary test to evaluate whether the data were reliable. Therefore, this study ran the validity and reliability test as well as the classical assumption test. The results of the reliability test for all variables indicate that the value of Cronbach Alpha is above 0.6. It means all the variables in this study are reliable. Furthermore, validity test was conducted to test whether the entire data to be processed were valid. The validity test shows that all correlation value on each variable and statements in this study is greater than table of r product moment. Therefore, the data are valid.

Table 1 describes the results of the t-statistic test performed to see whether there is a positive and significant influence of the indicator of the independent variables, on the dependent variable. Table 1 explains the results of the t-statistic test. As the table indicates, the variable of Culture indicates the beta coefficient of 0.224, which means that any increase in value will affect the interest to use CAATs of 0.224. Culture variable has Sig value of 0.033

where the value $0.033 < 0.05$. Therefore, it can be concluded that H1 is accepted which means culture variable significantly influences the interest to use CAATs.

The variable of Technology has beta coefficient of 0.276, which means that any increase in value will affect the interest to use CAATs of 0.276. Technology variable has Sig value of 0.014 where the value is $0.014 < 0.05$. Therefore, it can be concluded that H2 is accepted, which means that technology variable significantly influences the interest to use CAATs.

The variable of Organization has beta coefficient of 0.292, which means that any increase in value will affect the interest to use CAATs of 0.292. Organization variable has Sig value of 0.022 where the value is $0.022 < 0.05$. Therefore, it can be concluded that H3 is accepted which means that organization variable significantly influences the interest to use CAATs.

Table 1. *T-statistic Test*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.127	.299		.426	.671
	Culture	.224	.104	.211	2.163	.033
	Technology	.276	.111	.242	2.492	.014
	Organization	.292	.125	.249	2.328	.022
	Environment	.212	.085	.217	2.504	.014

Dependent Variable: External Auditors' Intention to Use CAATs.

The variable of Environment shows the beta coefficient of 0.212, which means that any increase in value will affect the interest to use CAATs of 0.212. The environment variable has Sig value of 0.014 where the value is $0.014 < 0.05$. Therefore, it can be concluded that H4 is accepted, meaning that environment variable significantly influences the interest to use CAATs.

Meanwhile, the value of Adjusted R Square (coefficient of determination) produces a value of 0.627 (Table 2). It means that the weight of variable Culture, Technology, Organization and Environment in explaining the dependent variable is 62.7%. Meanwhile, the remaining 37.3% is explained by other factors which are not included in this study.

Table 2. *Coefficient of Determination*

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801 ^a	.642	.627	.36957

a. Predictors: (Constant), Environment, Technology, Culture, Organization

The results of this study indicate that all independent variables tested influence the external auditors' intention to use CAATs. This study aligns with the research of Ramen et al. (2015). The results show that the audit firms need to be open-minded in terms of IT adoption so that they can fulfill their clients' requirements. It is expected the strong organizational culture will encourage the auditors' organizational commitment as described by Ismail,

Ishak, and Yusuf (2016). The intention to use CAATs is also influenced by the Technology aspect. The external auditors perceived the use of CAATs as supporting the audit process and that the CAATs features are consistent with audit procedures. The respondents indicate that CAATs use improves the accuracy. This result supports the previous studies (Lin & Lin, 2008; Ramen et al., 2015; Widuri et al., 2016). The organization aspect influences the intention of CAATs use. It is believed that financial and management supports ensure the successful adoption of CAATs in audit firms. This result supports the previous studies (Chang, Liao, & Hsiao, 2005; Ming-Ju & Woan-Yuh, 2008; Ramen et al., 2015). Furthermore, the Environment factor also influences the CAATs adoption. Such aspects as client, vendor and competition with other audit firms are found to be the significant drivers of the CAATs adoption. This results are consistent with the previous studies (Ramen et al., 2015; Widuri et al., 2016).

CONCLUSIONS

This research replicates Ramen's (2015) study with some modifications to examine the effect of Culture, Technology, Organization, and Environment on the intention of external auditors to use CAATs. The results indicate that Culture, Technology, Organization, and Environment positively influence the interest to use CAATs. This study provides opportunities for future research. Future research could examine other external auditors from different regions. Future research could also explore the perceptions of internal auditors to identify whether or not there are differences regarding their perceptions. It would be interesting if future research could investigate the actual use of CAATs in a specific audit firm.

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