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Adoption of Audit Technology in Audit Firms

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Abstract

This paper investigates audit technology adoption based on Technology-Organization-Environment (TOE) framework, Diffusion of Innovation and Institutional theories. As more audit firm's clients use enterprise information systems, it is important for audit firms to adopt audit technologies in auditing. Descriptive statistics results from questionnaire survey on 38 audit firms' auditors reveal that more than 50% of auditors had never used computer-assisted-audit tools other than electronic spreadsheets. Despite the low adoption, the respondents agreed that audit technology is cost-effective. Low mean ratings were given on other indicators of audit technology adoption i.e. technology compatibility, technology complexity, organization readiness, top management support, employee's competency, client's system complexity, competitive pressure, vendors' and professional accounting bodies' supports. Results also show that firm size influenced the adoption level. Theoretically, this paper contributes in developing a comprehensive audit technology adoption framework by incorporating client's system complexity and professional accounting body support that enhances the original TOE framework.

Keywords

Audit Technology, Audit Firms, Computer-Assisted Audit Tools, IT in Accounting, Technology Acceptance

INTRODUCTION

Audit technology support tools which are also referred as computer-assisted audit tools and techniques (CAATTs) in preceding studies range from a simple spreadsheet application software to an advanced use of specialized audit software application that embed the use of databases and business intelligence applications (Braun and Davis 2003). Elliott and Jacobson (1987) defined audit technology as "auditor's tool kit" which denotes the audit technology tool as "all the things designed to enhance the auditor's capacity to perform an audit task". Following previous studies definitions, audit technology in this study is defined as any use of technology to help auditor in the completion of an audit such as Electronic Spreadsheets, Electronic Working Papers, Generalized Audit Software, Embedded Audit Modules, Database SQL Search & Retrieval, Parallel Simulation Software and Test Data.

The growth of enterprise resource planning (ERP) applications and accounting information systems (AIS) applied in businesses has called the importance of adopting audit technology support tools by audit firms in auditing their clients businesses. Auditors have to accumulate and assess audit evidence to examine whether the AIS has processed business transactions correctly while maintaining data integrity, validity and accuracy of the information generated. Therefore, the auditors need advanced audit tools and techniques for auditing work and tracing electronic evidence for financial statement auditing so that auditing tasks can be done effectively and efficiently (Braun and Davis 2003).

However, notwithstanding the benefits of audit technologies, the implementation is not extensively utilized among public accounting firms (Curtis and Payne 2008). There are limited empirical findings about the adoption

and usage of audit technologies particularly among external auditors (Ismail and Abidin 2009; Janvrin et al. 2008). Thus, this paper aims to present the preliminary descriptive results of audit technologies adoption from external auditor's point of view. Theoretically, this research aims to provide an understanding of audit firms' practitioners' perceptions on the factors affecting the acceptance of audit technologies. We believe that the adoption of technology in audit firms is unique because audit firms are regulated by professional accounting bodies. The firms are required to abide the professional accounting practices and auditing standards developed by the professional bodies. Besides, in the context of audit firms, it is interesting to study the audit technology adoption as we argue that the complexity of client's AIS would influence the audit firm's decision to adopt an audit technology. We also argue that firm size would moderate the influence of the client's AIS, firm's readiness and employees' IT competency factors due to the fact that larger audit firms audit larger client firms and have more financial resources as well as human resources. Hence, this study contributes in proposing a comprehensive audit technology adoption framework that complements new variables i.e. client's AIS complexity and professional accounting bodies support with firm's size acts as the moderating factors.

RESEARCH FRAMEWORK

Figure 1 depicts the contextual framework of this study which is developed based on Technology-Organization-Environment (TOE) framework by Tornatzky and Fleischer (1990). The research framework provides the technological, organizational and environmental factors that affect the adoption of audit technologies, thus, it addresses the research question which investigates the adoption of such technologies. The framework is strengthened by Diffusion of Innovation (DOI) theory (Rogers 2003) and Institutional theory (DiMaggio and Powell 1983) to better explain the technological and environmental context influence on audit technology adoption in audit firms. It is argued that TOE framework only provides a general technological aspect influencing technology adoption without specifically address the characteristics of the technology (Rosli et al. 2012). The gap of the technological aspect could be supported by the characteristics explained in DOI theory. Besides, with the unique environmental aspect of audit profession, we believe that environmental factors in TOE framework could be best described through Institutional theory. Therefore, by combining these three theories, it could provide a comprehensive framework on the adoption of audit technology. The framework illustrates how (1) technological context (technology cost-benefit, technology compatibility and technology complexity), (2) organizational context (top management commitment, human resource IT competency and organization readiness), and (3) environmental context (client's AIS complexity, competitive pressure, professional accounting bodies support and vendor services) influence audit technologies adoption.

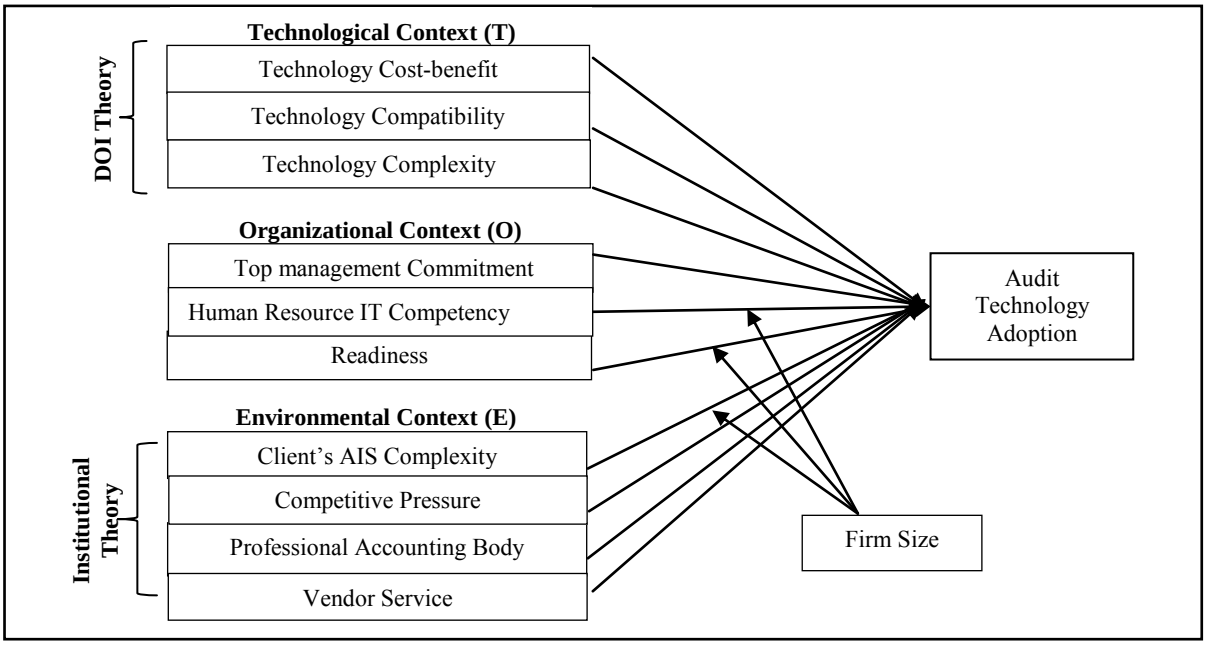

Figure 1: Research Framework for Audit Technology Adoption

Audit Technology Adoption

The dependent variable for this study is adoption of audit technology which refers to audit technology used by audit firms to support audit process. Adoption of technology is commonly used by prior studies to investigate the acceptance of users towards new technology innovation (Venkatesh and Bala 2012; Zhu and Kraemer 2005; Zhu et al. 2003). The attributes of this variable are presented in Table 1.

Technology Cost-Benefit

As supported by DOI theory, benefits which are derived from technology's relative advantage, affect technology adoption rate (Rogers 2003). According to Rogers (2003), relative advantage means a technology is "perceived as being better than the idea it supersedes" or in other words, the technology "offers improvements over currently available tools". In this study, technology cost-benefit is defined as the perceived benefits that an audit firm would obtain from audit technology outweigh the cost of its adoption. It is anticipated that cost-benefit will positively influence audit technology adoption. The attributes of this variable are presented in Table 2.

Technology Compatibility

In the present context, technology compatibility refers to the degree to which the use of audit technology is consistent with audit needs and matches the audit tasks that need to be performed by audit firm. It is adapted from the definition of compatibility in DOI theory by Rogers (2003) and task-technology fit definition by Goodhue and Thompson (1995). This study posits that compatibility will positively influence audit technology adoption. Table 3 shows the attributes of this variable.

Technology Complexity

Complexity as adapted from DOI theory is defined as the degree of difficulty to understand and use the audit technology. Business firms that perceive an IS/IT to be too complicated will likely reject the system from being adopted (Rogers 2003). Therefore, we believe that complexity will negatively influence audit technology adoption. The attributes of audit technology complexity are presented in Table 4.

Top Management Commitment

Top management commitment refers to the degree of top management involvement, direction and support given to audit technology adoption in audit firm. Top management support has been regularly found to be important in making decision for technology adoption in organization (Bradford and Florin 2003; Mahzan and Lymer 2009; Ramamurthy and Premkumar 1995). Thus, it is anticipated that top management commitment will positively influence audit technology adoption. Table 5 presents the attributes of this variable.

Organization Readiness

This study defines organization readiness as the level of firm's available financial and technological resources to adopt audit technology. With financial resource, a firm can equip its organization with necessary IT sophistication, technological facility and internal environment to support technology adoption (Venkatesh and Bala 2012). Prior literatures on computer assisted audit tools adoption stressed that organizational physical facility and technological infrastructure influence the motivation of computer assisted audit tools adoption (Janvrin et al. 2008; Mahzan and Lymer 2009). Hence, this study posits that organization readiness will positively affect audit technology adoption. The attributes of organization readiness are presented in Table 6.

Human Resource's IT Competency

As supported by TOE framework, knowledge and competency of workforce are required for a firm to successfully adopt a technology (Tornatzky and Fleischer 1990). Human resource's IT competency refers to the level of IT/IS competency and capability possessed by audit firm's employees. Evidence from study in IS adoption has shown that levels of employees' IS knowledge influence firm's decision makers to adopt an IS (Thong 1999). For that reason, we believe that human resource's IT competency will positively influence audit technology adoption. Table 7 presents the attributes of this variable.

Complexity of Client's AIS

Complexity of client's AIS variable is adapted from Janvrin, Bierstaker and Lowe (2008). It is defined as the level of complexity, difficulty and volume of transactions processed by AIS which is used in client's organization. Audit firm provides audit services to its clients, among others to examine its client's business financial reporting, AIS and its internal control (Hall 2011). Therefore, it is expected that audit technology adoption by audit firm will be positively influenced by the complexity of clients AIS. The attributes of this variable are presented in Table 8.

Competitive Pressure

Competitive pressure refers to the perceived level of pressure within the business environment in which the audit firms operates. Competitive pressure is found as a factor affecting AIS adoption (Cartman and Salazar 2011). As stressed by TOE framework and previous studies, firms are more likely to accept an IT when many competitors in its industry are adopting the technology (Iacovou et al. 1995; Tornatzky and Fleischer 1990; Zhu et al. 2003). This study hypothesizes that competitive pressure will positively influence audit technology adoption. Table 9 presents the attributes of this variable.

Professional Accounting Bodies Support

Previous literature found that there is a relationship between professional association and technology adoption (Swan and Newell 1995). From the normative viewpoint of Institutional theory, a firm will follow the same norm of its professional groups and react to its environment (DiMaggio and Powell 1983). In this study, professional accounting bodies support is defined as the guidance and support given to public audit firms through dissemination of audit technology use and standards. Thus, it is anticipated that professional accounting bodies support will positively influence audit technology adoption. Table 10 presents the attributes of this variable.

Vendor Services

Vendor services refer to the support services offered by IT vendor to audit firm, for example, training, consultation, technology monitoring and maintenance. As stated in TOE framework, access to suppliers of technology-related services influences firm to make decision on adopting a technology (Tornatzky and Fleischer 1990). Hence, we hypothesize that vendor services will positively influence audit technology adoption. The attributes of this variable are presented in Table 11.

METHODOLOGY

Data from audit firms were gathered through questionnaire surveys. The questionnaire items were mainly derived and adapted from survey instruments in the previous literatures. A five-point Likert scale ranges from strongly disagree (1-point) to strongly agree (5-point) was used to capture audit firm's perception on technological, organizational and environmental factors.

The questionnaire was pre-tested by 6 academics in audit and accounting information systems and 5 practicing auditors to improve the clarity of both questionnaire instructions and questions. In this preliminary study, the questionnaires were self-administered by mail and email to 67 audit practitioners from small, medium and large audit firms listed in Malaysian Institute of Accountants Member Firms Directory. The selection of the audit firms was based on convenience sampling. Convenience sampling was used in this preliminary research to test the instrument and get a gross estimation of the results prior to the actual survey. The response rate was 56.7 percent (38 respondents). Data entry and descriptive analysis for the questionnaire were done using Statistical Package for the Social Sciences (SPSS).

RESULTS AND DISCUSSION

Most of the respondents for this study were from small sized audit firms (39.5 %) and medium sized audit firms (44.7 %). Only 15.8 % were employed at Big 4 firms. All of the firms offered various services i.e. financial auditing service (100 %), IT auditing (28.9 %), internal auditing (50.0 %), taxation (92.1 %), business advisory (57.9 %) and financial advisory (52.6 %).

Adoption of audit technology was collected based on the percentage of audit task conducted using the respective audit technology (Table 1). Consistent with Venkatesh and Bala (2012), the percentage was used as a measure to assess the extent of implementation and utilization of audit technology adoption.

Table 1: Audit Technology Adoption

Audit Technology	Adopter				Utilization of audit technology			
	Big Firm Freq (%)	Medium Firm Freq (%)	Small Firm Freq (%)	Total %	Less Extensive (1-25%) Freq (%)	26-50% Freq (%)	51-75% Freq (%)	Very extensive 76-100% Freq (%)
Less advanced application								
Electronic Spreadsheets	6 (15.8)	17 (44.7)	14 (36.8)	97.3	3 (7.9)	5 (13.2)	2 (5.3)	27 (71.1)
Electronic Working Papers	6 (15.8)	6 (15.8)	7 (18.4)	49.7	4 (10.5)	1 (2.6)	5 (13.2)	9 (23.7)
Generalized Audit Software	6 (15.8)	8 (21.1)	4 (10.5)	47.4	1 (2.6)	3 (7.9)	6 (15.8)	8 (21.1)
Advanced application								
Statistical Software	5 (13.2)	5 (13.2)	2 (5.3)	31.7	4 (10.5)	1 (2.6)	4 (10.5)	3 (7.9)
Test Data	6 (15.8)	6 (15.8)	1 (2.6)	34.2	0 (0.0)	6 (15.8)	4 (10.5)	3 (7.9)
Database SQL Search	4 (10.5)	6 (15.8)	1 (2.6)	28.9	4 (10.5)	4 (10.5)	3 (7.9)	0 (0.0)
Parallel Simulation Software	5 (13.2)	5 (13.2)	1 (2.6)	29.0	2 (5.3)	2 (5.3)	4 (10.5)	3 (7.9)
Embedded Audit Modules	5 (13.2)	4 (10.5)	1 (2.6)	26.3	2 (5.3)	2 (5.3)	5 (13.2)	1 (2.6)

Freq= Frequency

The result shows that the audit technology adoption varied by firm size. It is found that the less advanced audit tools were adopted by most of the small and medium sized firms whereas the more advanced level of audit

technology were used by larger audit firms. This result is consistent with Ismail and Abidin (2009) findings that many auditors in small firms use less advanced audit technologies in auditing.

Findings reveal that many of the respondents had never used advanced audit technologies in performing audit tasks, i.e. Embedded Audit Modules (73.7%), Database SQL Search and Retrieval (71.1%), Parallel Simulation Software (71.1%), Test Data (65.8%) and Statistical Software (68.3%). As most of the respondents are from small and medium sized firms, a high percentage of respondents (97.3%) adopted Electronic Spreadsheets, of which 71.1% used it very extensively. Almost half of the respondents adopted Electronic Working Papers (23.7% extensively use the application). As for Generalized Audit Software, only 47.4% of the respondents adopted it with 21.1% extensively performed their auditing work by using the software.

Means, standard deviations and internal consistencies for attributes measuring each independent variable are shown in Table 2 to Table 11.

As shown in Table 2, the means for Technology Cost-Benefit attributes are close to 4.00. These reflect that most respondents tended to agree that audit technology brings benefits to auditing. Most respondents agreed with the statement that audit technologies will increase audit firm's productivity (4.11), reduce error rates in audit process (4.08) and improve audit efficiency through reduced paperwork (4.05). These findings are consistent with previous literatures that using audit technologies would benefit auditors and help auditing process to be more efficient (Banker et al. 2002; Braun and Davis 2003). However, respondents had a divided response toward the benefits and on-going maintenance cost that audit firms have to bear (see the high standard deviations above 1.00 for CB2 and CB9). They were unsure whether the benefits outweigh the cost of the system. This is probably because of the high audit software fees (particularly the advanced applications) that need to be paid annually to the vendor to maintain the software database and the training cost needed to update auditors with the new features of the software (Mahzan et al. 2009).

Table 2: Technology Cost-Benefit

	Attributes	Mean	Std Dev	F.L
CB1.	Benefits of using CAATTs outweigh its initial investment cost	3.61	.95	.85
CB2.	Benefits of CAATTs outweigh its on-going maintenance cost	3.58	1.00	.76
CB3.	Benefits of integrating CAATTs with firm's existing information systems are greater than its integration cost	3.74	.83	.78
CB4.	Benefits of using CAATTs compensate the cost of training staffs to use CAATTs	3.79	.74	.82
CB5.	CAATTs will improve audit efficiency through reduced paperwork	4.05	.90	.75
CB6.	CAATTs will provide accurate information for decision making	3.92	.88	.91
CB7.	CAATTs will increase audit firm's productivity	4.11	.92	.89
CB8.	CAATTs will reduce error rates in audit process	4.08	.85	.87
CB9.	CAATTs will help reduce cost in auditing operations	3.87	1.04	.82
	Total	3.86	.75	

Cronbach's Alpha = 0.941 Std Dev = Standard Deviation F.L = Factor Loading

Table 3 shows the means and standard deviations of attributes used to measure the Technology Compatibility factor. The results indicate the respondents' uncertainty of audit technology's compatibility with their audit procedures. They were not convinced that the respective technology will fit well with auditor's tasks in performing audit. If a technology does not fit with audit task requirements, auditors may not be able to successfully adopt the technology even if it is perceived as being useful (Goodhue and Thompson 1995; Rogers 2003).

Table 3: Technology Compatibility

	Attributes	Mean	Std Dev	F.L
TF1.	CAATTs are compatible with our firm's work procedures	3.58	.92	.90
TF2.	CAATTs will fit well with auditor's tasks in performing audit	3.82	.69	.84
TF3.	CAATTs are compatible with our firm's current ways of doing audit procedures	3.37	.94	.84
	Total	3.59	.75	

Cronbach's Alpha = 0.843

Means and standard deviations for attributes measuring Technology Complexity variable of this study are shown in Table 4. The total mean of audit technology complexity is less than 3.0 demonstrating that many respondents disagreed that using audit technology and learning to operate it are difficult. Nevertheless, the standard deviation for attribute "It is difficult for employees to use audit software/ CAATTs in auditing" and "Learning to operate audit software/ CAATTs is hard for employee" are higher than 1.0. These indicate that while some respondents considered using audit technology and learning to operate it are easy, others still perceived that implementing IT in auditing work is hard and prefer to audit manually. The variances may perhaps due to the level of IT

knowledge possessed by the respondents and their different personal experiences in using the technology. Auditors that are IT savvy or have experienced performing audit with the technology may find both using and learning audit technology are easier than those who have less familiarity with it (Venkatesh and Bala 2012). Besides, graphical user interface dissimilarity with the audit applications may also contribute to the different perceptions on technology complexity. Audit technologies that are not user-friendly and need many step-by-step procedures may burden the respondents to use the respective applications (Kim et al. 2009). The complicated feature would further restrict the auditors to learn and use the audit technology without any difficulty.

Table 4: Technology Complexity

	Attributes	Mean	Std Dev	F.L
C1.	CAATTs are difficult to understand	3.00	.90	.84
C2.	CAATTs are technically complex audit tools	3.16	.94	.77
C3.	It is difficult for employees to use CAATTs in auditing	2.82	1.11	.90
C4.	Using CAATTs requires a lot of mental effort	2.87	.99	.84
C5.	Learning to operate CAATTs is hard for employee	2.82	1.21	.91
	Total	2.93	.88	

Cronbach's Alpha = 0.905

All of the four Top Management Commitment attributes have mean scores close to 3.00 as indicated in Table 5. The results indicate that respondents were neither agree nor disagree about their firms' top management commitment in influencing audit technology adoption. Lack of support from top management might hinder the adoption of new technologies. As stressed in previous study, auditors would have a preference to use audit technology if audit firm's management encourages its usage (Curtis and Payne 2008). The results reveal that the auditors were unsure whether top management considers the audit technology adoption in the firm's competitive strategies. If the firm's management does not involve in the pre-adoption planning and support the adoption of audit technology, then the management would fail to give right direction and facilitate the communication that is necessary for their auditors in adopting it (Tornatzky and Fleischer 1990). Additionally, most of the responses indicate that the top management did not provide enough financial resources and unwilling to take any possible risk regarding audit technology adoption. All of these show that audit firms did not have strong supports from the top management in adopting audit technology.

Table 5: Top Management Commitment

	Attributes	Mean	Std Dev	F.L
T1.	Top management closely ties CAATTs with firm's competitive strategies	3.24	.94	.38
T2.	Top management is willing to take the risks involved in the adoption of CAATTs	3.26	.86	.86
T3.	Top management provides adequate financial resources for CAATTs implementation	3.32	.96	.96
T4.	Top management gives strong support for CAATTs usage in firm's operation	3.24	.91	.91
	Total	3.26	.72	

Cronbach's Alpha = 0.794

As showed in Table 6, all of the five attributes measuring Organization Readiness have high standard deviations (>1.0), indicating that while some respondents' firms were equipped to support the implementation of audit technologies, others found that they were not yet ready to adopt the technologies. The difference in perceptions may arise due to diverse resources available in each firm. Larger audit firms have more financial and human resources as compared to small and medium sized firms. The available supports in larger audit firms may permit them to be well prepared in adopting technological innovation (Janvrin et al. 2008). With financial resource, the firm can equip its organization with necessary IT sophistication, technological facility and internal environment to support technology adoption (Venkatesh and Bala 2012). The small and medium sized firms may be restricted in adopting advanced audit technology due to lack of existing resources (e.g. hardware, software and expertise), in which to provide the firms with such equipment would incur relatively higher costs.

Table 6: Organization Readiness

	Attributes	Mean	Std Dev	F.L
R1.	Our firm has financial resources to support CAATTs usage	3.58	1.11	.89
R2.	Our firm has IT resources to support CAATTs usage	3.24	1.13	.86
R3.	Our firm is willing to provide trainings on CAATTs for employees	3.71	1.01	.85
R4.	Our firm is ready to provide technical expertise to support CAATTs usage	3.39	1.03	.81
R5.	Our firm has IT facilities needed to implement CAATTs	3.37	1.13	.76
	Total	3.46	.90	

Cronbach's Alpha = 0.89

Means and standard deviations for attributes measuring human resource IT competency variable are shown in Table 7. Respondents had a divided response towards the IT capability of their firm's employees. While some firm's employees were good in dealing with audit technology, others found that their employees were lack of technology skills. Out of six attributes, five attributes have high standard deviations (>1.0). The result may possibly be moderated by the different size of the firms. The relevance of firm size as a critical moderator between employees IT skills and IT implementation has been found by previous study (Ifinedo and Nahar 2009). Big sized firms have more competent human resource especially experts in IT auditing, than medium or small firms (Bierstaker et al. 2001). Most of the respondents who were from small and medium sized audit firms were uncertain on how to use audit technology and interpret the generated results (mean score 3.32 and 3.29 respectively). This is possibly because not many of them have experienced performing audit task using audit technology.

Table 7: Human resource IT competency

	Attributes	Mean	Std Dev	F.L
EC1.	Our employees are IT literate	3.76	.91	.86
EC2.	Our employees' understanding of CAATTs are very good	3.27	1.07	.85
EC3.	Our firm has at least one employee who is CAATTs expert	3.26	1.25	.81
EC4.	Our employees know how to operate CAATTs	3.32	1.04	.88
EC5.	Our employees have experience with CAATTs	3.34	1.10	.90
EC6.	Our employees have sufficient knowledge to use the result produced by CAATTs	3.29	1.14	.90
	Total	3.36	.88	
	Cronbach's Alpha = 0.893			

Table 8 shows the ratings for attributes measuring the Complexity of Client's AIS variable. Results reveal that most of audit firms' clients accounting systems were not complex and the financial reporting systems were not highly computerized (total mean score of 3.48). This is possibly because most of the firms' clients are small and medium sized enterprises. These enterprises have accounting transaction volumes that are manageable to be audited manually and performed just by using basic auditing tools such as spreadsheets. On the other hand, bigger audit firms are likely engaged in auditing large companies with complex AIS, thus the audit firms need more advanced audit tools to help performing audit efficiently. This could be explained by the high standard deviation (>1.0) for attribute "Majority of our clients have complex financial reporting systems". The findings are consistent with Janvrin et al. (2008) that the complexity of client's IT affects the use of computer-related audit procedures. Auditors in smaller and medium audit firms use less computer assisted audit tools than Big 4 firms because they audit low IT clients.

Table 8: Client's AIS Complexity

	Attributes	Mean	Std Dev	F.L
CC1.	Majority of our clients have large accounting transaction volumes	3.63	.82	.89
CC2.	Majority of our clients have complex financial reporting systems	3.32	1.02	.81
CC4.	Most of our clients have highly computerized financial reporting systems	3.50	.98	.75
	Total	3.48	.77	
	Cronbach's Alpha = 0.751			

This study has found that audit firms were not experiencing intense competitive pressure in audit technology adoption although technology is recommended by preceding studies as a vital tool to support audit firms to be domestically and globally competitive (IFAC 2003; Salleh et al. 2007). As depicted in Table 9, the decision to implement technology in auditing was not influenced by audit firm's competitors (mean score= 2.87). Most of the respondents were unsure about the audit technology adoption among their competitors in audit environment and had doubtful perceptions of suffering competitive disadvantage if their firms did not adopt the technology (mean score close to 3.0). However, respondents were likely to agree that other audit firms have gained many benefits when they adopt audit technology.

Table 9: Competitive Pressure

	Attributes	Mean	Std Dev	F.L
CP1.	Our firm experienced competitive pressure to implement CAATTs	3.13	.99	.69
CP2.	Our firm would have experienced a competitive disadvantage if CAATTs had not been adopted	3.16	.97	.80
CP3.	Our main competitors that have adopted CAATTs have benefitted greatly	3.47	.86	.79
CP4.	Our firm's decision to implement CAATTs is affected by competitors in audit industry	2.87	.84	.74
	Total	3.16	.69	
	Cronbach's Alpha = 0.747			

Table 10 shows the Professional Accounting Bodies' Support attributes, means and standard deviations. This study reveals that many respondents to some extent agreed (mean score close to 4.0) with the statement "Auditing standards that are set up by professional bodies support audit software/ CAATTs usage". This can be explained by the fact that audit firms are regulated by professional accounting bodies, such as, the Malaysian Institute of Accountants (MIA), International Federation of Accountants (IFAC) and Information Systems Audit and Control Association (ISACA). The auditing standards that are issued by the professional bodies help to maintain the accounting and auditing professions' credibility, increase awareness on new emerging technologies and inform new accounting issues. As a member of the professional bodies, audit firms would follow the same norm of their professional group (DiMaggio and Powell 1983; Swan and Newell 1995). Similar result is observed in attributes "Professional accounting bodies highly recommend audit software/ CAATTs usage". The finding is consistent with earlier study (Mahzan et al. 2009) i.e. audit software that is recommended by professional body as one of the criteria in selecting audit software.

Table 10: Professional Accounting Bodies Support

	Attributes	Mean	Std Dev	F.L
PA1.	Professional accounting bodies support CAATTs usage	3.39	.92	.83
PA2.	Auditing standards that are set up by professional bodies support CAATTs usage	3.66	.82	.79
PA3.	Seminars/ workshops on CAATTs organized by professional accounting bodies are helpful	3.34	.94	.77
PA4.	Professional accounting bodies highly recommend CAATTs usage	3.66	.85	.66
PA5.	Professional accounting bodies provide incentives to implement CAATTs	3.08	.88	.53
	Total	3.41	.69	
	Cronbach's Alpha = 0.771			

Means and standard deviations for Vendor Services attributes are shown in Table 11. Many respondents were uncertain about vendor services in helping them adopting audit technology. They also had an ambiguous perception about consultation and advice given by vendor on audit technology benefits (mean score 3.32). This could be one of the reasons why adoption of audit technology is low among audit firms. The adoption could be hindered because audit firms' managers fail to notice the technology benefits that could help run their business process better. Thus, IT vendor should communicate the benefits of IT product through promotional seminars, marketing presentations, and on-site visits (Iacovou et al. 1995). By doing so, more audit firms will realize audit technology advantages, thus increase its adoption. Vendor should also give technical support services and trainings to firm's staffs (Tornatzky and Fleischer 1990). However in the case of audit technology adoption, the respondents were unclear about vendor services in giving adequate and quality trainings to staffs. This is supported by the moderate mean score of 3.47 and 3.34 respectively. All of these reflect that audit firms did not receive enough supports from audit technology vendors.

Table 11: Vendor Services

	Attributes	Mean	Std Dev	F.L
V1.	CAATTs vendor provides adequate technical support on CAATTs usage	3.58	.83	.77
V2.	CAATTs vendor gives excellent quality of technical support	3.42	.83	.95
V3.	CAATTs vendor provides adequate trainings to staffs in audit firm to implement CAATTs	3.47	.83	.95
V4.	CAATTs vendor provides excellent quality of trainings to firm's staffs	3.34	.82	.93
V5.	CAATTs vendor consults firm on CAATTs benefits	3.32	.85	.90
	Total	3.43	.78	
	Cronbach's Alpha = 0.937			

CONCLUSION AND RECOMMENDATION

In summary, this paper presents the extent of audit technologies adoption and perceptions on the technological, organizational and environmental factors that influence its adoption. Theoretically, the paper contributes to the existing technology adoption framework by adding two new factors (Client's AIS Complexity and Professional Accounting Body Support) to study the context of audit technology adoption in audit firms. The framework also proposed that firm size moderates the influence of employees' IT competency, firm's readiness and client's AIS complexity towards audit technology adoption. Although firm size may be obviously affect the adoption of technology due to limited resource, this relationship still need to be tested to know to what extent firm size has an effect. That is why we have segregated our data by the size of the firm (as shown in Table 1). Results discovered that the adoption of audit technology is focused on the less advanced applications. Most small audit firms use electronic spreadsheet applications to perform financial audit for their clients which are predominantly small enterprises with less complex financial systems. Small to medium sized audit firms with adequate financial

and human resources invest in generalized audit software, which is also adopted by large audit firms. Only medium to large audit firms which offer more audit assurance services such as internal auditing and IT auditing services utilize advanced audit techniques. These audit firms are likely auditing medium to large client organizations with high ERPs. Although the adoption of audit technology varies among audit firms, most of the firms acknowledged the benefits of technology in performing auditing efficiently, reducing audit mistakes and increasing audit productivity. Moreover, the audit practitioners did not find audit technology as a complex audit tool which is hard to comprehend and learn. Nevertheless, the auditors were unsure whether the technology would be appropriate and compatible with their existing audit practices. Pertaining to employees' skills and capabilities to implement audit technology in auditing, the current audit technology competencies of the auditors were relatively at low to average level. The study also found that audit firms' auditors only received a moderate level of supports from professional accounting bodies as well as the trainings and technical support services that they expect to get from audit technology vendors. The auditors also were unclear on getting strong supports from top management in which with full top management commitment would increase their readiness for the technology implementation.

To increase audit technology adoption among audit firms, the technological, organizational and environmental aspects that influence the adoption need to be improved. From the technological context, this study suggests that the audit tools should be designed to be user friendly and less complex so that it could be easily accepted in audit firms. The compatibility of the technology should be made clear with audit firms' existing systems and match with audit tasks that need to be accomplished. In the organizational context, top management should increase their commitment and readiness to provide trainings as well as infrastructure for audit technology adoption. With sufficient trainings and supports, employees' competency could be enhanced and audit technology could be successfully implemented (Mahzan and Lymer 2009). On top of that, audit technology should be taught as part of the tertiary education institution to instill awareness and expose accounting students with the knowledge. By doing so, the education system could prepare the future audit practitioners that are competent in audit technology usage. As in environmental aspects, vendor should provide quality technical support, on-going maintenance and trainings to audit firms' employees. This study also suggests that professional accounting bodies should tighten the requirements to use audit technology and give supports to encourage audit firms to increase its adoption.

LIMITATION AND FUTURE RESEARCH

This preliminary study only presents the audit technology adoption framework, together with descriptive statistics. The findings are limited to a small number of participants and therefore do not permit further inferential analysis. Hypotheses cannot be tested using the preliminary data nevertheless they will be tested through inferential statistical analysis in the final study. Future studies will be done with a wider population of audit firms to provide stronger empirical evidence. Structural Equation Modelling and Hierarchical Regressions Analysis will be conducted in the final study to investigate the relationship between the constructs, analyze the moderating effect of size and thus validate the framework.

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