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Perception towards the importance and knowledge of information technology among auditors in Malaysia

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This paper reports the results of a study that investigates the level of IT knowledge and also IT importance in the specific context of audit work in Malaysia. Results of this study is based on data collected from 95 audit firms via mailed questionnaires. The results suggested information systems audit in Malaysia is still at the infant stage. IT knowledge level among the auditors is lower than their perception towards the importance of the technologies. Twelve technologies are considered relevant in the context of audit work in Malaysia, while only 5 technologies are considered knowledgeable by the responding auditors. On average, General Office Automation receives the highest mean value for both importance and knowledge, whilst system development and installation receives the lowest mean value. Overall, responding auditors perceived their overall IT knowledge as adequate, while the current practice of information systems audit is less than adequate. Findings from this study are significant to the standards setters regulating the audit profession, academicians designing university courses and audit practitioners evaluating their own IT knowledge. The findings can be used to gauge the relevant IT in the specific context of audit work and also the IT knowledge level of the auditors not just in Malaysia but also other developing countries.

Keywords: Auditors, auditing, external auditing, information systems auditing, developing economies.

INTRODUCTION

Competence in information technology (IT) is crucial for the professional accountants due to its pervasive use in the business world (IFAC, 2001). Today, almost every aspect of the accounting profession is being pervasively affected by advances in IT (Elliot, 2002). The extent, mode and quality of IT adoption in most enterprises have become more sophisticated and complicated, hence introduces new challenges and risks to the professional accountants (Scapens and Jazayeri, 2003).

The integrated nature of Enterprise Resource Planning System (ERPS), for example, has not only changed the traditional role of accountants (Scapens and Jazayeri, 2003; Caglio, 2003) but has substantial impact on the internal controls of the adopting companies (Sayana, 2004). Undoubtedly, in the light of large scale business failure such as Enron, MCI-WorldCom and Parmalat, one of the most critical roles is auditing. To be effective, auditors need to embed technology in everything they do

during the audit process, similar to the practices of their clients (Winograd et al., 2000; Janvrin et al., 2008).

The increasing dependence of businesses on computerized information systems such as ERPS and e-business requires external auditors to evaluate the reliability of computer generated data supporting financial statements and analyze specific programs and their outcomes (Abu-Musa, 2004). This is important as audit judgment influences the quality and effectiveness of audit (Bonner, 1999), while decisions tools may influence audit judgment (Janvrin et al., 2008). Hence, to effectively audit on-line systems, auditors need to incorporate on-line audit software as their primary audit tool and gather evidence electronically (Bierstaker et al., 2001).

Auditors will no longer able to perform audit around the computer but to use new technology to gain audit efficiency and effectiveness. In addition, IT auditors need to examine the adequacy of controls in information systems and related operations to ensure systems effectiveness (Zhao and Yen, 2004). Therefore, auditors would normally be expected to have higher level of IT knowledge and skills than the average accountants since

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they must audit the work of many different clients with diverse information systems (Greenstein-Prosch et al., 2005).

Despite auditors' IT knowledge is required by the professional standards, comprehensive reviews of audit literature indicate that very few studies have examined the use and perceive importance of IT among the auditors (Janvrin et al., 2008) especially those in developing economies like Malaysia. The possible reason is that companies in most developing countries use less complicated IT systems (Sangaran, 2001), thus IT audit is viewed as less relevant by auditors in those countries. Even results from prior research studies of external auditors in the Western countries like Norway, German and United States (e.g. McKee, 2000; Greenstein-Prosch and McKee, 2004; Greenstein-Prosch et al., 2005) indicated a relatively low level of IT knowledge.

McKee's (2000) study was the earliest that investigated IT knowledge among auditors in Norway. Extending McKee's (2000) study, Greenstein-Prosch and McKee (2004) investigated appropriate ITs for auditing professors and audit practitioners and their self-perceived knowledge of these technologies. In another study, Greenstein-Prosch et al. (2005) compared the level of IT knowledge among auditors in Germany and United States. More recently, Janvrin et al. (2008) examined perceived importance and use of IT audit across a diverse group of audit firms in the United States and found extensive use of variety of audit applications among the auditors.

Applying the theory of task-technology fit (Goodhue and Thompson, 1995), this study extends Greenstein-Prosch et al. (2005) and Janvrin et al.'s studies by exploring not only the level of IT knowledge but also the auditors' perception toward the importance of the technologies. More specifically, this study attempts to achieve three objectives: first, to examine the knowledge level of IT audit applications; second, to examine the auditors' perception toward the importance of the technologies and finally, to examine the fit between knowledge possessed by auditors and the relevance of IT audit applications in the context of auditors' work in Malaysia.

Finding from this study is important as it would extend the existing literature on auditors' ITs knowledge levels. In addition to the auditors' knowledge level, this study would identify the auditors' perception towards the importance of recent ITs in their audit works in the specific context of Malaysia. This is important as IT sophistication levels are different in different countries.

Therefore, findings from studies in advanced countries might not be applicable in the context of developing economies like Malaysia. For example, Sangaran (2001) found the sophistication of IT adoption among businesses in Malaysia is still lagging of those in developed countries. Therefore, it is expected that the level of IT audit practices is also lower in Malaysia compared to those

countries. This argument is in tandem with the task-technology fit theory which postulates that IT is more likely to have a positive impact on individual performance and be used if the capabilities of the IT match the task that the user must perform (Goodhue and Thompson, 1995).

The remainder of the paper is organized as follows. The next section reviews literature relating to the impact of IT on the accounting and audit profession. Next, the paper discusses the methodology and presents the results of the study. Finally, the paper provides a brief conclusion of the study, discusses its limitations and offers important implications for future research.

Literature review

The IFAC Education Committee (2001) has stated that "information technology is pervasive in the world of business. Competence with this technology is imperative for the professional accountant" (p. 6). Chang and Hwang (2003), however, questioned whether professional accountants including auditors are competence in IT. They argued that "given the dynamic nature of IT and its widespread adoption in business organizations, many in the accounting profession have voiced concerns over whether college education and professional training effectively and efficiently prepare accountants to meet these challenges" (p. 441). Their concern is supported by Chen's (2005) study which revealed that accountants in Taiwan, on average, are proficient with the general computer and the professional accounting software skills. Despite this encouraging result, Chen (2005) argued that accountants' capability in performing managerial, advisory and evaluative roles of IT deployment is still an issue of great concern. These arguments raised the issue of the perceived value of various IT knowledge and skills by audit practitioners (Greenstein-Prosch and McKee, 2004; Hall, 2004).

According to IFAC (2001), the accounting profession performs many roles where IT is used. First, as user of information systems, accountants must be able to clearly convey their needs to the IT professionals who design the system. Being information-oriented professionals, accountants should actively participate in systems development projects to ensure appropriate systems design. Second, as designer of information systems, accountants are responsible for the conceptual system which determines the nature of the information required, its sources, its destination and the accounting rules that must be applied. Third, as manager of information systems, accountants must be able to perform appropriate analyses of IT investments, understand IT related benefits and risks and stimulate and manage organizational change. Finally, as auditor of information systems, the role of accountants encompasses the function of internal audit, external audit and other evaluative roles. Greenstein-

Prosch et al. (2005) suggested that "IT knowledge requirements for independent auditors are higher than average accountant since they typically serve a wide variety of clients" (p. 4).

The rapid growth of technology and the use of computers in business result in more IT auditing and internal control standards and guidelines to assist auditors in their roles and responsibilities. IT audit can be defined as the process of collecting and evaluating evidence to determine whether a computer system has been designed to maintain data integrity, safeguard assets, allows organizational goals to be achieved effectively and uses resources efficiently (Yang and Guan, 2004).

Several organizations such as the American Institute of Certified Public Accountants (AICPA), the Information Systems Audit and Control Association (ISACA) and the IFAC have issued standards in this area to be observed by their members in performing an IT audit. SISA 040: Competence issued by ISACA (1997), for example, requires information systems auditor to be technically competent, having the skills and knowledge necessary to perform the auditor's work. It also requires that the auditor maintains technical competence through appropriate continuing professional education.

The AICPA, in addition to issuing several standards for IT-related auditing, also publishes Top 10 Technologies list annually to build member awareness about important and emerging technologies that will contribute to the profession. Auditor knowledge levels are clearly specified in the International Standard on Auditing (ISA) 401, paragraph 4, (IFAC, 1999) which states that the auditors should have sufficient knowledge of the computer information system (CIS) to plan, direct, supervise and review the work performed.

Auditors need, among others, obtain sufficient understanding of the accounting and internal control systems affected by the CIS environment; determine the effect of the CIS environment on the assessment of overall risk and of risk at the account balance and class of transaction level; design and perform appropriate tests of control and substantive procedures and if specialized skills are needed, the auditor would seek the assistance of a professional possessing such skills, who may either on the auditor's staff or an outside professional. If the use of such a professional is planned, the auditor should obtain sufficient appropriate audit evidence that such work is adequate for the purposes of the audit, in accordance with ISA "Using the Work of an Expert". In the Malaysian context, the same standard applies since the Malaysian Institute of Accountants (MIA) has determined to adopt the ISA as the basis for approved standards on auditing.

Reviews of literature indicated that several studies have attempted to investigate the gap between the desired and the actual level of IT knowledge among auditors. Lymer and Debreceny (2003), for example, discussed issues about the role of auditors in providing

assurance on corporate reporting via the Internet. They find gaps between IT utilization and professional responses and conclude that, "...the actual pronouncements made thus far by the various bodies around the world fall considerably short as a response to the challenges that arise from current and future Internet reporting technologies" (p. 103). Chen, Tseng and Chang (2005) found that only half of the accounting firms in Taiwan used the Internet in business-related activities. They argued that, if the firms do not implement the internet, while the firms' clients have transmitted their data through Internet to the firm, then the auditors' ability to assist clients in enhancing added value is questionable.

McKee's (2000) study is probably the earliest that investigate IT knowledge among auditors when he surveyed Norwegian practicing auditing profession during the late 1998 and early 1999. Major findings from this survey include: a large number of professionals indicated either no knowledge or relatively low levels of knowledge for the 25 technologies surveyed; 71% of the respondents believed they had received less than adequate coverage of ITs in their college or university careers; 17.3% of the respondents self-rated their overall knowledge of IT as either low or very low and "Big 5" audit firm respondents self-rated their overall knowledge of IT higher than did other respondents.

Greenstein-Prosch and McKee (2004) extended McKee's (2000) study by investigating appropriate ITs for auditing professors and audit practitioners and their self-perceived knowledge of these technologies. The study found a relatively low level of knowledge for e-commerce and advanced technologies and audit automation by both educators and practitioners. The study, however, found a relatively high level of knowledge for office automation and accounting firm office automation constructs.

Greenstein-Prosch et al. (2005) conducted a survey similar to McKee (2000) and Greenstein-Prosch and McKee (2004) but among the German and United States auditors during 2000 - 2001. Their study revealed a relatively low level of knowledge for the general constructs of e-commerce, systems design and implementation and audit automation technologies for both German and US auditors. The knowledge of German auditors were found to be higher for e-commerce technologies than US auditors, while the knowledge of US auditors were found to be higher for systems design and implementation and office automation technologies than German auditors. Importantly, the study revealed that more than one-fourth of the respondents in both countries rated their overall IT knowledge as "less than adequate".

Interestingly, results from a more recent study by Janvrin et al. (2008) revealed that auditors in the United States extensively use a variety of audit applications such as analytical procedures and electronic working papers. However, while auditors perceive several sophisticated audit applications as important, they use them infrequently.

The above discussions suggest that the audit profession is having a problem adjusting to the rapidly changing technology landscape. Thus, it is interesting to investigate whether the level of IT knowledge and usage among auditors found in the Western countries is also applicable here. The auditing profession in Malaysia and other developing countries with similar characteristics can benefit by identifying relevant technologies and conducting self-assessment to learn how knowledgeable its members are about these technologies.

METHODS

A questionnaire survey was undertaken to gather data relating to this research. However, prior to the actual survey, the questionnaire was pre-tested with 10 audit and accounting information systems lecturers and 10 practicing auditors. The main purpose of the test is to achieve more clarification regarding the wording of both questionnaire instructions and questions (Oppenheim, 1992).

A total of 100 firms were then randomly selected for the pilot survey. A total of 9 questionnaires were returned after duration of about one month. This represents a response rate of 9% since no reminders had been issued, this return rate was considered sufficient to continue with the main survey. However, no alterations were made to the questionnaire since the overall impression from the answers given by the 9 respondents was that the questionnaire was satisfactory.

The questionnaires were finally delivered to the partner of 1110 audit firms listed in Malaysia Institute of Accountants (MIA) Member Firms Directory during October to December 2007. Of the 1110 questionnaires distributed, 20 were returned unopened, stamped on the envelope 'addressee has moved' or 'ceased operation'. Following Churchill's (1999) suggestions, these 20 questionnaires were excluded from the calculation of the response rate.

After duration of about three months and two reminders including random phone calls, 95 usable questionnaires were returned, representing about 8.7% response rate. While the percentage is considered low which would affect generalization of the findings, it is still reasonable in the context of Malaysia. According to PricewaterhouseCoopers (2002), the average response rate to postal surveys in Malaysia is about 16% and much less for audit firms. For example, Md Salleh et al. (2002) study on the state of IT consulting services among audit firms in Malaysia received quite a response rate of 9%.

Definition and categories of IT

The IFAC defines IT as: "...hardware and software products, information systems operations and management processes, and the human resources and skills required to apply those products and processes to the tasks of information production and information systems development, management and control" (IFAC, 2001, p. 9). McKee (2000) argued that the definition is too broad as it includes "human resources and skills" in addition to "hardware and software" products (McKee, 2000). Chang and Hwang (2003) also raised about the difficulty in assembling a complete list of IT topics that are important to accounting professionals due to the dynamic nature and broad spectrum of IT.

Following McKee (2000), Greenstein-Prosch and McKee (2004), Greenstein-Prosch et al. (2005) and Janvrin et al. (2008) this study narrows the IT definition by focusing only on the hardware and software products. The instrument for this study is adapted from prior researches such as Greenstein-Prosch et al. (2005) and Janvrin et al. (2008). In addition, a literature search which includes

the latest IFAC and AICPA publications was also carried out to ensure that all latest technologies relevant to accountants are included in the questionnaire. The original lists comprise of 40 technologies but reduced to 35 technologies after it was pre-tested with academicians and practitioners. These 35 technologies were grouped into five categories: general office automation, accounting firm office automation, audit automation, e-commerce technologies and system design and implementation.

DEMOGRAPHIC RESULTS

Table 1 indicates that about 91% of the respondents are working with the national or local audit firms, while the remaining 9% are working with the big-four firms. Seventy-three percent of firms are located in the central region. The results in Table 2 shows that only 16% of the responding firms provide information systems audit and assurance services, while Table 3 indicates that only 21% use generalized audit software. Similar to the results of prior studies conducted in developed countries such as McKee (2000), Greenstein and McKee (2004), Greenstein et al. (2005) and Janvrin et al. (2008), results of this study also suggest that information system audit among audit firms in Malaysia is still at the minimum level.

The results in Table 4 exhibit the profile of respondents. While the questionnaires were originally addressed to the firms' partners, only 55% of the respondents are partners. When asked their age range, about 82% of the respondents stated that they are in the category of 30 years old and above. The respondents were also asked to indicate the audit experience. Results show that the respondents' experience ranges from 1 to 37 years, with a mean experience level of 14 years. The demographic data suggest that the responding auditors are quite experienced in their career, thus are able to give meaningful answers to the questions.

Importance and knowledge of information technology

To identify relevant IT in the context of audit work in Malaysia, the first part of the questionnaire asked respondents to rank their perception toward the importance of 35 technologies in the context of their audit work on a 1 to 4 scale, where 1 = not important and 4 = very important. The questionnaire then asked respondents to rank their own knowledge of the same 35 technologies on a 1 to 4 scale, where 1 = very little knowledge and 4 = expert knowledge. The mean value of the responses for each category of the 35 technologies is shown in Table 5 below.

The results in Table 5 show that the mean value of the perception of the importance of technology items ranges from 2.01 to 3.84. Twelve technologies received a mean value of 3.00 and above, thus can be considered as relevant in the context of audit work in Malaysia. The technologies are word-processing, electronic spreadsheet, email, electronic search and retrieval, electronic working papers, small business accounting software, tax

Table 1. Category of Firms.

Category	Frequency	Percent
Big four and its affiliates	9	9.5
Non big four	86	90.5
Total	95	100

Table 2. Services provided.

Services	Frequency	Percent
Audit	95	100
Tax advisory	81	86.3
Business advisory	52	54.7
Financial advisory	45	47.4
Information systems audit and assurance	15	15.8
Others	18	18.9

Table 3. Types of technology used.

Technology	Frequency	Percent
Accounting-based application	86	90.5
Office support system	84	88.4
Local area network	78	82.1
Decision support system	75	78.9
Database system	54	56.8
Generalized audit software	20	21.1
External network	52	54.7

Table 4. Profile of respondents.

Position	Frequency	Percent
Partner	51	55.4
Audit manager	14	15.2
Senior auditor	19	9.8
Auditor	16	17.4
Audit trainee	2	2.2
Total	94	100

Age range	Frequency	Percent
20–29	17	18.3
30–39	36	38.7
40–49	23	24.7
50 and above	17	18.3
Total	93	100

Location	Frequency	Percent
Central region	69	73.4
Southern region	16	17.0
Northern region	8	8.5
Eastern region	1	1.1
Total	94	100

return preparation software, time management and billing

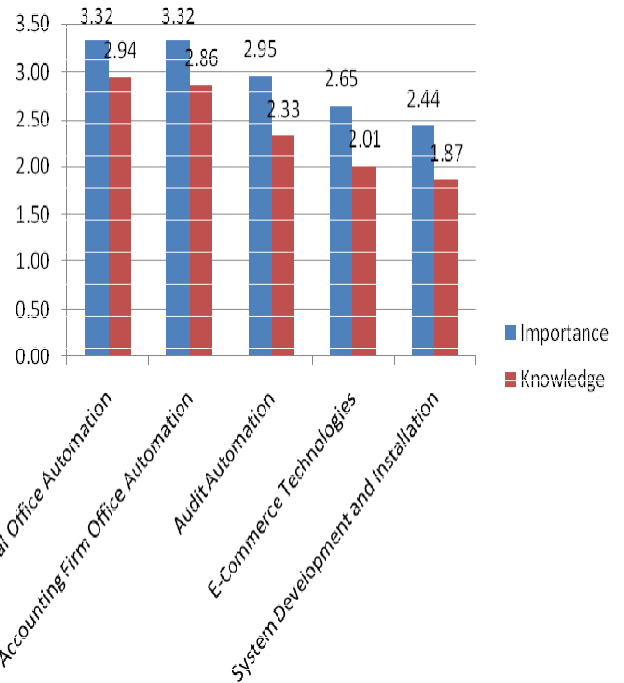


Figure 1. Average mean value of importance and knowledge for each category of technologies.

systems, image processing, generalized audit software, firewall hardware/software and external network configurations.

In terms of knowledge, the results in Table 5 show the mean value for the self-perceived IT knowledge items ranges from 1.35 to 3.49, which is lower than the mean value range for their perception towards the importance of IT (2.01 to 3.84). This suggests that the responding auditors perceived their IT knowledge are less than what they perceived as important in their audit work. Only five technologies received a mean value of 3.00 and above, thus can be considered as knowledgeable by the responding auditors. The technologies are word-processing, email, electronic spreadsheet, electronic search and retrieval and small business accounting software.

Figure 1 below summarizes the average mean value for each category of technologies. General Office Automation receives the highest mean value for both importance and knowledge of technology, whilst system development and installation receives the lowest mean value for both importance and knowledge of technology.

The alignment between IT importance and IT knowledge

The previous discussion explored IT importance and IT knowledge without employing a specific analytical scheme of measuring alignment. This section describes the matching approach for measuring AIS alignment. According to Venkatraman (1989), one of the analytical

Table 5. Mean ratings and rankings of importance and knowledge of IT.

Category/Technology	Importance		Knowledge		Matching
	Mean	Rank	Mean	Rank	Mean
General office automation:					
Word processing	3.84	1	3.49	1	0.35
Electronic spreadsheets	3.75	2	3.29	3	0.46
E-Mail	3.66	3	3.46	2	0.46
Internet search and retrieval	3.55	4	3.26	4	0.22
Image processing	3.05	9	2.68	8	0.77
Electronic presentations	2.84	16	2.49	9	0.58
Groupware	2.58	24	1.93	24	0.71
Accounting firm office automation:					
Small business accounting software	3.47	6	3.17	5	0.49
Tax return preparation software	3.41	7	2.93	7	0.54
Time management and billing systems	3.08	8	2.49	9	0.86
Audit Automation:					
Electronic Working Papers	3.52	5	2.98	6	0.34
Generalized Audit Software	3.05	9	2.42	11	0.78
Embedded Audit Modules/Real-time audit modules	2.64	21	1.95	22	0.43
Expert systems	2.59	23	1.96	21	0.63
E-Commerce Technologies:					
Firewall software/hardware	3.02	11	2.31	14	0.74
External network configurations	3.00	12	2.41	12	0.78
User authentication systems	2.98	13	2.21	16	0.62
Internal network configurations	2.87	14	2.18	18	0.64
Intrusion detection and monitoring	2.86	15	1.95	22	0.64
Wireless communications	2.76	17	2.36	13	0.66
Digital communications	2.74	18	2.24	15	0.74
Encryption software	2.39	28	1.68	32	0.84
EDI-traditional	2.33	30	1.82	27	0.82
Agent technologies	2.14	33	1.59	33	0.73
EDI-web based	2.01	35	1.35	35	0.64
Systems Design and Implementation:					
Cooperative client/server environment	2.74	18	2.21	16	0.68
Test data	2.73	20	2.05	19	0.75
Database search and retrieval	2.62	22	2.05	19	0.62
Flowcharting/data modeling	2.44	25	1.90	25	0.69
Enterprise resource planning	2.43	26	1.77	30	0.58
Simulation software	2.41	27	1.73	31	0.66
Workflow technology	2.34	29	1.86	26	0.82
Database design and installation	2.31	31	1.79	29	0.95
Application service providers	2.30	32	1.80	28	0.76
Case tools	2.09	34	1.49	34	0.80

schemes that can be used for the matching perspective is the deviation score analysis. This method is based on a premise that the absolute difference between the stan-

dardized scores of two variables indicates a lack of fit.

For the purpose of this study, the deviation score analysis is adopted and the measure of alignment is compu-

ted as the absolute difference between the rating for IT importance and the rating for IT knowledge. A low value for the difference indicates that the alignment between the two variables is high, while a high value for the difference implies that there is a high degree of misalignment. The mean difference for each type of technology is calculated by summing up the absolute difference for all responses and divided by the number of responses. A mathematical representation of the above is as follow:

$$\text{Mean Difference} = \frac{\sum \text{ABS (IT importance rating - IT knowledge rating)}}{N}$$

The results for all 35 technologies are presented in column 6 Table 5. A low mean indicates that there is a high degree of alignment between the paired IT importance-IT knowledge items. From Table 5, it appears that Internet search and retrieval, electronic working papers, word-processing, embedded audit modules/real-time audit modules, electronic spreadsheets, email and small business accounting software are most aligned with IT knowledge for the responding auditors. The greatest mismatch is observed for more advanced technologies such as database design and installation, time management and billing systems, encryption software, EDI-traditional, workflow technology and CASE tools.

Finally, the respondents were asked to rate, based on a five-point scale, their current overall knowledge of IT and their perception toward current practice of information systems audit in Malaysia. The results indicate that the responding auditors perceived their overall IT knowledge as adequate (mean = 3.04), while the current practice of information systems audit is less than adequate (mean = 2.74).

Conclusions, Limitations and Future Research

This study aims to achieve three objectives. The first objective is to identify relevant technologies from the perspective of external auditors in Malaysia. Twelve technologies are rated as important by the responding auditors, thus considered relevant in the specific context of audit work in Malaysia. It is interesting to note that while only 21% of the participating firms use generalised audit software and only 16% provide information systems audit and assurance services, the responding auditors perceived generalized audit software knowledge as important in their audit work. Twenty-three technologies perceived as less important and thus considered less relevant by the responding auditors are more advanced technologies.

The second objective is to identify the level of IT knowledge among the Malaysian external auditors. The responding auditors considered themselves as having good knowledge of 5 technologies, little knowledge on 15 technologies and very little knowledge on the remaining 15 technologies. The technologies that responding audi-

tors are good at are in the category of General Office Automation and Accounting Firm Office Automation. Most auditors considered themselves as having poor knowledge of more sophisticated technologies especially technologies in the E-Commerce and Systems Design and Installation categories.

The less complicated information systems adopted by Malaysian companies and thus less demand for external auditors to acquire the knowledge might also explain the finding. However, considering that many companies are moving toward digital transactions, lack of auditors' knowledge on audit automation and e-commerce technologies such as encryption software, intrusion detection and monitoring and embedded audit modules and real-time audit modules skills may affect the reliability of audit works. Despite this, it is interesting to note that the low level of advanced technologies' knowledge among the responding Malaysian auditors is consistent with those found in other studies like McKee (2000), Greenstein and McKee (2004), Greenstein et al. (2005) and Janvrin et al. (2008).

The third objective is to examine the fit between IT importance and IT knowledge among the Malaysian external auditors. A comparison between the mean value of the perceived importance of technologies and their respective knowledge indicate that IT knowledge items always received a lower mean rating than the IT importance items. The findings suggest a lack of alignment between what the responding auditors perceived as important and their knowledge of the technologies.

To further explain the findings, a matching technique was used to examine the alignment between the importance of ITs and the actual levels of knowledge possessed by the responding auditors regarding these technologies. With the exception of embedded audit modules and real-time audit modules, the results suggest that the most aligned technologies are common technologies like Internet, email, electronic working papers, word-processing, spreadsheets and small business accounting software.

The greatest mismatch between ITs importance and knowledge items among the responding auditors are observed for more advanced technologies like database design and installation, encryption software, EDI-traditional, workflow technology and CASE tools. It can be concluded from the findings that while more advanced technologies are deemed as less important in the context of audit work in Malaysia by the responding auditors, their knowledge regarding the technologies is much less.

In a nutshell, an important contribution of this study is that the findings would initiate discussion, debate and action that will lead to positive changes in the Malaysian auditing profession and other developing countries as they move forward in today's technology-intensified environment. It is hoped that the survey results will help not only the practitioner but also academicians to focus on the development on necessary IT skills of accounting

graduates. Considering the effort of Malaysian government to speed up the development of the country's IT infrastructure, it is also expected that Malaysian companies would also adopt more sophisticated information systems especially among large companies. Therefore, Malaysian Institute of Accountants (MIA) must introduce a policy which requires auditors to possess a minimum set of knowledge and skills to audit computerized accounting systems.

As is common with all types of research, this study has few limitations that may limit the validity of its results. One possible limitation of survey research is non-response bias, especially one with low response rate such as this study. This occurs when the perception of persons not responding to the questionnaire are significantly different from those individuals who responded (Greenstein-Porsch and McKee, 2004). Since a comparison between respondents and non-respondents is not possible, the alternative solution is to compare early versus late respondents (Lindner et al., 2001).

In this case, t-test is conducted comparing early (first 30 respondents) versus late respondents (last 30 respondents) for each of the 35 technologies for both IT importance and IT knowledge. The results indicate that only 3 of the 70 items had response differences that were statistically significant at the 0.05 level. The nonresponse bias for this survey can be considered mild and not to be significantly affect the results of the survey (Ismail and King, 2005).

Second, the 35 technologies examined in this research were mostly adopted from previous studies. Therefore, some equally significant technologies may have been inadvertently overlooked in the literature and thus are not included in this research. Finally, it is important to note about the respondents' self-reported views about their perception toward ITs. They may hold incorrect views about their perception of the importance and knowledge of these technologies, hence their actual knowledge may be higher or lower than what was reported.

Furthermore, future research could examine how audit complexity and decision-making activities impact the use of IT audit applications. Despite these limitations, this study is the first that provides important insights about auditors' perception toward the level of importance and knowledge of IT in the specific context of audit work in Malaysia. The findings of this study could also benefit and can be used as a benchmark by audit and accounting profession in other developing countries especially those with similar IT development.

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