



# Technology in audit engagements: a case study

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## Abstract

**Purpose** – The audit of corporations is now dependent on the examination of corporate computer systems. Although tools and techniques have been available for decades, there are major limitations on the audits of corporate systems by external auditors. This paper aims to examine external auditor usage of technology benefiting from a unique opportunity of reviewing a large CPA firm's audit work papers and interviewing their audit staff to examine the following questions: are auditors using the available technological tools? What are the difficulties they face in using these tools? Are there mediators to enhance usability? Why and what circumstances surround their absence?

**Design/methodology/approach** – The authors use a cross-sectional, case-based field study comparing four engagements in a major audit firm.

**Findings** – This paper concludes that the characteristics of the audit team largely determine the levels of technology utilization. Furthermore, the integration of technology support teams and auditors may improve usability, and, consequently, increase technology adoption.

**Research limitations/implications** – The paper includes information about four audit engagements. Given that audit firms have different cultures, practices and employee competencies, and hence emphasize the use of technology to varying degrees, it would be desirable to expand this study to reflect these variations.

**Practical implications** – The paper presents a discussion of the reasons why auditors do not fully use technology and provide tools to increase its usability.

**Originality/value** – The paper benefits from a unique opportunity of interviewing audit teams of a large firm, as well as through reviewing their work papers.

**Keywords** Audit technology, Audit tools, Usability audit

**Paper type** Research paper

## 1. Introduction

The increasing sophistication of technology as well as the progressive digitization of business have fundamentally altered the manner in which external audits are conducted. Ubiquitous use of accounting information systems has made it necessary for audit firms to enhance individual technical and analytical skill sets and to develop specialized teams capable of evaluating the effectiveness of computer systems during engagements. Shaikh (2005) discusses how auditors can use modern technologies to audit machine-readable transactions. Julisch *et al.* (2011) highlight the risks

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## JEL classification – M4

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of new technologies. They discuss how IT architects can build more auditable applications. Dowling (2009) looks at factors that determine the appropriate usage of technological tools, and Dowling and Leech (2007) compare audit support systems used in five large audit firms.

This paper, on the other hand, focuses on auditor tool utilization as well as the determinants of this usage. These questions are explored through a cross-sectional, case-based field study comparing four audit engagements. The following four sections address conditions that favor usage of technology, methodology, characteristics of the different teams interviewed, findings, and finally the conclusions and limitations of the study.

## 2. Conditions that favor usage of technology

This section examines the conditions that favor technology usage first by looking at the sociological work environment and second, by discussing operational variables. Then, by conducting interviews with audit teams, we examine the extent of usage of available technological tools. Further analysis leads to suggestions concerning tools to improve the levels of usage.

### *Sociological work environment and management attitudes and beliefs*

There are various theories that may explain the factors that determine usage of technology. For example, March (1962) defines the firm as a political coalition in which decisions are made through conflict resolution. Hence, the question of technology acceptance is a political issue, whereby interests of different groups are involved. In this context, a new tool is accepted when the conflict is resolved and the difference between the demand from the coalition and the returns from its environment are maximized. Other factors relative to decision aids that affect adoption concern personal feelings and beliefs. Many times users do not rely on decision aids even when doing so would improve the quality of the decision (Eining *et al.*, 1997). For a technological tool to be adopted, the audit manager must believe that it will provide some advantage and subsequently negotiate for its adoption. However, auditors are often overconfident about their own judgmental skills, and consequently believe that these tools are not essential. In that case, they will adopt the tools only if they confirm their previous judgment (Ashton, 1990).

Karahanna *et al.* (1999) present the following key parts in the innovation-decision process:

- Innovation's perceived attributes.
- Individual's attitude and beliefs.
- Communications received by the individual from his/her social environment about the innovation (subjective norm). These norms are determined by the individual's beliefs about what their peers expect from them.

When audit managers do not have the required knowledge about a new tool and do not perceive its benefits, substantive pressure by peers or supervisors will be needed for the tool to be adopted. Dowling (2009) surveys 569 auditors of large and medium sized audit firms, and finds evidence that the intent to adopt a system increases its actual appropriate use. She also finds that perceived normative pressure and auditor's attitude also influence appropriate auditor's system usage. However, lack of

knowledge about the tool might convince the auditor that s/he should rely on other evidence (Arnold and Sutton, 1998).

Arnold and Sutton (1998) express concerns that the continued use of an intelligent decision aids might reduce auditors' decision-making skills. They propose that a decision aid should become an electronic colleague, so that while individuals do not make decisions only by using the aid, the tool maintains a dialogue that continuously helps the decision-maker arrive at a final judgment. Karahanna *et al.* (1999) suggest that the:

[...] attitude toward adopting (or continuing to use) an IT tool is generated by the individual's salient beliefs about the consequences of adopting (continuing to use) the tool (behavioral beliefs) and evaluation of these consequences.

Management attitude was also found to influence the auditor's appropriate use of a system (Dowling, 2009). Hence, if audit managers are not technology adopters, their beliefs and attitudes as well as their perceptions regarding the attributes of the tool might prevent them from considering it as an electronic colleague. Given the importance of an open attitude towards adopting new audit tools, and given the fact that most auditors might not be technology adopters, it is necessary to find a mediator between the tool and the audit team to provide the necessary advice, feedback and dialogue.

#### *Operational issues of cost, quality and time*

Other factors that affect the usability of any tool are those related to project management. These factors are known as the Iron Triangle and consist of cost, quality and time (Oisen, 1971). In addition, Klomglan and Walter Coward (1970) suggest that while sociological variables may be more important in explaining mental acceptance of innovations, economic variables may actually be more critical in justifying their use. In general, no tool will be adopted if auditors perceive the costs to outweigh the benefits. In this stage, a mediator may effectively reduce the cost of adoption by helping managers to master the tools more readily, and, therefore, increase the likelihood of adoption. Consequently, our research questions follow:

*RQ1.* Do audit teams use the available technology tools?

*RQ2.* What are the difficulties they find in their usage?

Finally, if the technological aid is not useful, we expect it to be discarded after being tried. Alternatively, if the tool is expected to be useful but it is not tried, there might be factors that could be used to assist with adoption or at least facilitate trial. Previous research has studied the existence and effectiveness of mediators on improving usability. For example, in the computer science domain, graphical user interphases (GUI) use icons to facilitate the usage of software. Brajnik and Cancilia (2006) study the effect on disabled users of text transcoders that convert web pages into text only versions. Stanney and Salvendy (1995) develop an interface to compensate for the difficulties of low spatial individuals to build a mental model of menu system's structures. McGill and Beatty (1992) discuss the task of facilitators in learning. They define action learning as a process of learning and reflection supported by colleagues, with the intention of getting things done. This collaboration of tools or coaches might help in the understanding and adoption of technology. Hence, our third research question is stated as follows:

*RQ3.* How can we integrate mediators into the audit teams to facilitate usability?

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### 3. Methodology

This study conducts a cross-sectional, case-based field study[1], [2] comparing four audit engagements in a large audit firm. A partner and a senior manager of the aforementioned firm helped to prepare the case study. They helped to identify four audit engagements with different characteristics, to study the relationships among teams, and with issues concerning the adoption of technology. The manager also attended the interviews and facilitated communication with the interviewees. The audit firm has audit tools available but their use is not required. This leads to full adoption of sophisticated software including continuous monitoring by some audit teams, while others conduct traditional audits with the help of Microsoft Office (basically Excel and Word), and less sophisticated audit tools[3]. The case study is both descriptive and exploratory. It first describes the state of technology adoption by these four audit teams. Second, it explores variables that affect technology adoption such as team characteristics, collaboration and training, as well as issues relative to software usage and client data access. Because computer usage is currently ubiquitous, and auditors use computers on a regular basis, it is possible that the influence of these determinants on auditors has changed from what was reported previously in the literature.

Yin (2003) defines a case study as an empirical enquiry to investigate facts in its context, and states that the case study's unique strength is its ability to deal with a variety of evidence (documents, artifacts, interviews and observations), and to detect missing constructs. An exploratory study utilizes a method that supports the building and development of theory as opposed to methods directed at testing theories (Arnold, 2006; Rom and Rohde, 2007). Lillis and Mundy (2005) try to close the gap between case studies and surveys by pointing out advantages of cross-sectional field studies. Consequently, it is reasonable to use a cross-sectional study with four different audit engagements to compare differences in adoption of technology among teams. The professional environment of today's large firms makes this level of access very unusual due to professional liability considerations.

Although interviews were the primary source of information, information from several documents, including working papers, was also collected. The audit teams interviewed ten interviewees, selected from a pool specified a priori by one of the firm's partners. They included auditors and managers of the IT and forensic support groups. In order to identify potential industry specific adoption difficulties and enablers, large engagements in different industries were selected. The interviews were conducted by two researchers via face-to-face sessions when possible, or conference calls. The general questions focused on determinants of technology adoption and group relationships. A semi-structured interview approach was used, starting with a set of questions that was extended according to the circumstances. To optimize information capture, the interviews were recorded and then transcribed. Previous to the interviews, three pilot interviews were conducted with doctoral students who had worked as auditors before joining the program.

### 4. Characteristics of the different teams interviewed

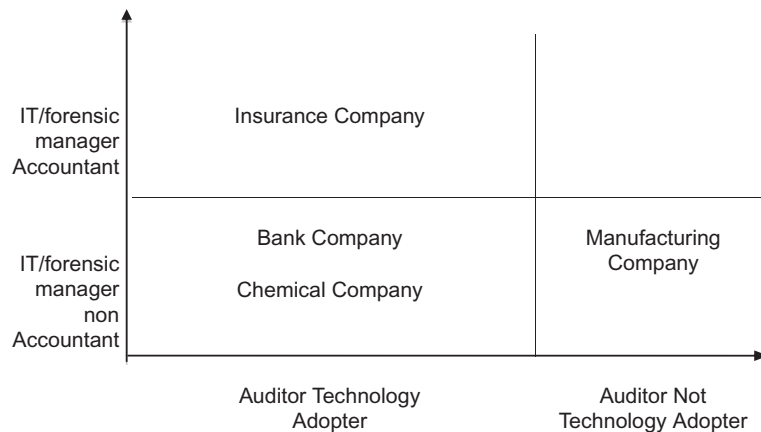
The forensic and IT managers interviewed had different backgrounds (Table I). While some of them had Master degrees in information science, others started their careers in accounting, and became interested in IT after being trained by the audit firm. Some of the audit managers were interested in testing new technological tools; they used the software

Industry	Audit manager	IT manager	Forensic manager
Insurance company	4.5 years in the firm Undergrad in accounting CPA One year with client Background in banks	7.5 years in the firm Tests IC Advisor for clients (internal audit) ERP advisory service Learned about technology in the firm Background in programming	
Chemical company	Proficient in technology		Master in information science Oracle programmer
Financial institution	Auditor considers the team at the top end of technology users when compared to other teams	Information technology background	
Manufacturing company	Five years with the firm. 1.5 years as manager Undergrad in accounting		CPA Three years in the firm Undergrad in accounting MBA Master in information science Oracle programmer

**Table I.**  
Characteristics  
of the interviewees

themselves, and went to training sessions when new tools became available (technology adopters). Others were more reluctant to test new tools (not technology adopters).

Figure 1 presents the industry of the audit engagements and the characteristics of the audit manager and supporting team managers for each company. The insurance company audited had an IT/forensic manager who had an accounting background and an audit manager who was a technology adopter. The bank and the chemical company engagement had audit managers who were technology adopters as well, but the



**Figure 1.**  
Relationship between  
industry of the audit client  
and the characteristics of  
the audit team

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IT/forensic manager had not an accounting background. Finally, the manufacturing company engagement had an IT/forensic manager with no accounting background, and the audit manager was not a technology adopter.

Cushing and Loebbecke (1986) represented the audit process as entailing six main activities:

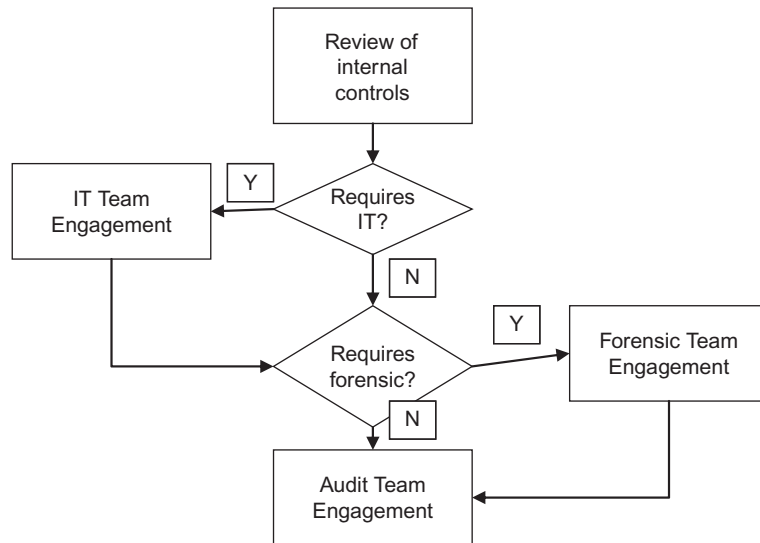
- (1) Pre-engagement.
- (2) Planning.
- (3) Compliance testing.
- (4) Substantive testing.
- (5) Opinion formulation and reporting.
- (6) Continuous activities.

This process has evolved in the last decade. Robson *et al.* (2007) discuss how the larger firms have developed new business risk audit methodologies. They posit that although the economic conditions pressure the transformation of organizational products, structures and technologies, the existence of internal technologies and changes in the environment are what produces audit change.

During the first year of an engagement, the audit process is somewhat different relative to subsequent years (Arens and Loebbecke, 1981). This difference is primarily due to the lack of knowledge concerning the client's operations and the need to check additional information (e.g. beginning balances of accounts) in the initial engagement. In this study, none of the teams interviewed were in the first year engagement. Consequently, first year activities are excluded from the analysis and the study focuses on the planning stage. This planning stage involves obtaining knowledge of the business, making preliminary estimations of materiality, reviewing internal controls, and developing the audit plan (Cushing and Loebbecke, 1986).

Because the interviewed teams were involved in recurring audits, all associated auditors had previous knowledge of the business and estimated materiality. The interviewees expressed the view that first year engagements and changes in systems prompted additional hours of work. The manufacturing company had recently modified its ERP system requiring additional audit work. As discussed later, this problem was resolved by involving the forensic team.

Given the strength in the assessment of internal controls required by SOX, auditors follow audit planning templates with specific questions about the engagement, to determine whether there is a need for involving specialty teams such as computer audit (information risk management) or forensic. This structure is shown in Figure 2. When deemed necessary, the IT support-team checks application controls of the client's systems before the audit team starts its assessment. This check is more thorough when there are changes in systems or controls from the previous year. Once the controls are evaluated, and the support IT team reports their results, the roles of the different teams vary across the engagements. The participation of the forensic team requires budget and a request from the audit manager. This structure is consistent with Julisch *et al.* (2011). They state that as a prerequisite of the audit "the correctness and integrity of the financial information has to be verified", which is done in this firm by the IT teams. The authors also identify five assumptions of the systems and process auditors:



**Figure 2.**  
Audit team participation  
in a typical audit

- (1) The IT infrastructure has to be audited separately (by IT auditors).
- (2) All software works as specified by their creators.
- (3) A small sample of walkthroughs is sufficient to test all controls.
- (4) The auditor's judgment is adequate for risk assessment.
- (5) Best practices and professional judgment are sufficient to select controls.

## 5. Findings

### *Characteristics of the companies audited and the software used*

Table II depicts the industry type, audit engagement characteristics, and key software usage information for the four target audit engagements.

### *Determinants of technological tools adoption*

The audit managers interviewed are CPAs with accounting undergraduate degrees and an average of four years employment in the audit firm. When hired, they are not required to have previous IT knowledge. However, the firm has intensive training programs, and requires its auditors to complete the corresponding module(s) before using any specific tool. When new software is introduced, its availability is communicated to the managers via e-mail. Subsequently, they are free to decide whether or not to adopt the software for use by the audit team.

The decision to adopt these tools depends on the characteristics of the manager and also on the integration of the support teams. If the manager is interested in technology, when those tools are presented, s/he enrolls in training or obtains information about the audit related benefits of the technology. If the manager is not comfortable with new technology, any additional adoption of new tools usually originates from the supporting team (IT). This influence of the IT team upon managers seems in some circumstances to be stronger than a simple suggestion of implementing new technological tools. This can be illustrated by the ensuing anecdotes:

Industry	Insurance	Chemical	Manufacturer	Bank
ERP system used	Oracle	SAP	Oracle	SAP
Characteristics of the engagement	Some presence year-round. Support IT team checks internal controls and works with auditors throughout the audit. No reliance on the company's internal controls; they make their own tests	IT support team checks the internal controls before they start the audit. Auditors do not request support of technical teams because of their expertise with audit software	The company switched ERPs in this period	Audit team finds their work facilitated by the client having an ERP system because all the data is in the same source. More consistency in the data
Use of word processor and spreadsheets	Yes	Yes	Yes	Yes
Use of email and electronic file transfer	Yes	Yes	Audit manager sometimes prefers manual reports	Yes
Use of audit software for data extraction	Yes	Yes	Yes	Yes
Use of audit software for SOD	Journal extraction performed by the client with script provided by auditors. Auditors use their own laptops	Data extraction performed by the client with script provided by auditors. Audit team uses own laptops	Data extraction performed by the client with script provided by auditors	Data extraction performed by the client with script provided by auditors
	Yes	NO	NO	Yes
	Data extraction done by the client with script provided by auditors. Audit team uses own laptops			Used in a pilot SOD. Multiple rule-based errors.
				Managers would not rely on the results. Do not expect to use in the future. If the internal audit used it, they would leverage their work only if they could map the risks with the financial statements risks they are worried about.
Use of software by forensic team	Not mentioned	Yes	Yes	Can get same result with other tools
		To test manual transactions in their own server	The audit team engaged forensic. They rely more on forensic than on any tool they can use themselves	Yes

**Table II.**  
Characteristics of  
the audit engagement by  
company



- In one of the teams, where the IT supporting team member had an accounting background, his work was more integrated with the audit team, and he collaborated to present and facilitate access to the available tools. He seemed to understand better what the auditor needed and how to make the tools useful by facilitating access to them. In this specific engagement, the software available was developed for manufacturing firms and the IT manager modified the segregation of duties (SOD) rules to make them meaningful for an insurance company. Without this effort the audit manager might not be able to use the system and the tool may be considered useless.
- In the other three companies where the IT support team member had a background in information science, the participation of the support team was limited to testing the client's controls. In this situation (auditor technology adopter and support team with no audit background), the audit teams were more reluctant to use new tools and limited their use to spreadsheets, word processors, e-mail and electronic transfer of documents and files, as well as basic audit software. When the audit managers were technology adopters, although they had knowledge of the capabilities of the new tools, the software was not adopted due to the cost (time required to implement it successfully) and attitude (feeling that the results would not change in terms of findings). One of the auditors concluded that his/her team would not use the software available for SOD and continuous monitoring in the future, because it would not provide any better evidence to what they had. The auditor believes that in the course of a traditional audit they would find any violation detected by the software.
- When the audit manager was not a technology adopter, he did not respond to e-mails announcing new tools and showed no interest in determining its advantages. Although this audit manager used spreadsheets, word processor, e-mail, and electronic transfer of documents, he expressed his preference for hand written reports and documentation.

*Reported issues faced by the audit teams*

All the interviewees reported their concerns about data extraction. The fact that the client is involved in the collection and provisioning of data can compromise its reliability. Independent data access was considered preferable.

One of the problems audit managers faced related to the difficulties in implementation of audit software in financial service companies. Both teams interviewed in this industry (insurance company and a bank) used this software to test for SOD. Initially, the standard rules embedded in the software were designed for manufacturing companies. Therefore, difficulties arose when the reports indicated hundreds of violations of SOD that were, in fact, only a function of manufacturing rules. As the following examples illustrate, implementation success varied according to the relationship between the IT support team and audit team:

- In the insurance company, where the audit manager was a technology adopter and the IT advisor had an accounting background, both teams worked together in revising the necessary rules and analyzing the violations to determine which of them were attributable to real internal control deficiencies. As such, the

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implementation was a success and the audit team expects to extend the usage of the software to other areas in the future.

- In the financial institution, on the other hand, the audit manager was a technology adopter, but the IT advisor had no accounting background and minimal involvement in the audit engagement. The audit team applied the standard rules, finding hundreds of meaningless violations. Subsequently, because there was no IT involvement and the team became overwhelmed. Therefore, it eschewed use of the software and instead relied upon other evidence. In this case, it appears that either the IT advisor was unaware of the auditors' needs, or that the audit managers did not think that IT support was necessary. Perhaps, they felt that they could successfully use the tools by themselves. In any event, the audit team did not find the software helpful, and decided not to try it again. Finally, the audit team believes that specific rules (a tailored approach) would enhance the results and usability of the software, but it does not think the effort is worthwhile because other alternatives are able to get the same results. This finding relates usability to cost and attitude.

#### *Perspectives for the future*

Vasarhelyi *et al.* (2010) used the modified Delphi method (Rowe and Wright, 1999; Baldwin-Morgan, 1993) to predict the effect of technological changes upon auditing in the next ten years. These changes will determine how audits will be performed and the level of training needed by auditors. One of the key findings in that study is the need to shift from the current sampling-based audit methodology to a model that includes continuous monitoring of all transactions, error reporting and immediate response. They discuss that the development of such an audit model will reduce the time needed to identify risks. External auditors will be able to rely on the work of internal auditors because it will be based on automation and continuous monitoring. This new model affords more time for interpretation of the results. They also envision the use of XBRL-formatted data to examine similar risks among clients in the same industry, and the use of resources like sensors, biometrics, and voice recognition as tools for evaluating evidence. Therefore, the envisioned audit of the future relies on technological tools, and requires access to high quality data.

At the end of the interviews, auditors were asked about changes needed and how they envision auditing in the near future. Their answers can be classified in the following categories:

- *Have access to the data independently from the client.* The client should understand that measures have been taken to guarantee the security and privacy of the data. The interviewees do not expect data independence to be easy to obtain (Vasarhelyi *et al.*, 2012), but they report it as one of the main concerns and a first step necessary to guarantee data quality with the automation of audit envisioned by Vasarhelyi *et al.* (2010).
- *The development and update of electronic working papers.* The degree of adoption is related to the technological sophistication of the manager. The manager with little interest in technology, for example, finds that the whole team produces

better results when they read and work on paper. His technological needs are limited to transferring files. In general, however, managers find it helpful to have electronic working papers in order to facilitate the production, review, storage and transfer of documents.

- *Training is considered to be adequate.* However, they would appreciate more formal communications about available technological tools as well as the associated applications and advantages.
- *Auditing in the future is similar to Vasarhelyi et al. (2010).* All managers agree on the importance and benefits of continuous control monitoring of all transactions. However, even though they expect it will be implemented, they believe this transition will take time, because companies are currently financially constrained, and therefore reluctant to make new investments.

## 6. Conclusions and limitations of the study

This study examined four engagements within a large audit firm. It aimed to increase understanding of the deployment, usage and enablers of technology in day-to-day practice. The firm made available to their audit staff a multitude of software tools, and our research questions look into their usage: do audit teams use the available technology tools? What are the difficulties they find in their usage? First of all, it was found that the available tools were often not utilized or used on a very limited basis, with very little perceived benefit. Consistent with the iron triangle considerations, the cost of adoption and the time required to effectively internalize and utilize the tool influenced levels of adoption and usability. Another factor observed was the strong influence of user's attitudes and beliefs (Karahanna *et al.*, 1999). In this sense, some auditors did not use the most sophisticated tools because they believed that they could get the same evidence with the traditional audit. Although they priced the software, they thought it was a good tool that could be marketed as an additional service, but not in the audit. This behavior is consistent with the lack of knowledge about a tool convincing the auditor that s/he should rely on other evidence (Arnold and Sutton, 1998).

Finally, *RQ3* asks if mediators facilitate usability. It was found that the inclusion of an integrated IT support team assists auditors in understanding and adjusting the tools, which helps at the time of adoption. The accounting knowledge of the supporting IT consulting team manager facilitated adoption because of better understanding of auditor needs. It seems that the complexity of current audits require this integration so that the IT specialist engages in a discussion with the auditors to look for their specific needs. This study may be used to extend awareness of the effect of team relationships in audit engagements.

The critical difficulty audit engagements faced was their inability to independently access data. This issue becomes crucial given the importance of data quality and expected future changes in auditing. Clients are reluctant to allow external individuals to access to private data, and express the need for a nonintrusive extraction method to guarantee data integrity and quality[4].

Given that audit firms have different cultures, practices, and employee competencies, and hence emphasize the use of technology to varying degrees, it would be desirable to expand this survey to reflect these variations. Ideally[5], the sample should include more audit firms, both Big 4 and non-Big 4, different types of

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audit practices, and different employee teams. The broader the sample, the more likely we will come to completely understand why auditors are not fully adapting the available software tools.

### Notes

1. Both the CPA firm and the engagements were promised to be kept anonymous. Although a larger sample of engagements would be desirable, privacy and resources necessary restricted to four the engagements to be examined.
2. The firm (as most of the big 4) is organized as having separate risk management (IT) and forensic groups. The risk management group is always involved in the audit to evaluate IT controls. The extent of their further involvement is contingent on the audit manager's perception of needs. The usage of forensic consultants is totally optional although, as in the case of risk management, there are questions on the audit planning template that may drive their participation.
3. IDEA and APROVA are the audit tools used. APROVA is considered a sophisticated tool for the purposes of this paper.
4. The AICPA's (2012) Assurance Services Executive has, in order to address this problem, proposed the creation of "Audit Data Standards" that specify a minimum set of data to be made available to internal and external auditors.
5. Although this expansion would be desirable, considering the current litigious environment and tight regulation, the authors feel it to be an unfeasible proposition.

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### Further reading

- Haklay, M. and Tobon, C. (2002), "Usability engineering and PPGIS: towards a learning-improving cycle", *URISA Conference*.

## Preliminary interview guide

## Audit team and engagement background

**Information obtained from background reading**

- Auditors' background – industry, skills, level of experience etc.
- Engagement characteristics: size of team, number of hours, industry of client; key issues and significant audit risks; nature of prior year audit findings (fraud, SUADs, performance improvement observations)

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1. Usage of CA/CM&AT
  - a. How would you rate yourself and the team as a user of technological tools?
  - b. Were you required to use CA/CM&AT on this engagement or any other?
  - c. If not required, why did you use CA/CM&AT on this engagement?
2. Training
  - a. Were you trained in the use or interpretation of CA/CM&AT?
  - b. What kind of training did you have?
  - c. How was your training experience?
    - Did it equip you with the knowledge you needed to use the technology?
    - Do you think that the amount of time assigned to training was enough?
    - Would it be beneficial to have longer sessions?
    - Would it be beneficial to have more sessions with reduced time assigned to each of them?
  - d. What difficulties did you find in the training process?
  - e. What could be changed to increase your knowledge of the systems during training?

## Audit Technology

**Information obtained from background reading**

- Which CA/CM&AT are you using?
- Is this a SO x 404 engagement?

1. Use of CA/CM&AT tools
  - a. Were the tools run by specialists or by the audit team?
  - b. Did the tools require any special technology to run?
  - c. Describe the process used to run the tools.
2. Do you think that the audit firm is ahead or behind its key competitors in the use of these tools?
3. Do you think that the quality of the tools is appropriate?

## Client Technology

**Information obtained from background reading**

- Is the client using ERP systems? Which? Characteristics?
- Is the client using CA or CM software or Analytical tools? Which? Characteristics?
- What are the available CA/CM&AT features of the client systems (whether or not they are used by the client)?
- Have the client's systems changed recently?

(continued)

1. Usage of technology – ERP/CA/CM

- a. (If the background information reveals that the client changed their systems or introduced new ones) What has been the impact on the company's business processes of the change in the ERP system?
- b. Comparing this client with others who are not using ERPs, do you think that the data provided by the client on this engagement were more reliable?
- c. Are you able to modify the extent, timing or nature of your audit procedures as a result of the reliability of the data from the ERP system?
- d. What was the process used to extract the data from the client's systems?
- e. How easy was it to extract the data from the client's system (1 = very difficult; 10 = very easy)?
- f. If it was difficult to extract the data, describe the difficulties encountered.
- g. How do you think the reliability and ease of extracting can be improved?
- h. Is internal audit using any CA approaches and technologies?
- i. Are you able to modify the extent, timing or nature of your audit procedures as a result of the CA techniques used by internal audit?
- j. Is the client planning to change the ERP system? If so, are the availability of CA/CM and the ease of providing data to an internal or external auditor factors in the purchase of the system?

**Use of CA/CM&AT by the audit team**

***Information obtained from background reading***

- a. How did you use CA/CM&AT in:
  - Planning
  - Control Evaluation
  - Substantive Testing
  - Completion
  - Debriefing
- b. When and how often are the CA/CM&AT tools used?

1. Use of CA/CM&AT

- a. Are there any areas in the audit engagement in which you think that CA/CM&AT has increased your effectiveness?
  - How has it improved the quality and reliability of the evidence obtained?
- b. Are there any areas in the audit engagement in which you think that CA/CM&AT has increased your efficiency?
  - Are you able to obtain the necessary evidence in fewer hours or with less skilled staff?
  - How has the use of CA/CM&AT affected the nature, timing and extent of your audit procedures?
- c. Has the number of false positives increased?
- d. Were you able to modify the nature, timing or extent of your audit procedures as a result of the CA/CM&AT tools used?
- e. What barriers did you find to using the CA/CM&AT tools effectively and efficiently?
- f. Did you use the CA/CM&AT tool to automate existing audit procedures?
- g. Did you design new audit procedures to take better advantage of the features of CA/CM&AT?

*(continued)*

2. Overall assessment.
- a. What worked well in the engagement?
  - b. What didn't work well?

Why?

**Future implications**

- a. How could the CA/CM&AT features be improved?
- b. What do you wish you could do to improve effectiveness and efficiency further?
- c. What do you think has to be done to increase the extent to which teams rely on CA/CM&AT?
- d. What will you do next year?
- e. What factors do you think would promote the increase use of CA/CM&AT amongst others?
- f. What improvements can be made to make the data extracted from the company's ERP "ready to be used" by the CA/CM&AT tools?
- g. How would you modify existing audit procedures (in timing, nature or extent) to increase the utilization of technology in the audit?
- h. To what extent does the current audit methodology and guidance inhibit a fuller adoption of CA/CM&AT tools?
- i. What are the barriers to more widespread use of technology?

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