Using Audit Software for Risk Management, Continuous Monitoring, And Data Analysis

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Introduction

In order to improve the quality of the audit process, the auditor must avoid complacency and be receptive to change, including innovative ways of using audit software for risk management, continuous monitoring, and data analysis.¹ This article is a commentary based on literature reviews, on-site observations, a written survey, and a live feedback session. The subjects of this article included, but were not limited to, Fortune 500 Companies, Research I educational institutions, and governmental agencies.

This article focuses on methods of improving the use of audit software and employing innovative ways of improving audit efficiency and effectiveness. Thus, this article is designed to be a qualitative analysis, coupled with suggested ways of improving the audit process using audit software.

The Underutilized Basics

Our survey² and feedback session³ results indicate that many of the organizations under review employ the use of basic word-processing, spreadsheet, and/or database software.⁴ Such software packages also include other helpful tools such as centralized calendars and simple planning programs.

As one commentator noted, better use of such programs can greatly improve staff participation in the audit process up to and including the final audit report. "[The] possibilities for word processing, flowchart[ing], and presentation software include…

² The target of our survey included approximately 120 Research I institutions. Research I is the designation given by the Carnegie Institution for the highest-ranking colleges and universities, based on academic research rankings.

process and data flow diagrams; risk modeling; and the standardization of workpaper and report formats."  

In spite of the common use of such software suites such as those offered by Lotus and Microsoft, auditors run the risk of becoming complacent, thereby grossly underutilizing some of the simple power tools associated with such packages. These findings dovetail with other survey results evidencing the underutilization of powerful software capabilities.  

One of the most glaring deficiencies in the use of software suit was in the area of spreadsheets. For example, over 50% of the participants in the feedback session did not regularly use spreadsheet or other related software to generate statistical samples when conducting their audit work. To the contrary, they were still using judgmental sampling techniques on most audits. Given today's software tools, judgmental sampling should be the exception, not the rule.  

Spreadsheet packages, such as Excel, have the necessary tools to conduct statistical sampling, and related measurements, including calculating data means and standard deviations. The advantage of having a statistical sample is that it allows you to mathematically quantify the risks related to not testing the entire population. Auditors

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3 The feedback session was conducted on an informal basis during a training session in statistical sampling of approximately 55 auditors.
4 Packages such as Microsoft Office and Lotus Suites are common.
6 A recent survey questioned internal auditors from Switzerland, Canada, the Philippines, Thailand, Malaysia, Spain, South Africa, and the United States. The auditors were asked to what extent they were employing software applications to do the following: extract and analyze data, prevent and detect fraud, audit and control electronic commerce, evaluate internal controls, and monitor the control environment. The findings indicate that, while some audit departments are using all of these products and can clearly identify benefits, a relatively large percentage of auditors have not adopted next generation technology. Glover, Steven M.; Romney, Marshall B., The next generation software. (includes directory of internal-auditing software products). Vol. 55, Internal Auditor, 08-01-1998, pp 47(7).
who engage in judgmental sampling are not able to express the probability that audit conclusions are erroneous, given the fact that the auditor tested only a sample of the data and not the entire population.

The survey and observation results were also revealing. Several of the institutions that responded indicated heavy use of software packages to sort and summarize data before conducting detailed analysis of the information. However, the degree and extent of use varied. Some of the basic deficiencies that were gleaned from discussions and observations include the following:

- **Failure to centralize software files, causing inefficiencies and duplicated effort.** Having basic non-sensitive word processing documents or forms in a centralized filing system allows users to avoid originating commonly used documents and thereby avoid duplicating audit effort.\(^7\)

- **Not regularly running basic analytical tests such as simple regressions.** Audit teams use software packages for audit workpapers and recording audit test work. However, not all auditors habitually run quantitative analysis and plot results. Nor do audit steps regularly include simple regression and trend analysis models for visualizing

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\(^7\) As one article stated, “... auditors can quickly search through previous audits to determine whether an audit with similar circumstances or goals has already been performed. If a finding is relevant, the auditor can search through the methodology used by the previous audit team and electronically cut and paste audit lines of inquiry into the current audit program. Research time can be reduced from days to hours, and audit programs can be built to serve the organization, rather than just the current audit.” See, Coderre, David G., *Seven easy CAATT: (computer-assisted audit tools and techniques)*. Vol. 51, Internal Auditor, 08-01-1994, pp 28(5).
captured data.\textsuperscript{8} Note that such techniques can be coupled with more complex software packages that afford the auditor to run complex audit tests such as \textit{digital analysis}.\textsuperscript{9}

- \textbf{Not adequately quantifying the results of benchmarking}. Intra-company and inter-company benchmarking can provide insightful information regarding performance.\textsuperscript{10} No more than 25\% of those in the feedback session conducted intra-organizational and inter-organizational benchmarking on a regular basis.

- \textbf{Failure to centralize audit personnel and events}. This includes the failure to centralize calendars and location of audit personnel.\textsuperscript{11}

The underutilization of software features can also be coupled with over-reliance on such software. As one respondent to the survey indicated, MS Office was virtually the only software used by the audit department of the $2.5 billion organization. While such packages are very helpful, audit departments that are not supplementing such packages with other software tools are arguably engaging in sub-optimal auditing. Such other software tools are discussed in more detail below.

\begin{itemize}
    \item Programs such as Lotus Suites and MS Office include data analysis tools such as regression that are simple to run and can give very insightful results.
    \item "Digital analysis, is a audit technology that looks for the abnormal duplication of single digits, digit combinations, specific numbers, and round numbers,... [These] abnormal duplications could signal data anomalies.... The expected digit distribution for tabulated data is usually based on Benford's Law." See, MARK J. NIGRINI, \textit{Adding Value with Digital Analysis}. Vol. 56 no, Internal Auditor, 02-01-1999.
    \item "The implementation of a measurement system using internal or external benchmarks is key to continuously verifying... progress." See, Lanza, Richard B., \textit{Performing a process improvement study. (benchmark evaluation of audit procedures)}. Vol. 54, Internal Auditor, 08-01-1997, pp 58(5).
    \item Programs such as Microsoft Outlook are simple and allow departments to centralize the calendaring of events, and make the information accessible to all on staff. Such tools are now available on web browsers such as AOL.
\end{itemize}
Data Mining Tools
That Increase Cycle Time while Reducing Audit Risk

Beyond the use of basic word-processing and spreadsheet packages, many of the departments surveyed engage in the use of more sophisticated software such as ACL\textsuperscript{12} and Brio Query. Both packages afford the user the opportunity to audit 100\% of the population under review. As stated by one auditor, such data analysis software is proving to be the "silver bullet."\textsuperscript{13} Advantages include affording the auditor the opportunity to mine data while virtually eliminating sampling risks. Other benefits were articulated in a recent survey\textsuperscript{14} as follows:

- "The ability to add numerous value-added services at a nominal cost.
- The opportunity to save the company substantial amounts of money.
- The capability to conduct very specific tests to find all errors within the population.
- The ability to perform additional analyses, such as fate analysis, data mining, volume analysis, and customized reports.
- A greater assurance of audit results.
- Confidentiality, since the IS department does not know what is being tested.
- More comprehensive risk assessment and earlier detection of aberrations, which has improved audit planning.
- Independence; prior to using software, internal auditing had to formally request specific ad-hoc reports from the IS department."\textsuperscript{15}

\textsuperscript{12} Note that ACL was only founded in 1987, and currently ranks as one of the most relied upon software tools available to the auditor.

\textsuperscript{13} Hudson, Mary E., CAATs and compliance. (computer-assisted audit techniques in health care). Vol. 55, Internal Auditor, 04-01-1998, pp 25(3).


\textsuperscript{15} Ibid.
Such benefits were also found in our survey. As one auditor stated, "[w]e use [this] software to select data from our data warehouse. We can select data for a department, an account, a vendor or employee, a type of transaction, etc. We can then sort the data by dollar amount, date, name, etc., which makes it easier to select a sample to review in more detail. This access to information has helped tremendously in our investigative audits, where we can get to critical data and analyze it quickly."

In the annual software survey published in the August 2000 issue of Internal Auditor magazine, the prevalent use of audit software such as Brio and ACL was very apparent. The survey was conducted through an electronic poll of approximately 2700 IIA members.\(^\text{16}\)

The survey revealed that approximately 40\% of the respondents used data mining and analysis packages such as ACL, Brio, IDEA, IBF, SAS, and Easytrieve, while approximately, 23\% were still relying on basic spreadsheet packages such as Excel, Lotus 123, and Quattro Pro, to perform data extraction and analysis.

The survey also revealed that packages such as ACL and Brio were also used conduct continuous monitoring (discussed more below). Such packages afford the auditor the ability to efficiently and effectively conduct ongoing queries, and analytical reporting.

\(^{16}\) Questions asked included areas such as data extraction and analysis, fraud detection, and, continuous monitoring.
Another survey\textsuperscript{17} indicated that several respondents using such software had increased effectiveness and efficiency of the audit process. As stated by one participant in the survey, "[t]he software allows us to be more efficient, because less time is needed to test large populations…. It also allows us to be more effective, because we can test the entire population, not just a sample."\textsuperscript{18}

While using such tools, it is important for the auditor to keep in mind that data being analyzed can be tainted or altered by the auditee. It is imperative for the auditor to ensure the data is "raw," and untainted. As one author emphasized, it is critical to verify the data, and watch out for the following:\textsuperscript{19}

- "Columns or transactions that have been "hidden" to deter analysis.
- Transactions that have been added or deleted in an effort to "plug" a reconciliation.
- Calculations that have been altered to benefit the analysis at hand."\textsuperscript{20}

While such power tools are very helpful to the auditor, the auditor should avoid overconfidence and ensure that the data extracted for review is verifiable and reliable.\textsuperscript{21}

\textsuperscript{17} Glover, Steven M.; Romney, Marshall B., \textit{The next generation software. (includes directory of internal-auditing software products)}. Vol. 55, Internal Auditor, 08-01-1998, pp 47(7).

\textsuperscript{18} Glover, Steven M.; Romney, Marshall B., \textit{The next generation software. (includes directory of internal-auditing software products)}. Vol. 55, Internal Auditor, 08-01-1998, pp 47(7).

\textsuperscript{19} Lanza, Richard B., \textit{Audit raw, not "cooked," data.}. Vol. 54, Internal Auditor, 12-01-1997, pp 23(3).

\textsuperscript{20} Ibid.

\textsuperscript{21} Ibid.
Audit Software for Planning, Risk Assessment, and Engaging the Auditee

Audit software can also be employed in planning and risk assessment, and provides effective ways for engaging the auditee in the audit process. This can be realized even from high level assessment, such as executive evaluation of compliance with COSO\textsuperscript{22} and CoCo\textsuperscript{23} control models.\textsuperscript{24} "Since the adoption of the (COSO) and (CoCo) control models by many organizations and the growth of control self-assessment strategies in the early 1990s, some software has been developed to assist in those efforts."\textsuperscript{25}

In one survey, "only 10 percent of participants indicated that they use automated COSO/CoCo models. The software packages listed were Visual Assurance by Deloitte & Touche, Price Waterhouse Controls, IIA COSO Software, Patrol 400, Comet by Price Waterhouse, and Rare Advisors…. Fifteen percent of the survey participants reported that they use self-assessment and voting system software. Visual Assurance, Audit System2 for Internal Audit, and OptionFinder were the three software brands named."\textsuperscript{26}

In the same survey\textsuperscript{27}, only 24% indicated they used software to continuously monitor organizational activity. This percentage of ongoing monitoring seemed rather low, given the apparent move towards automated auditing. As pointed out, such software can be employed to continuous monitor on a routine basis and help to "… identify trends, 

\textsuperscript{22} Committee of Sponsoring Organizations
\textsuperscript{23} Canadian Criteria of Control Committee
\textsuperscript{25} Ibid.
\textsuperscript{26} Ibid.
\textsuperscript{27} Ibid.
abnormalities, or exceptions that indicate an audit is necessary."^28 Such powerful information helps "… [identify] high-risk transactions; produce exception reports; detect fraud; monitor inventory trends and turnover; monitor computer processing functions, such as confidential file access and password usage; and track legal and compliance issues."^29

There are other power tools such as Risk Ranking Advisor that aid the auditor in risk assessment, planning, and managing audit.^30 "Risk Ranking Advisor, which runs under the Windows 95, 98, and NT operating systems, provides a complete method for planning, conducting, and managing an individual audit, including pre- and post-audit risk assessment of the auditable area."^31 Other packages, such as ADM Plus, also offer risk assessment features.^32

AuditMASTERPLAN can also assist the audit department as an "audit management suite." The software "… handles the annual planning and tracking of the audit universe, preparation of the annual schedule, use of resources, and tracking of recommendations."^33

Beyond the use of commercial software, some audit departments work with organizational experts to create their own useful tools. Our survey responses included the following example of using tools developed in-house:

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^28 Ibid.
^29 Ibid.
^31 Ibid, citing a contribution by David McNamee.
^32 Ibid.
^33 Ibid.
"We had our Information and Media Technology Dept. help us to develop a questionnaire for our procurement card audit…. We emailed all procurement cardholders on campus and gave them the [web] address. When they went to the site, the questionnaire [was there] for them to fill out…. The answers were automatically entered into an excel spreadsheet for our analysis."

The use of on-line questionnaires is merely one example of the customized approaches used during the audit process. Such techniques can help the auditor perform a more efficient and effective audit and realize a more successful solicitation of information from the auditee during the audit process.

**Audit Software for Consolidating the Audit Team**

The software packages available for consolidating the audit team have greatly improved over the years. One of the first softwares to allow for team integration was Lotus Notes. Lotus Notes allows for the audit team to consolidate the following:

- Workpapers
- Planning
- Risk assessments
- Budgeting
- Administration

Some auditors contend that this program allows virtually the entire audit to be completed in one software environment.

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Other programs, such as AutoAudit 2000 heavily automate the audit process and audit environment, from planning the audit to issuing the report. Such programs also give audit staff the ability to easily conduct workpaper review and approval, as well as perform administrative functions on-line.\textsuperscript{36}

Users contend that such programs greatly enhance the management aspect of the audit process. Audit supervisors are able to easily review workpapers, even from very remote locations. A bulk of the work is done electronically. This greatly enhances the efficiency and effectiveness of the audit process.\textsuperscript{37}

Other database-driven systems include TeamMate2000, which is a relational database. Advantages cited by TeamMate2000 include the following:

- **Real-time team based use** - Allowing auditors the power to access the same audit workpapers simultaneously.

- **Replication** - Replication allows real-time remote use by more than one user.

- **Automatic Referencing** - the auditor can easily and automatically cross-reference workpapers.

- **Automatic Report Generation** - The auditor can access various report styles.

As stated by one of the respondents to our survey, "[t]he only audit software we use is TeamMate. It's an electronic workpaper program that allows complete integration of Word and Excel documents as well as scanned documents. The software also allows online workpaper review. In sum, all of the audit workpapers are electronic."

Conclusion - Implementing Change

The use of audit software varies from organization to organization. Auditors must identify weaknesses in the use of software on hand, and consider procuring additional software that may increase the efficiency and effectiveness of the audit process.

In his article *Mainstreaming CAATS*, Frank Paukowits makes some meaningful recommendations for increasing the efficient and effective use software tools available to the auditor. Those steps include the following:

- **Training:** The learning curve can be onerous. "[T]raining [should be] targeted to a highly specific audience. Involving top management and providing technical, hands-on training to well chosen staff can pay dividends in the long run."

- **A Champion:** Identify a person to spearhead the project. This individual is key.

- **A Help Desk:** The user must have access to individuals familiar with the programs being implemented to avoid gross inefficiencies. On-

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37 Ibid.
39 Ibid. Note these steps are excerpts from Mr. Paukowits' article.
site support is highly encouraged, over merely relying on vendor help desks.\textsuperscript{40}

- **Employee Evaluation:** Employee evaluations should include the extent to which employees use such techniques in the planning and execution of the audit.\textsuperscript{41}

- **Monitoring Use:** "Our champion assembles a report detailing the audits on which CAATS are used, the auditors on those projects, the nature of the tests performed, and the results and payoffs realized. We disseminate this report to top managers, and it is included as an agenda topic at their meetings."\textsuperscript{42}

The above recommendations should be supplemented with the additional steps to help ensure the department is on the cutting edge. For example, some departments, at least informally, benchmark their implementation of audit software against other organizations of comparable size or within their respective industries. Additionally, attending conferences and seminars outside of the organization helps foster comparisons of department practices with those of other organizations.

\textsuperscript{40} Many companies go one step further, with IS auditors providing routine help and conducting routine monitoring. For example, an on-site observation at IBM evidenced extensive use of IS audit staff to assist audit teams in extracting data and running audit tests.

\textsuperscript{41} To this end, audits should begin to routinely include CAATs in audit programs. Once the audit process begins to include the use of audit software on a regular basis, the audit department is arguably more prone to employ such techniques.

\textsuperscript{42} Ibid.
Such recommendations can greatly enhance the probability that audit staff will be aware of existing technology and regularly employ such audit techniques during the course of the audit process. Survey results indicate that substantial time and resources can be saved. The goal is to improve the overall efficiency and effectiveness of the audit process. To that end, audit software and computer assisted auditing techniques can greatly enhance risk management, continuous monitoring, and data analysis, as well as assist the audit team in timely issuing a meaningful audit report.