Role of CAATTS in Internal Audit

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Abstract

Modern audit technology has freed auditors to use their judgment and all of their critical faculties rather than be limited by physical reviews, rigid audit programs, and information systems and technology that do not support audit. While some barriers to the use of CAATTs (Computer-Assisted Audit Tools and Techniques) still exist, advances in hardware and software have reduced negative attitudes significantly, so much so that you do not have to be a member of a large audit organization with sophisticated mainframe software to make effective use of CAATT. As a result, auditors can make effective use of these tools with a limited investment in training.

The main elements of strategy to ensure effective use of computer technology in the audit function must be delineated and clearly understood by all participants.

An effective plan to implement and support the use of CAATTs must be developed to ensure that the tools and techniques are properly understood and used by all.

Keywords: Computer-Assisted, Audit Tools and Techniques, CAATTs, Internal Audit, Role of CAAT.

INTRODUCTION

Computers are not new to us. From microwave ovens to DVDs, everywhere around us we see and feel the effect of the microchip. But, too often, we have either not applied these new technologies to our everyday work activities, or we have only succeeded in automating the functions we used to do manually. “Things are working fine the way they are” or “I’m not an IS auditor” are just two of the many excuses we hear for not capitalizing on the power of the computer. However, we cannot afford to ignore the productivity gains that can be achieved through the proper use of information technology. The use of automation in the audit function—whether it is for the administration of the audit organization or tools employed during the conduct of comprehensive audits—has become a requirement, not a luxury. In today’s technologically complex world, where change is commonplace, auditors can no longer rely on manual techniques, even if they are tried and true. Auditors must move forward with the technology, as intelligent users of the new tools. The vision of the auditor, sleeves rolled up, calculator in hand, poring over mountains of paper, is no longer a realistic picture has found its way into our homes, schools, and the workplace—now is the time to welcome it into the audit organization.

This essay discusses microcomputer-based audit software, but the techniques and concepts are equally applicable to mainframe and minicomputer environments. Examples of software packages are provided, but the focus is on the discussion of an approach to using automation to assist in performing various audit tasks rather than the identification of specific audit software packages.

Throughout this essay, Computer-Assisted Audit Tools and Techniques (CAATTs) and audit automation are meant to include the use of any computerized tool or technique that increases the efficiency and effectiveness of the audit function. These include tools ranging from basic word processing to expert systems, and techniques as simple as listing the data to matching files on multiple key fields.
THE NEW AUDIT ENVIRONMENT

These are exciting times for internal auditors, especially those who see themselves as agents of change within their organization. The drive to do more with less, to do the right thing, or to reengineer the organization and the way it does business is creating an environment of introspection and change. Change is occurring at a faster rate than ever, and this change is being driven by technological advances. Companies wishing to survive in these times must strive to exploit new technologies in order to achieve a competitive advantage. Today's business environment is rapidly and constantly changing, and technology is one of the key factors that are forcing auditors to reassess their approach to auditing. Other factors are the evolving regulations and audit standards calling for auditors to make better use of technology. These forces are creating a new audit environment, and audit professionals who understand how to evaluate and use the potential of emerging technologies can be invaluable to their organizations. New possibilities exist for auditors who can tie software tools into their organizations’ existing systems (Baker [2005]).

THE AGE OF INFORMATION TECHNOLOGY

In the last 20 years, we have progressed from Electronic Data Processing (EDP) to Enterprise-wide Information Management (EIM). We have gone from a time when hardware drove the programming logic and the software selection to a time when the knowledge requirements are driving business activities. As little as 15 years ago, information was almost a mere by-product of the technology; the selected hardware platform determined the software, which would likewise be a determining factor of each application. Today, the technology, the hardware and software, are merely delivery mechanisms, not the determining factors behind either information technology purchases or systems development activities. One of the main tenets of EIM is that the information is a key resource to be managed and used effectively by every successful organization. Data holdings are driving business processes, not the reverse, and there has been an increased treatment of information as a strategic resource of the business. From an audit perspective, this means that data and information are equally important. First, to analyze the current state of the business critically; and second, to help determine where the business is going or should go.

DECENTRALIZATION OF TECHNOLOGY

We are seeing a greater reliance on computers in every aspect of our world. Data processing is no longer confined to programmers or to the mainframe systems. We have seen the emergence of enterprise-wide systems in all business/operational areas in many organizations. In some, the separate information processing by specialized applications is a thing of the past. Enterprise-wide systems are changing the notion of traditionally centralized data and applications. Application programmers have been transferred to business areas to support and encourage use of enterprise technology. Today, one can find business applications where a purchase order transaction is initiated in England, modified in the United States, and then sent to a processing plant in Mexico. All of this occurs in minutes—or even seconds—across time zones and continents. The modules or components are fully integrated with the business processes and occur without a paper trail. These types of applications make traditional manual audit approaches useless and impossible to apply. Auditors must learn how to access and analyze electronic information sources if they want to make a meaningful contribution to their organizations’ bottom line.

DEFINITION OF CAATTs

Many audit organizations have looked to the microcomputer as the new audit tool, a tool that can be used not only by IS auditors, but by all auditors. This essay highlights the benefits of Computer-Assisted Audit Tools and Techniques (CAATTs) and outlines a methodology for developing and using CAATTs in the audit organization. Today's auditors must become more highly trained, with new
skills and areas of expertise in order to be more useful and productive. Increasingly, auditors will be required to use computer-assisted techniques to audit electronic transactions and application controls. Laws like the U.S. Sarbanes-Oxley Act of 2002 are pushing audit departments to find new ways to link specialty tools into the complex business systems (Baker [2005]). By harnessing the power of the computer, auditors can improve their ability to critically review data and information and manage their own activities more rationally. Due to the critical shortage of these skills and talents, they will become even more valuable and marketable.

CAATTs are defined as computer-based tools and techniques that permit auditors to increase their personal productivity as well as that of the audit function. CAATTs can significantly improve audit effectiveness and efficiency during the planning, conduct, reporting, and follow-up phases of the audit, as well as improving the overall management of the audit function. In many cases, the use of the computer can enable auditors to perform tasks that would be impossible or extremely time-consuming to perform manually. The computer is the ideal tool for sorting, searching, matching, and performing various types of tests and mathematical calculations on data. Automated tools can also remove the restrictions of following rigid manual audit programs as a series of steps that must be performed. CAATTs allow auditors to probe data and information interactively and to react immediately to the findings by modifying and enhancing the initial audit approach.

In today’s age of automated information and decentralized decision making, auditors have little choice concerning whether or not to make use of computer-based tools and techniques. It is more a question of whether the use of CAATTs will be sufficiently effective, and whether implementation will be managed and rationally controlled or remain merely haphazard. Many organizations have tried to implement CAATTs but have failed. By understanding the proper use and power of computer-based tools and techniques, auditors can perform their function more effectively. This understanding begins with knowledge of CAATTs, including their beginnings, current and potential uses, and limitations and pitfalls.

**EVOLUTION OF CAATTs**

Today’s microcomputer-based audit tools and techniques have their roots in mainframe Computer Assisted Audit Tools (CAATs), which in turn are surprisingly rooted in manual audit tools and techniques. These mainframe based tools were primarily used to verify whether or not the controls for an application or computer system were working as intended. In the 1970s, a second type of CAAT evolved, which sought to improve the functionality and efficiency of the individual auditor. These CAATs provided auditors with the capability to extract and analyze data in order to conduct audits of organizational entities rather than simply review the controls of an application. A third type of CAAT, and a more recent use of automated audit tools, focuses on the audit function and consists of tools and techniques aimed at improving the effectiveness of the audit organization as a whole. But, for a moment, let’s step back in time to the late 1970s, as illustrated in Exhibit 1.1.

Essay written on computer controls and audit in the 1970s did not include sections on end user computing or, at best, mentioned audit software only in passing. In fact, for the most part, auditors avoided dealing with the computer and treated it as the black box. Audit methodologies discussed the input and output controls, but largely ignored the processing controls of the system. The methodology employed was one of auditing around the computer. The main audit tools included questionnaires, control flowcharts, and application control matrices. Audit software was specifically written in general-purpose programming languages, was used primarily to verify controls, and parallel simulation was only beginning to gain ground. Audit software packages were considered as specialized programming languages to meet the needs of the auditor and required a great deal of programming expertise.

The packages were mainframe-family dependent and consequently were limited in data access flexibility and completely batch-oriented.

By the 1980s, some of the more commonly used tools to verify an application system were test decks, Integrated Test Facilities (ITF), System Control Audit Review File (SCARF), and Sample Audit
Review File (SARF) (Mair, Wood, and Davis [1978]). Other techniques included parallel simulations, reasonableness tests and exception reports, and systematic transaction samples. Some organizations were still achieving very effective results with these types of audit tools in the 1990s. In fact, according to a 1991 Institute of Internal Auditors’ Systems Audit ability and Control (SAC) study, 22 percent of the respondents were still using test decks, 11 percent were still using ITF, and 11 percent were still using embedded audit modules (Institute of Internal Auditor’s Research Foundation [1991]).

EXHIBIT 1.1 Audit Tools and Techniques (Computer System Audit)

<table>
<thead>
<tr>
<th>1970s</th>
<th>1980s</th>
<th>1990s</th>
<th>2000s</th>
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<tbody>
<tr>
<td>Programming Language Applications Programming</td>
<td>3rd-Generation Programming Language Applications</td>
<td>4th-Generation Programming Language Applications</td>
<td>Web-enabled Software (XBRL)</td>
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<tr>
<td>1st-Generation Audit Software (Batch)</td>
<td>2nd-Generation Audit software (Interactive and batch)</td>
<td>3rd-Generation Audit Software (PC-based interactive and batch)</td>
<td>Continuous Auditing</td>
</tr>
<tr>
<td>Simple Parallel Simulations</td>
<td>Extensive Parallel Simulations</td>
<td>Comprehensive Data Analysis and Testing</td>
<td>Digital Analysis</td>
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<tr>
<td>Test Decks/Integrated Test Facilities (ITF)</td>
<td>Test Decks/ITF</td>
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<tr>
<td>Input/output Testing</td>
<td>SCARF/SARF (Definition in text)</td>
<td>Audit Software</td>
<td>Audit Assurance Software</td>
</tr>
<tr>
<td>Internal Control Review (ICR)</td>
<td>Automated ICR Questionnaires</td>
<td>Integrated ICR Questionnaires</td>
<td>Control Self Assessment</td>
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<tr>
<td>Questionnaires Control</td>
<td>Flowcharting</td>
<td>Process Flows Emphasis on Data Auditing</td>
<td>Visualization Software</td>
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<td>1st Computer based Monetary Unit Sampling</td>
<td>More Developed Dollar-Unit Sampling</td>
<td>Diverse Sampling Options including Stratified</td>
<td>Less Emphasis on Sampling</td>
</tr>
<tr>
<td>Control Matrices</td>
<td>Improved Control</td>
<td>Expert Systems</td>
<td>Neural Networks and Artificial Intelligence Matrices</td>
</tr>
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HISTORICAL CAATTs

It is useful to review the various CAATTs briefly, in order to develop a common body of knowledge from which to judge the currently available audit technology and to assess its impact on audit practice.

REASONABLENESS TEST AND EXCEPTION REPORTING

Current audit software allows auditors to perform reasonableness checks and exception reporting without the use of test decks, ITF, SCARF, or SARF. The entire transaction file can be directly accessed from, or downloaded to, the auditor’s microcomputer and all transactions reviewed for edit checks, reasonableness, invalid data, and more. Rather than using test decks to see if specific edit checks are working properly, the auditor can review every transaction to identify all instances of erroneous, invalid, or unreasonable transactions. However, auditors recognize that the absence of invalid transactions does not mean that the system has edit checks to prevent the user from entering
incorrect data—only that none was found. As a result, the audit emphasis has shifted and continues to shift. Not only the traditional meaning of CAATTs, but also the traditional audit paradigm, has been called into question (Will [1995]). Let us first consider the traditional approaches to computer-based auditing.

ROADBLOCKS TO CAATT IMPLEMENTATION

Audit software has been available for a number of years. Still, in many organizations, only the IS auditors have attempted to introduce CAATTs into their audits and, even then, only to a limited degree—for very specific tests or under rigid circumstances. Too few auditors and audit organizations have invested much thought and resources into computer-based tools and techniques, let alone information technology.

Before examining the roadblocks to the implementation of CAATTs, please review Case Study 5.

MYTH 1: TOO COSTLY TO PURCHASE AND MAINTAIN

Some audit organizations believe that audit software is costly and cannot be proven to be cost effective.

Early audit software only ran on mainframe computers and often required site licenses and expensive maintenance contracts. Embedded audit modules had to be written during the development of the application and were expensive to program and had to be maintained when the application was modified. Often the audit organization was billed for the time the mainframe was used and had to request special runs or to create copies of the production databases. Also, the output was usually paper-based and had to be reviewed manually. Moreover, audit organizations had to deal with different software for each application. To make matters worse, depending on the cycle time for the audits, the software may not have been used more than once every two or three years. This often meant that no one had sufficient expertise with the software to make effective use of the tool. Under these conditions, the cost/benefits of maintaining the audit software would obviously be questioned, and often a decision would be made to suspend its use and to develop more robust controls and manual audit procedures.

Typically, audit software supports access to various databases and file formats and data types, including DB2, IDMS, IMS, Microsoft Access, AccPac, dBase, Excel files, and other esoteric data types. So there is no need to purchase and maintain a variety of tools.

Today, microcomputer packages are affordable, not only by the smallest of audit organizations, but also by intelligent sole practitioners who can amplify their power and potential enormously without becoming dependent on “Big Brother organizations.”

MYTH 2: TOO TECHNICAL AND COMPLEX FOR NON-IS AUDITORS

Once again, this false belief stems from the historical usage patterns of audit software. The mainframe audit modules/packages had to be developed and maintained by a programmer. Traditionally, programming departments were under considerable pressure and had backlogs of up to several years. The priority given to developing audit modules for new applications was not always as high as audit would have liked. Little time was spent developing user-friendly, menu-driven interfaces, and documentation was likely to be absent or not very useful. To add to the problem, the programmer did not usually have any audit expertise. Consequently, the audit routines were often difficult to use, and the results did not exactly meet audit’s requirements. Also, all requests would have to be made through the programming area, adding delays and raising questions of auditor independence. After several attempts at developing and using audit software, many audit organizations abandoned this approach.

Today’s audit software does not have the same limitations. Software vendors have developed audit-specific packages with excellent user interfaces. These packages can easily be used by auditors and often do not require the services of the programmers. Further, it has become much easier to extract and transfer data from one application or computer system to another. Data stored in complex databases can also be extracted using structured query language (SQL) packages. The results can be
accessed directly by audit software and used by practically all auditors. Further, the auditors can do most of their analysis on their own microcomputers, and the communication and download facilities are supported by most systems. For large files, many audit organizations have powerful microcomputer audit workstations that support CD-ROM, optical disks, and other facilities to handle large volumes of data. Now, mainframe files, which are hundreds of megabytes in size, are easily processed using microcomputer audit software. In addition, audit software is available in client-server versions, providing auditors with the ease of use of the microcomputer and the storage and processing capacity of the mainframe.

**MYTH 3: ONLY FOR USE BY IS AUDITORS**

More and more auditors are joining the workforce with some level of computer expertise, have taken programming courses in school, and have personal computers at home. The workplace requires most auditors to use computers in one way or another, even if it is only word processing or e-mail. With graphical user interfaces and application portability, the complexity of the audit software and the problems surrounding access to data are not what they used to be. An auditor with a basic understanding of computers and knowledge of data concepts (such as fields, records, files, and databases) can use today’s audit tools effectively because programming, as a logical exercise in itself, is no longer required. Modern audit software makes it easy for auditors to develop their own analysis plans and to execute them with limited involvement and dependence on technical experts. There is also an increased understanding among audit managers that staff must be provided with sufficient computer training to keep abreast with technology. Since the audit software is more standardized, there is little need for training on your company’s proprietary software package. Self-directed learning, computer-based training, Web-based training, and a variety of seminar and instructor-led courses are readily available. In fact, some of today’s general field auditors have more practical technical skills and a higher level of computer familiarity and expertise than did the IS auditors of 10 to 15 years ago.

**MYTH 4: HANDS-ON APPROACH TO AUDITING REQUIRED**

The feeling that auditors must conduct the review manually—physically touching and reviewing files and reports—is more of a myth than a reality. Of course, automated techniques do not eliminate the need to conduct a manual file review, but the automated tools will help to focus the auditor’s attention for physical review. Instead of having to examine 100,000 pay statements, the audit software might highlight the 100 that are of critical interest for one reason or another. So, the auditor only needs to perform a manual review of a small subset of transactions. In addition, the interactive nature of audit tools also provides a high degree of hands-on analysis. Using transaction data, the auditor can pose what-if questions and test out various scenarios. The ability to query the data, to run a variety of tests, and to get immediate responses to specific questions provides the auditor with a hands-on capability that is not available when dealing strictly with the physical files. Audit software allows the auditor to perform tests of 100 percent of the transactions, regardless of whether there are 10,000 or 10 million transactions.

**MYTH 5: CLIENT SYSTEMS AND DATA COMPROMISED**

Previously, mainframe audit software had to be loaded on the client’s computer system, modified for the particular installation, and run. The only alternative was to obtain a tape containing the client’s database and process the information on the audit organization’s computer. Neither alternative was considered to be completely secure. Clients were reluctant to allow unknown software on their mainframe and did not want to release data to the auditors. Some of these concerns still exist today, but auditors have more options. In particular, the auditor can download the data to a microcomputer and analyze it at the client’s site. Thus, software is not being loaded onto the client’s system, and the data does not physically have to be removed from the premises. For large data files, even portable laptop computers come equipped with CD-ROM drives, which are capable of holding millions of bytes of data, and external hard drives can hold hundreds of gigabytes of data.
SUMMARY AND CONCLUSIONS

Modern audit technology has freed auditors to use their judgment and all of their critical faculties rather than be limited by physical reviews, rigid audit programs, and information systems and technology that do not support audit. While some barriers to the use of CAATTs still exist, advances in hardware and software have reduced negative attitudes significantly, so much so that you do not have to be a member of a large audit organization with sophisticated mainframe software to make effective use of CAATTs. The processing power and storage capabilities of the microcomputer continue to improve, while the hardware costs continue to decrease—making microcomputer-based tools increasingly viable.

Modern audit software is more powerful and much easier to use than the mainframe software of ten years ago. As a result, auditors can make effective use of these tools with a limited investment in training. It is possible to equip a stand-alone microcomputer with audit software for under $2,000, and the required hardware and additional useful software for between $2,000 and $3,000. Clearly, if you are considering the cost and benefits of automated audit tools, you should examine the latest options and alternatives. Historical comparisons and performance measures are no longer valid. However, the road to automation is still lined with potential pitfalls.

The main elements of strategy to ensure effective use of computer technology in the audit function must be delineated and clearly understood by all participants. An effective plan to implement and support the use of CAATTs must be developed to ensure that the tools and techniques are properly understood and used by all.

References