

# ARGUMENTS ON USING COMPUTER-ASSISTED AUDIT TECHNIQUES (CAAT) AND BUSINESS INTELLIGENCE TO IMPROVE THE WORK OF THE FINANCIAL AUDITOR

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## **Abstract:**

*In the 21st century, one of the most efficient ways to achieve an independent audit and quality opinion is by using information from the organization database, mainly documents in electronic format. With the help of Computer-Assisted Audit Techniques (CAAT), the financial auditor analyzes part or even all the data about a company in reference to other information within or outside the entity.*

*The main purpose of this paper is to show the benefits of evolving from traditional audit techniques and tools to modern and, why not, visionary CAAT, which are supported by business intelligence systems. Given the opportunity to perform their work in IT environments, the auditors would start using the tools of business intelligence, a key factor which contributes to making successful business decisions. CAAT enable auditors to test large amount of data quickly and accurately and therefore increase the confidence they have in their opinion.*

**Keywords:** *audit techniques, computer, software systems, business intelligence, spreadsheets.*

**JEL Classification:** code M42 - Auditing

## **1. Introduction**

The process of selecting the most relevant information, of analyzing and structuring it is not an easy task for the auditor motivated to seek the most appropriate tools. In the absence of information systems, the auditor and the management will never get real-time information to make effective decisions. Improving decision effectiveness and productivity of the economic entity is possible thanks to business intelligence systems, capable of generating information which is accurate, relevant and current and can be verified by the auditor and improved by the management.

The modern computerized environment, in which any audited entity operates nowadays, creates new opportunities, but also new risks, additional rules regarding security, accuracy and acceptable error rates, thus constantly influencing the auditors' work. The increasing complexity of computerized accounting systems such as ERP (Enterprise Resource Planning) and the large volume of transactions recorded in the present days have led to the rapid replacement of classical "manual" audit techniques with modern techniques, computer-assisted, known as CAAT (Computer Assisted Audit Techniques).

## **2. Research Methodology**

The methodology includes analysis of national and international literature, defining the concepts underlying the traditional method of reporting and the modern method performed using computer-assisted techniques, relying on sources such as BDI and ISI articles, magazines, books and specialized sites. The present paper analyzes our vision on the use of business intelligence systems and computer-assisted audit techniques and the benefits they bring to the audit mission statement.

The research starts with a general description of the solutions presented by business intelligence and computer-assisted audit techniques, supporting the need to implement them in the current context of information technology expansion. Between tradition and modernity, the financial auditor must make certain choices, with their advantages and disadvantages, with the risks specific to the use of general or specialized software applications for financial audit.

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Finally, the article presents a practical application of the use of computer-assisted audit techniques, specifically spreadsheets, in the audit tests performed on a case study.

### **3. Challenges of the 21<sup>st</sup> Century for the Financial Auditor**

Today, in a computerized era, the need arises for the auditor to express an opinion based on real-time information, instead of the classical historical approach. The auditor needs to consider qualitative information produced by information systems, as pressures come, in this respect, both from the internal management and the external shareholders, who need to be informed to withstand competition.

As business intelligence systems are increasingly used by economic entities, the auditors' interest in them increases as well, along with the need to identify and understand all transactions and practices recorded by the computerized system, which, according to the auditor's judgment, may be significant for the financial statements. In general, business intelligence refers to software designed to assist managerial decision through a system able to manage the information available in an organization.

Auditing Practice Regulation 1009 "Computer-Assisted Audit Techniques" is developed based on the International Auditing Practice Regulation IASP - "Computer-Assisted Audit Techniques") approved by the International Federation of Accountants (IFAC) in the 2001 edition.

Computer-assisted audit techniques can be defined as a computer-based instruments designed to improve the efficiency and performance of the audit process and it is a growing field in the 21<sup>st</sup> century. These techniques include basic office software, spreadsheets and word processors, as well as advanced software programs including smart tools for business, able to perform statistical analysis, in parallel with the development of specialized audit software programs.

CAAT is an important step ahead from the analysis of financial statements and customer confirmation procedures, as this classical techniques are based on a small part of the transactions and may not always reflect the real situation of the entity in the audited period, despite the auditors' efforts and professionalism. Using computerized applications, the auditors develop a clearer picture of the customer's "business" as they are able to verify large volumes of data, classify them according to certain criteria, they may issue statistics and even forecasts, being provided with a complex picture of the audited company.

In general terms, computer-assisted audit techniques refer to any computer program used to improve the auditing process. Specifically, it refers to software for extracting and analyzing data, containing spreadsheets (eg. Excel), databases (eg. Access), statistical analysis (eg. SAS), etc.

The advantages of audit software include: independence from the audited system using a read-only copy that cannot be influenced, the use of specific auditing methods such as sampling, the production of specific documents for every test performed by the software that may be included in the auditor's worksheets.

Specialized audit software can perform the following: questionnaires, data stratification, simple extractions, identifying missing sequences, statistical analysis, calculations, identifying duplicate transactions, creating pivot tables and cross tabulation.

Other uses of computer-assisted audit techniques include:

- the ability to create electronic worksheets on a centralized database, inside which the auditor may coordinate current audits and can access information from past or similar projects. In addition, the auditor will use a standardized audit report format, which improves the quality of the worksheets;

- the possibility to detect fraud through the use of tools that can identify unexpected or unexplained patterns in the audited data. No matter how simple or complicated the

computer techniques used, computerized data analysis provides many benefits in the prevention and detection of fraud.

- continuous monitoring as a constant process of accumulating, analyzing and reporting company data in order to identify business operational risk. Auditors are provided with a comprehensive data system as long as they make sure that the management continuously monitors activities on all computer systems, on all transactions and applications used.

#### **4. The Advantages of Using Computer-Assisted Audit Techniques**

When using computer-assisted audit techniques, the auditor discovers that work is improved and made more efficient, as it benefits from many advantages compared to the traditional verification system. Among the advantages of using these techniques, we include:

- testing the client's accounting software, as the auditor can verify whether it works correctly or not, since the volume of transactions subject to auditing is extremely high. The only effective way to test the client's program is by using computer-assisted techniques.

- testing of large volumes of data in a short time and with good accuracy, so that the auditor has more confidence in his opinion.

- testing the data source, as the auditor can test the accounting program and its records directly at their origin, rather than testing paper documents that are supposed to be accurate replicas.

- cost effectiveness because, once an audit software is implemented, it can be used year after year to obtain audit evidence, provided the client does not regularly change their accounting software.

- making comparisons between the results obtained using computer-assisted techniques and the results of traditional tests. If similar results are obtained, the auditor's general confidence will grow.

On the other hand, the auditor is not the only one to benefit from these advantages. The audited entity also acquires more certainty regarding the accuracy of the transactions and the extent to which they comply with existing policies. By constant use of automatic transaction analysis and through continuous monitoring, these techniques allow testing and validating of critical company data, independently and in real time.

The management of the audited entity may use this information to proactively identify exceptions and take immediate action to meet standards, while the implementation of these programs help increase confidence in the data underlying the financial statements.

#### **5. Analyzing Specific Risks**

When auditors choose their work tools, they should evaluate the following characteristics: ease of use, ease of data retrieval, the ability to access a wide range of data files on different platforms, the ability to integrate data in a different format, the ability to define fields and select from standard formats, menu functionality to process analysis orders, setup and changes of simplified questionnaires.

The traditional auditing method allows auditors to reach a reasonable conclusion based on a limited sample of a population, but does not allow exhaustive examination of a sample or of all available data. Using small samples can decrease efficiency of the final conclusions, but the auditor states that sample selection is based on generally accepted auditing standards and then the sample is statistically valid.

Computer-assisted audit techniques solve this problem as they are able to analyze large volumes of data to identify errors. An audit based on these techniques will not examine a sample, but all transactions of the audited entity in the period under audit. Then the auditor tests the data to identify possible anomalies - for example you can find VAT registration codes wrongly recorded by connecting your system to the national database or

erroneously duplicated transactions by using spreadsheets. Identifying these potential problems, the auditor can address the management stating that 100% of transactions have been tested and 100% of anomalies have been identified.

Another great advantage of computer-assisted audit techniques is allowing to test specific risks. For example, when the auditor must verify issued invoices: the traditional method allows the auditor to randomly select a "statistically valid" sample of 100 invoices from various moments of the audited period. Since the total number of invoices may exceed 3,000, chances are very small to detect all possible errors in the selected sample. Instead, using computer-assisted techniques, the auditor can check all 3,000 invoices and will surely identify all existing errors.

What do you prefer to say in an audit report? That "the auditor reviewed 100 invoices and identified 5 invoices incorrectly recorded" or that "the auditor used computer-assisted techniques to review all invoices from the audited period, identifying 78 erroneous records"?

However, we must stress that the analysis using these techniques is limited to data stored on a systematic pattern. Unfortunately, few data is recorded in this manner and the available database usually lacks information or is incompletely classified, may be difficult to access or data integrity is doubtful. Therefore computer-assisted audit techniques are currently used along with the other traditional techniques and instruments. There are audits in which computer-assisted techniques cannot be used at all, as well as audits which cannot be performed efficiently and relevantly without these techniques.

## **6. Specialized Audit Software**

There are already different kinds of computer audit programs, such as special package software, to be adapted to each case by changing the file format to be queried, by indicating the required parameters and the shape of the desired result. In addition, the auditor may also use other available programs, designed for a specific purpose, special programs in which it is not possible to adapt a software package because of the computer, of the processing method or of the way the chosen files are organized. And last but not least, we have access to the usual software used by the client to process data, such as Excel, for sorting and printing files.

The Institute of Internal Auditors (IIA) conducted an analysis of audit software and issued several key recommendations for the auditor in selecting appropriate tools for computer-assisted techniques:

1. establishing the mission statement, the objectives and priorities of the audit of an entity: the auditor should consult management about key priorities of the mission statement and the way to apply computer-assisted audit tools to perform this task more efficiently.

2. determining the audit type and extent: what is the stated audit objective? What questions will the auditors ask and where do their investigations stop? Knowing the answers to these questions is very important to decide what audit software is most appropriate.

3. assessment of the entity's technological environment, meaning that audit tools will be selected to work with other software, hardware and network systems already implemented. There are cases where existing IT infrastructure may contain useful tools for the auditor, to be used along with other automated software tools for an improved result.

4. assess the risks inherent to any audit software implementation, so that the auditor is not in a position to reach erroneous conclusions or make assumptions contrary to the entity's operations.

Audit software has multiple uses in the financial auditor's work, such as:

- calculations checkup: for example the program indicates the total amount of individual records of purchases in the daily register in a certain period. The auditor verifies whether this total amount corresponds to the entries in the ledger.

- identifying the violations of the company regulations: for example the program checks if there are receivables from clients whose amount exceeds the standardized limit.

- identifying anomalies: the program checks if there are clients who received discounts exceeding 50% or for whom the ledger balance exceeds the total amount of sales.
- development of new analysis and calculations: for example the statistical analysis of stock movements to identify slow moving stocks.
- selecting items for audit tests: obtaining a stratified sample of general ledger balances to be used as the basis for the rotation speed of the debtors.
- checking the level of document integrity, so that the auditor ensures that all documents have been recorded correctly.

Obviously, the financial auditor may encounter some difficulties in using audit software:

- high implementation costs: the initial cost is high because you need to research and understand the client's procedures before using the audit software to access and query those files.
- changes are expensive, meaning that if the client changes the accounting software, then the audit software will require changes as well and they are not cheap.
- inadequacy of simplified accounting software: it is unlikely for the auditor to use an audit software suitable to a simplified accounting program. As a simplified software does not provide complete information, it is very difficult for the auditor to identify all procedures. It will be hard to justify the cost of a special audit software to test these programs considering the possible benefits of the audit or the possibilities to recover the costs of this software.
- exaggeration of investigations: the tendency to produce overly laborious investigative, too expensive programs, in which processing and reviewing take too long. All these increase audit costs, without justifying utility.
- the volume of results: in the end the results might have a too high volume, either because of poor software design or because of using the wrong parameters in a test. In this way, the auditor will lose too much time to decide what is relevant from this large volume of results.
- client database: the audit software must run on an effective client database for the auditor to test the client's existing accounting program. Some customers might not allow auditors to run the audit software directly on the actual files for fear they would corrupt their database. The alternative solution is for the audit program to run on a backup copy of the actual database, provided that the copied files are identical to those from the client's database.

### **7. Case Study - Using Spreadsheets to Identify Anomalies**

S.C. SPORT S.R.L. is a company that deals with selling sports equipment, especially in tennis - rackets, balls, clothes. Goods are purchased from various suppliers and then sold exclusively on the internet. The company sells about 200 kinds of tennis rackets, each identified by a unique product code.

Customers' orders are made directly online, mostly for a racket or two. The software receiving the orders automatically checks order details, customer's address and credit card information before the goods are prepared and shipped. The integrity of the ordering system is periodically checked by an independent Internet service company.

As external financial auditor of SC SPORT SRL, you have just started planning the audit of the company sale system. You have decided to use tests to verify the data entered by customers in the sales system. This test will include making false orders to the company's online system.

Here is a list of the types of tests to be carried out during the audit of the client's financial statements, so as to confirm the accuracy and completeness of data recodered by the sales system:

- enter an order for a negative number of tennis rackets. Reason for test: make sure the system accepts only amounts expressed in positive numbers, although the company still can not deliver a negative number of products.

- enter an order for 10 tennis rackets. Reason for test: the system must perform a checkup to identify possible errors. The display should show a warning message asking the customer to confirm the order once it exceeds a certain limit, for example more than 2 rackets.

- enter an order without filling in the payment data. Reason for test: make sure the orders are paid before goods are shipped. This limits the amount of bad debt.

- enter wrong item code. Reason for test: make sure the system detects the wrong code and issues an error message, rather than to register a similar code and accept the order as such.

- enter incorrect data from the customer's credit card. Reason for test: make sure the system detects erroneous data so that orders are paid before goods are shipped. This also limits the amount of bad debt.

- enter client's address wrongly. Reason for test: make sure the online system has access to a correct database of addresses and postal codes. For any error, there should appear an error message. This way, goods will be shipped to a valid address.

The audit tests which can be programmed on the audit software for the sales and inventory system of SC SPORT SRL are:

- checking the calculations of daily sales. Reason for test: make sure that the computerized daily sales are correctly implemented and thus the balance sheet checks out.

- analysis of the age of inventory. Reason for test: make sure that old goods are detected, which are to be recorded as net value, not as sale price.

- select a sample of inventory at year end, during a physical inventory checkup. Reason for test: comparison of goods from a sample with goods recorded as available in the online system, within an examination system that works faster than a manual system.

- select a sample of invoices to verify shipping. Reason for test: analyzing the integrity and accuracy of recorded documents from an actual sample within an examination system that works faster than a manual system.

- check invoice numbers. Reason for test: be sure to follow the chronological order of numbering and registration in the sales book.

- check payments for all issued invoices. Reason for test: all orders are paid online so unpaid invoices would be a violation of the system rules and the auditor should investigate them.

- verification of provisions for customers. Reason for test: identifying reasons why shipped goods are returned, as returns can be caused by errors in the ordering system. Investigating the provisions, the auditor investigates the system itself.

Further on, we illustrate how spreadsheets help the financial auditor identify duplicates of invoices to customers, a common operation in audit practice, as it corresponds to a situation in which the auditor is found quite frequently: when receiving an extended list of transactions performed in a period of time (such as issued invoices), the auditor must make sure there are no duplicate records (several records of the same invoice). Even in cases where duplicates are allowed (if multiple payments are made on the same invoice), it may be necessary to analyze the reason for duplication as well as records accuracy.

Figure 1 shows the data set containing a list of invoices issued during January-March 2013 by the audited entity and it is required to identify any duplicate (invoices recorded several times). As can be seen, each invoice indicates the client's name and the total invoice amount.

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2	NrFact	DataFact	Societate	Valoare (lei)								
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4	ABC1235	06.01.2013	SC AAB SRL	1181								
5	ABC1236	07.01.2013	SC ADA SRL	506								
6	ABC1237	08.01.2013	SC AEA SRL	1318								
7	ABC1238	09.01.2013	SC AAF SRL	1808								
8	ABC1239	10.01.2013	SC ASA SRL	749								
9	ABC1240	11.01.2013	SC AXA SRL	1042								
10	ABC1241	12.01.2013	SC AAV SRL	1992								
11	ABC1242	13.01.2013	SC AZA SRL	1976								
12	ABC1243	14.01.2013	SC AAR SRL	1277								
13	BBB2222	01.02.2013	SC BAB SRL	862								
14	ABC1237	02.02.2013	SC BSB SRL	1257								
15	BBB2224	03.02.2013	SC BQB SRL	1695								
16	BBB2225	04.02.2013	SC BXB SRL	1929								
17	BBB2226	05.02.2013	SC BCB SRL	1350								
18	BBB2227	06.02.2013	SC B2B SRL	669								
19	ABC1237	07.02.2013	SC BVB SRL	522								
20	BBB2229	08.02.2013	SC BZB SRL	911								
21	BBB2230	09.02.2013	SC BMB SRL	1314								
22	BBB2231	10.02.2013	SC BBX SRL	1159								
23	ABC1237	07.03.2013	SC CCC SRL	1926								
24	CCC3334	08.03.2013	SC CAC SRL	1071								
25	CCC3335	09.03.2013	SC CSS SRL	584								
26	CCC3336	10.03.2013	SC CDD SRL	608								
27	ABC1237	11.03.2013	SC CQC SRL	1537								
28	CCC3338	12.03.2013	SC CCE SRL	564								
29	CCC3339	13.03.2013	SC CEC SRL	1755								
30	CCC3340	14.03.2013	SC CXX SRL	1998								
31	CCC3341	15.03.2013	SC CZC SRL	1892								
32	CCC3342	16.03.2013	SC CAA SRL	1520								
33												

Figure 1 - Details of the initial data set (own projection)

New features to the 2013 version of the Microsoft Excel allow the identification of duplicate records in a fast and simple method. This involves the following steps:

- Step 1 - select the cell range that contains invoice numbers (in this case from A3 to D32), then select *Conditional Formatting* from the *Home* section of the main menu. In this command (which is also organized as a menu), choose the option *Highlight Cell Rules* and then *Duplicate Values*. The result of this command is the display of a dialog box, from which the user can choose one of the highlighting options (by choosing the background color and text color). The whole process is shown in Figure 2;

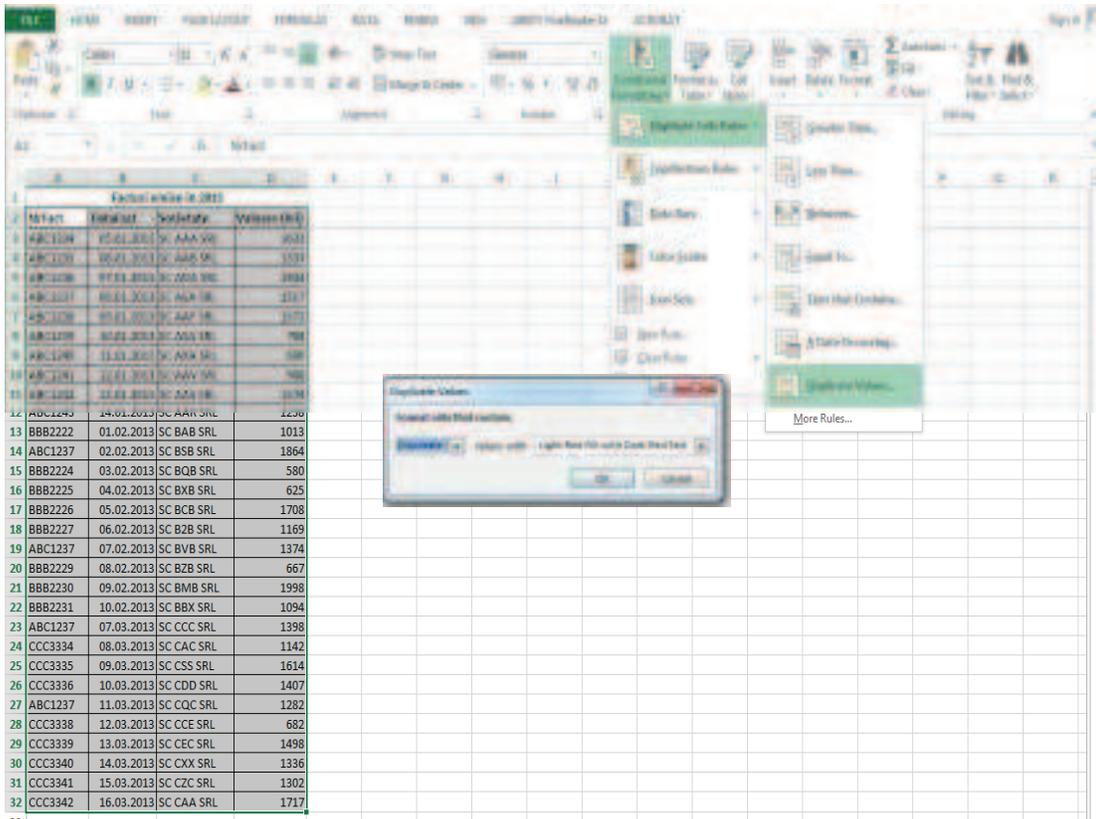


Figure 2 - The first step of the identification process (own projection)

• Step 2 - as duplicate invoice numbers were highlighted (using a different color) in the previous stage, now we only need to bring them on top of the list, so that the auditor does not have to go through the whole list in order to see all suspicious records. Achieving this re-ordering involves selecting one of different colored cells in the list of invoice numbers (that is, select a duplicate invoice number), followed by the *Sort* command from the dropdown menu (right-click), then choose the option *Put Selected Font Color on Top* (to place cells with this color on top). The process is summarized in Figure 3.

### 8. Conclusions

In-depth knowledge of the facilities offered by spreadsheet applications can bring significant saving of time and resources to a wide range of users. The modern auditor who, almost without exception, carries a significant part of his work by testing data, can greatly benefit from using these facilities.

Business intelligence and CAAT provide auditors with the expertise and tools necessary to comply with new regulations and standards, both professional and IT, helping them collect information quicker and in real time, and understand the client's work and environment. As long as auditors obtain, process and analyze information faster than with traditional methods, the quality of the audit mission is increased and risks are reduced.

