


● ● ● USING DATA ANALYSIS  
TO MEET THE REQUIREMENTS OF THE  
NEW AUDITING STANDARDS



A CaseWare IDEA Research Report



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## INTRODUCTION

Auditors around the world have been shaken by events that place a question mark behind the believability of their external audit opinions. Through various regulatory requirements and professional standards revisions,<sup>1</sup> auditors must now use a risk-based audit approach to lower their risk of signing off on fraudulent financial statements.

The road to development of the risk assessment set of auditing standards has been highly reactive to the impact on investors and other stakeholders of headline-grabbing corporate failures. In August 2000, after extensive research including surveys, focus groups and the qualitative study of 126 audits conducted by major audit firms, the Public Oversight Board's Panel on Audit Effectiveness released its report of recommendations. The report supported the risk-based audit model, with strengthened standards, and included introduction of a forensic-type fieldwork phase.<sup>2</sup> A risk-based audit model had already been adopted by a number of firms as a means to gain audit efficiency while maintaining audit quality.

In 2002, the Sarbanes-Oxley Act was passed in order to add more requirements and real consequences for the auditing industry and for top management of U. S. publicly held companies to lower the instances of financial statement fraud not detected by the auditor, followed by the necessary guidance by auditing standards boards. At the same time, these standard-setting bodies have been working towards clarity for the auditing standards so that they are understandable, clear and able to be consistently applied when examining financial statements for the purpose of expressing an opinion.

While several of the Panel's recommendations regarding financial statement fraud and earnings management became a part of SAS 99, issued in 2003, the term "forensic" was not used. However, a 2006 report by the six largest global accounting firms called for dialogue with policymakers and investors to close the "expectations gap" and consider other fraud detection requirements such as the periodic conduct of forensic audits of all or selected public companies. The report states, "...unless companies or investors are willing to pay auditors to police all of a company's transactions, auditors are limited to using indirect means to ascertain whether fraud has occurred."<sup>3</sup> These dialogues have not resulted in any additional changes in the auditing standards. However, if we define a forensic audit as one that uses an iterative process to obtain evidence about a fraud, then data analysis is the solution to the need for auditors to effectively look for and find financial statement fraud. Use of data analysis software (also known as computer assisted audit techniques or CAATs), can allow the auditor to perform unpredictable procedures on essentially all of a company's recorded transactions. This research report reviews the areas where data analysis can be used most effectively to meet the new auditing standards.

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1 Audit standard-setting bodies include the International Auditing and Assurance Standards Board (IAASB) of the International Federation of Accountants (IFAC), the Auditing Standards Board (ASB) of the American Institute of Certified Public Accountants (AICPA), and the Public Company Accounting Oversight Board (PCAOB)

2 Public Oversight Board, Panel on Audit Effectiveness, "Report Recommendations," August 30, 2000, p. 88.

3 Serving Global Capital Markets and the Global Economy: A View from the CEO's of the International Audit Networks, November 2006, p.12.

# UNDERSTANDING THE ORGANIZATION'S INDUSTRY AND ENVIRONMENT IN ORDER TO ASSESS RISK

The new standards require auditors to gain a thorough understanding of the organization's industry and environment, including its internal controls. The risk assessment procedures required include inquiries of management and others, observations and inspections to support the responses to the inquiries, and analytical procedures. Data analysis can be used to analyze information for comparison with industry data that might be publicly available. In cases where a client has multiple product lines, it might be necessary to obtain sales and cost details by product line for better comparisons or to explain variations from public domain benchmarks.

Inquiries of management about the accounting system, initiation and recording of the various kinds of transactions, and areas where estimates are required are necessary procedures. Since the trial balance is the normal source for financial statement preparation, the auditor should obtain a year-to-date general ledger detail report and perform forensic-type analysis to gain an understanding of transaction flows.

With data analysis software and an electronic version of the report, such procedures are powerful and provide substantial information in helping to understand the client's financial environment. For example, all transactions for the period can be summarized by account and by journal source. A quick review of the results can tell the auditor such things as:

- what types of entries exist;
- whether there are a high number of manual journal entries and what accounts are most often affected;
- volume of activity in loan accounts;
- whether excessive credits that are not from an accounts receivable posting source are included in accounts receivable;
- whether excessive debits that are not from an accounts receivable posting source are included in revenues;
- whether the ledger balances and how many transactions are included in each account.

The figure below illustrates how such a report could appear and be used for documentation of this analytical risk assessment procedure.

	ACCT_DESC	SOURCE_DOC	NO_OF_RECS	DEBITS_SUM	CREDITS_SUM
14	ACCOUNTS RECEIVABLE-CURRENT	ARCRJ	469	0.00	-3,795,984.91
15	ACCOUNTS RECEIVABLE-CURRENT	ARSJ	538	4,775,475.02	-515,277.03
16	ACCOUNTS RECEIVABLE-CURRENT	GJ	25	163,257.41	-384,209.90
17	ALLOWANCE FOR DOUBTFUL	ARSJ	8	48,905.14	0.00
18	ALLOWANCE FOR DOUBTFUL	GJ	17	1,428.00	-68,131.94
19	CASH ADVANCES	APTRX	45	23,079.83	-152.61
20	CASH ADVANCES	GJ	35	5,285.06	-15,231.50
21	INTERCOMPANY ACCOUNTS REC	APTRX	242	215,756.71	0.00
22	INTERCOMPANY ACCOUNTS REC	APVCH	3	0.00	-1,263.30
23	INTERCOMPANY ACCOUNTS REC	GJ	125	427,164.69	-308,034.24

With this detailed analysis, the auditor will be able to identify significant recorded activities that might represent risks, and can ask more specific questions while gaining an understanding of the environment. Comparing this type of summarization with a similar summary from the prior year will help the auditor know more about changes during the year and be able to narrow the scope of items to consider for the current year.

It is said that the audit begins and ends with materiality. Materiality is the threshold amount an auditor begins with in deciding what scope to set in performing the risk assessment and further audit procedures. Tolerable misstatement is the amount an account balance can be off without causing a material misstatement in the financial statements. While no specific formula is provided in the new auditing standards, amounts must be set while planning the audit, based on the auditor's quantitative and qualitative judgment, taking the users of the financial statements into consideration. Appropriate reasoning must be documented in the work papers.

Because data analysis software has no limit in the amount of data that can be imported for review, stratifications or data population profiles can help identify individually significant items and groups of items that are also significant, and can provide documentation for the basis of the auditor's judgment when planning the audit strategy.

## FRAUD RISK ASSESSMENTS – SAS 99 OR ISA 240

Throughout the planning process, the risk assessment includes considering risks that fraud may have occurred. The auditing standard for fraud risk assessment requires the auditor to ask: what can go wrong and how could management intentionally cause a material misstatement in each significant area of the financial statements. Fraud risk factors outlined in the standards are related to the fraud “triangle” of pressures or incentives, opportunities and rationalizations. In addition to the inquiries required, the auditor must perform specific analyses to help identify potential fraud or to respond to all identified risk factors. The procedures listed below are taken from the applicable audit standards and their appendices. Data analysis software is a critical tool for effectively performing these procedures.

- Analyze unusual or unexpected relationships identified in earlier analytical procedures
- Perform disaggregated analysis of revenue (by month or quarter, by product line, etc.)
- Disaggregated analysis of expenses/expenditures and payroll
- Identify and test journal entries made at the end of reporting periods and other unusual entries
- Identify accounting estimates for review; analyze underlying details
- Perform cut-off procedures at period end
- Compare inventory quantities for current period with prior periods by class or category of inventory, location or other criteria, or comparison of quantities counted with perpetual records
- Use computer-assisted audit techniques to further test the compilation of the physical inventory counts
- Perform a computerized match of the vendor list with a list of employees to identify matches of addresses or phone numbers
- Perform a computerized search of payroll records to identify duplicate addresses, employee identification or taxing authority numbers or bank accounts
- Analyze sales discounts and returns for unusual patterns or trends
- Review the propriety of large and unusual expenses (requires data extraction)

The Center for Audit Quality, affiliated with the AICPA, released a Practice Aid on Journal Entry Testing. The guide lists the following 16 queries that can be performed using data analysis software.<sup>4</sup>

Find journal entries that do not balance	Find manual entries
Find gaps in journal entry number sequence	Sample journal entries (random or high dollar)
Find high-dollar journal entries	Find specific journal entries (by month, day or JE#)
Find possible duplicate account entries	Find all entries containing specific account(s)
Find round-dollar journal entries	Find all entries within a range of accounts
Show journal entry information by employee	Find post-dated entries
Find all entries made by a specific employee	Find entries with unusual (non-standard) descriptions
Show values for the 'journal entry type' code	Find entries posted on weekends

<sup>4</sup> The guide can be downloaded from the Center's website at: <http://www.centerforauditquality.org/resources/index.htm>

## RESPONSE TO RISK ASSESSMENTS: DESIGNING THE AUDIT APPROACH AND DEVELOPING THE AUDIT PROGRAM

Audit risk (AR) and the risk of material misstatement (RMM) are often viewed as formulas:

RMM = Inherent risk (IR) x control risk (CR)

AR = RMM x Detection Risk (DR)

The standards require that auditors link their audit procedures – the nature, timing and extent of tests they perform – to the RMM. If IR and CR are low (controls must be tested to achieve a low risk), the risk assessment procedures performed to make that determination might be sufficient to lower the auditor's risk. If they are not, or if any fraud risk factors are identified, the auditor must respond with a plan to perform additional procedures, and they should be customized to the client.

Following is an example of how data analysis can be used early and often to save time and minimize the risk of material misstatement.<sup>5</sup>

Big Kachina, Inc. is a rapidly expanding multi-location retailer of business equipment. Total assets are \$12,000,000 including \$9,914,148 in accounts receivable. The accounts receivable aging report provided by the client showed more than \$252,000 past due by 120 days or more. An electronic version of the detailed report was obtained and further analysis helped document a decision to examine more current account receivable balances separately from those past due by 120 or more days, per the figure below:

	STORE	NO_OF_RECS	LT_120_DAYS	NO_OF_RECS1	OLD	BAL_TOTAL	PERCENT ▼
Net value		909	9,661,660.50	80	252,487.46	9,914,147.96	26.24
1	0011	40	525,754.75	7	29,683.67	555,438.42	5.34
2	0009	139	1,511,519.10	7	80,087.62	1,591,606.72	5.03
3	0004	116	1,183,156.74	18	52,283.42	1,235,440.16	4.23
4	0003	133	1,157,048.79	17	50,662.83	1,207,711.62	4.19
5	0008	41	276,464.82	8	8,568.34	285,033.16	3.01
6	0001	82	583,753.30	5	15,213.39	598,966.69	2.54
7	0005	63	913,264.93	10	14,035.79	927,300.72	1.51
8	0007	19	345,871.86	2	578.67	346,450.53	0.17
9	0006	53	653,566.27	4	1,136.76	654,703.03	0.17
10	0040	25	142,555.71	1	39.76	142,595.47	0.03
11	0002	65	929,875.79	1	197.21	930,073.00	0.02
12	0030	12	306,656.62	0	0.00	306,656.62	0.00
13	0020	107	974,243.06	0	0.00	974,243.06	0.00
14	0010	14	157,928.76	0	0.00	157,928.76	0.00

In less than 20 minutes, the auditor was able to perform the following steps:

1. Gain a better understanding of the monitoring system for accounts receivable.
2. Total the file and agree the balance to the client's monitoring report and general ledger balance.
3. Check (re-perform calculations) the aging report by using the due date field.
4. Isolate past due balances and summarize them and the more current balances by store, then compare and calculate the percentage of past due accounts to total by store.
5. Decide on an effective strategy in order to respond to the high inherent and control risk assessments.

Further tests, based on the determination of materiality, would include extraction of a sample for confirmations for the less risky accounts, and later matching of subsequent collections for those older items. Without the power and efficiency of data analysis software, the auditor might have selected accounts from the entire population and exceeded his budget dealing with the inevitable problems that would occur if several of them were seriously past due.

Materiality is an important concept for financial statement and other audits because the cost of examining 100% of a population would be prohibitive for clients. Some forms of sampling, such as monetary unit sampling, make use of materiality by requiring the use of tolerable and expected errors as parameters while planning the sampling application.<sup>6</sup>

With large populations, data extraction is the only efficient way to make sure all individually significant items are identified.

Data analysis is most suited to testing assertions of accuracy and cut-off. While it would be impossible to “find” something that is not in a database while testing for completion, the auditor can check date statistics to determine that every month is represented in the population. A test for cutoff of transactions would involve looking at subsequent payments to determine that they were recorded in the correct period.

Audit program steps should reflect the auditor's risk assessment, noting how the tests (further audit procedures) will be used to lower the risk of material misstatement, and these must be defined by the relevant assertion for the account balance. In the example above, the valuation assertion is affected by a high risk of overstatement for net accounts receivable (or understatement of the allowance for bad debts), because of the high percentage of past due accounts. Since the work that would be done to audit the allowance account includes subsequent collections, evidence is also obtained for those accounts regarding existence. The audit evidence about existence that would come from the confirmations could be reduced in this case by segregating the population.

Since less experienced staff will normally perform the tests of details (further audit procedures) or other substantive tests in response to RMM, it is important that the audit program clearly define not only the tests to be performed, but also the process for obtaining the data, importing it into the data analysis software, and output that will become a part of the work papers. Some firms have adopted a policy of using IT specialists to acquire, import and analyze the data during an audit. This practice handicaps the field auditor who must see the results of the test and decide what to do next. With data analysis software, simply drilling down on a summarized amount that is questionable can provide the evidence the auditor needs to clear or isolate the exception.

With IDEA and its optional component, Smart Analyzer Financial, auditors can easily test for common indicators, such as negative amounts, duplicates, rounded amounts and unusual descriptions on accounts receivable, general ledger, accounts payable, inventory and fixed assets data. Since the tests are pre-developed, training time for staff can be minimized. (See Appendix for a complete list of the tests provided in IDEA's Smart Analyzer Financial.)

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5 Case scenario and data files illustrated were adapted from the IDEA Case Study, a self-study resource that can be downloaded from <http://www.audimation.com/self-study.cfm>.

6 IDEA – Data Analysis Software offers planning, extraction and evaluation modules in its offerings for monetary unit sampling and classical variables sampling.

## ANALYTICAL PROCEDURES

Analytical procedures include everything from simple financial statement balance and ratio comparisons to complex correlations, time series and trend analyses; but they also include visually scanning records to identify large and unusual items. In each case, the objective is to set an expectation, then perform the test or other procedure and compare the results to the initial expectation. Audit evidence consists of the documentation of that process, together with the auditor's conclusion about the account balance or set of transactions after explaining and corroborating the reasons for variances.

Scanning the general ledger or subsidiary accounts looking for unusual items is highly effective with data analysis software, which provides the ability to summarize the details then drill down to investigate further those things that raise concerns or questions about errors that might exist.

Following are two examples that illustrate the ability of data analysis to achieve audit effectiveness and provide added value for clients:

<b>Analytical Procedure</b>	<b>Impact on Audit</b>	<b>Value for Client</b>
Summarize entire year of cash disbursements by payee and compare with a similar summary from prior year.	Allows auditor to note excessive payments and payments to new payees. Auditing by exception is effective for fraud detection.	Efficiencies for check processing can be recommended in cases where excessive payments, while accurate, are wasteful for the client.
Compare inventory unit costs between years.	Lowers the cost to perform inventory testing in second and third years of an audit. Increases can be compared with expectations based on auditor's knowledge of economic trends and other factors for prices.	By analyzing all inventory items, special reports can be provided to clients that will help them see anomalies or errors in their inventory data that might not be material, but would still provide valuable action items.

If detection risk represents the chance that the auditor will miss a material error, then using analytical procedures to bring more details to the auditor's attention will help lower that risk. Performed during the risk assessment, analytical procedures result in a better understanding of the client, and the work counts as audit evidence! When performed as further audit procedures in response to identified risks, the same data can be disaggregated so that smaller amounts in groupings will allow the auditor to more easily see relationships and isolate the cause for anomalies that need to be explained.

In certain cases, data analysis can also be used to help clients and auditors recover from challenges that occur when sampling is used. If the error rate in a sample used for substantive testing is higher than expected, the auditor can perform an analysis of the cause for misstatements identified, and use this information when deciding on how to project the errors.<sup>7</sup> For example, if an unusually high number of errors in cash disbursements data are analyzed by userid – the auditor could summarize the sample and the population by userid to make a better determination of the impact on cash disbursements of the errors found.

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<sup>7</sup> IFAC, ISA 530 (Redrafted), Audit Sampling, paragraphs 12-13; AICPA, AU Section 350, paragraph 27.

## INTERNAL CONTROL TESTING

Internal controls over the major transaction classes include manual and automated control activities that assure management's directives are carried out. In most companies today, IT significantly affects control activities, especially in the areas of authorization and segregation of duties (through passwords and other access controls), accuracy and completeness (through IT general controls over program change control and processing controls in each significant application). Tests of controls to determine reliability of details will be necessary if the information system data is to be used for these kinds of analytical procedures.

Data analysis software is useful in facilitating tests of controls because it calculates sample sizes based on the desired confidence level and precision, and can compute achieved confidence to help the auditor document his conclusions. The figure below illustrates the sample size calculation method for attribute sampling.

The screenshot shows the 'Attribute Sampling' window with the following input parameters:

- Population size: 20000
- % Expected deviation rate: 5.00
- % Tolerable deviation rate: 10.00
- Confidence level (to control Beta Risk): 80.00

Calculated results:

- Sample size: 54
- Critical number of deviations in sample: 3

Deviations	% Deviations	Achieved Confidence (Beta Risk Control)
0	0.00	99.67
1	1.85	97.65
2	3.70	91.70
3	5.56	80.22
4	7.41	63.93
5	9.26	45.80
6	11.11	29.34
7	12.96	16.80
8	14.81	8.61
9	16.67	3.97

**Conclusion:** If no more than 3 deviations are observed in a sample of size 54, you can be at least 80.00% confident that the population deviation rate is not more than 10.00%.

Buttons: Print, Close, Compute, Help

Attribute sampling in IDEA - Data Analysis Software includes an evaluation tab, which allows the auditor to enter actual test results (i.e., the number of errors found), then print a report with an appropriate conclusion.

Sampling modules are also available to extract the sample on a random basis, systematic basis or stratified random basis. Stratified random sampling is useful if the auditor is designing a “dual-purpose test,”<sup>8</sup> because the sample will randomly select items from each strata per the auditor's judgment as to how many items to select from each group. The figure below represents a dual-purpose test of revenues where the auditor can test the reliability of sales transactions and their posting in the general ledger so that analytical procedures on the ledger balances can be relied on and to support revenue analyses.

	CUSTOMER ▲	INVOICE_CM	DATE	AMOUNT	TEST_1	TEST_2	TEST_3	DIFFERENCE	COMMENT
1	C 50	042784	8/15/2007	38,079.54	✓	✓	✓	0.00	
2	C 50	045103	2/29/2008	44,095.00	✓	✓	✓	0.00	
3	C 69	046694	9/27/2008	98,125.45	✓	✓	✓	0.00	
4	C 69	046222	7/25/2008	170,034.30	✓	✓	✓	0.00	
5	F 98	044225	12/14/2007	201,718.98	✓	?	✓	0.00	no credit application in file
6	F100	040993	4/30/2007	947.95	✓	✓	✓	0.00	
7	F111	042750	8/14/2007	145.74	✓	✓	✓	0.00	
8	H123	046495	8/21/2008	8,251.90	✗	✓	✓	660.15	sales tax incorrectly invoiced
9	H123	043975	11/30/2007	112,252.64	✓	✓	✓	0.00	
10	H124	043765	11/9/2007	183.48	✓	✓	✓	0.00	
11	H124	040861	4/30/2007	477.17	✓	✓	✓	0.00	
12	H124	046570	8/26/2008	1,767.67	✓	✓	✓	0.00	
13	I146	046261	7/28/2008	11,485.50	✓	✓	✓	0.00	
14	J155	045099	2/29/2008	3,916.00	✓	✓	✓	0.00	
15	J161	045950	6/20/2008	9,139.00	?	✓	✓	0.00	cleared via subsequent CM
16	J161	045573	4/30/2008	51,455.25	✓	✓	✓	0.00	

<sup>8</sup> AICPA, Audit Sampling Audit Guide, as of May 1, 2008 p. 9, describes dual-purpose tests as those that seek to test the effectiveness of a control and whether a recorded balance or class of transactions is materially misstated.

## CONCLUSIONS

Auditing is an iterative process, which requires the auditor's judgment to constantly evaluate the evidence obtained and make determinations as to when the procedures are sufficient to minimize Audit Risk. Data analysis software provides better coverage and reduction of risk than can be achieved manually or with a spreadsheet application. It is an auditor's tool for obtaining an understanding of the client's systems and reporting environment, identifying anomalies, errors and potential fraud, plus extracting all items of individual significance within a transaction or master file.

Accounting firms that are most successful in implementing data analysis have incorporated the procedures into their audit process. They have provided adequate training and support to staff, and have guarded against over-relying on technical specialists. They have overcome the challenge of insufficient staff levels by arming their field auditors with data analysis software, while freeing up their IT auditors to work on more complex areas and win consulting projects for continuous auditing applications.

Properly implemented and integrated into the audit, data analysis can help solve the auditor's dilemma of a continuing expectations gap concerning the auditor's responsibility to detect material misstatements in the financial statements.

# A P P E N D I X

## Tests Included in IDEA Smart Analyzer – Financial

### General Ledger tests

- Identify Journal entries which are:
  - Out of balance
  - Duplicates
  - Missing
  - Posted on weekends, specific dates or times
- Reports and summaries by:
  - User
  - Account Combinations
  - Journal Entries with Large Amounts
  - Journal Entries with Rounded Amounts
  - Journal Entries with Amounts that end in 999
  - Journal Entries with Specific Comments
  - Account Number
  - Period or Source
  - Account Balances by Source or Period

### Inventory tests

- Aging by Receipt Date
- Recalculate Inventory Balance
- Calculate Inventory Turnover Ratio
- Calculate Unit Turnover Ratio
- Zero or Negative Unit Cost
- Negative Quantity on Hand
- Inventory Location Summary
- Large Inventory Amounts
- Inventory Received Around a Specified Date
- Last Sales Price Lower than Unit Cost
- Compare Sales Price with Unit Cost
- Duplicate Field Search

### Accounts Receivable tests

- Aging by Due Date or Invoice Date
- Accounts with Balances or Transactions Exceeding Credit Limits
- Accounts with Credit Balances
- Transactions Around a Date Range
- Duplicate Transactions
- Debtor Transaction Summary

### Accounts Payable tests

- Aging by Invoice Date
- Duplicate Invoices or Payments
- Creditors with Net Debit Balance
- Creditors with Balances or Transactions Exceeding Credit Limits
- Creditor Transaction Summary
- Invoices Without Purchase Orders
- Posted on Weekends, Specific Dates or Times
- Transactions Summarized by User
- Transactions with Rounded Amounts
- Duplicate Field Search

### Fixed Assets tests

- Fixed Assets Additions
- Asset Category Summary
- Recalculate Straight Line Depreciation
- Recalculate Declining Balance Depreciation
- Depreciation Exceeding Cost
- Duplicate Field Search



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