01 February 2023

Computer assisted audit techniques (CAATs)

Chartered Institute of Internal Auditors

Computer assisted audit techniques (CAATs) refer to the use of technology to help you evaluate controls by extracting and examining relevant data. Sophisticated use of CAATs can be known as 'data analytics' and is increasingly being used across the profession.

For the small audit team it can be a common misconception that CAATs are a nice-to-have, or can only be used effectively by large organisations. However, with basic Excel and Word knowledge, a few simple tips and tricks and a well-defined strategy, taking that first step to achieve great rewards, including increased efficiency, accuracy and a stronger relationship with the business, may not be so far away.

The key to CAATs is the small actions which deliver big results, if you plan to try at least some of the points in this guide you have taken your first step on the journey.

IDENTIFY	OBTAIN	TEST	ARTICULATE
Use your audit plan to identify where CAATs can be used. Focus on recognising specific audit needs. Identify data necessary to achieve the required results. Document your data requirements, i.e. the what, where, how and who.	Be forward thinking about timescales for data and resource requests. Make sure you use the data requirements document, keep it relevant to ensure the process is repeatable.	Ensure you have a clear plan and understanding of the tests you will perform. Use the most appropriate tool for your defined testing. Consider the volume of data you will be testing, this will impact required resource and time.	Emphasise conclusions are based on full population size, not just a sample of data to add weight to your observations. Draw out root causes, errors identified could be symptoms of larger issues.
Tips	**Tip**	**Tip**	**Tip**

Application screens used to input data (input fields) can help identify data requirements. A simple data flow map may also help this process.	If you have to use experts make sure you plan in time for knowledge transfer.	Stick to the testing plan! It is easy to become engrossed in the detail and lose time.	Take the opportunity to include positive findings and practices.

1. Identify

Your contact
This could be the data owner or the person with the ability to perform the data extraction.

Your data source
This is the technical detail of where the data is housed. Make sure you clearly understand where the data is coming from (for example a production system (database), a copy (data warehouse) or backup (disk or even tape)). It is not recommended to use any source other than the live production data. However this is not always feasible and therefore when using other data sources you need to document how you gain assurance over the accuracy.

Your collection method
This is the script or query with version history.

Your extraction process
This is any validation, checks or cleaning performed as part of the data collection.

Your data structure
Including a description of what each field means.

Your data format
The output file, this may be .csv, .txt, .xls etc.

Your specific data considerations
Confidentiality and anonymisation. Do you have to take any extra precautions when dealing with particular data? What internal policies or external legislation must you comply with when handling or storing the data, such as GDPR?

Ensure you keep a record of all decisions in a data requirements document, in order to allow your extraction to be repeatable by another auditor.

Tip
Gathering and clearly documenting this information ensures you are capturing your key processes and parameters which will make the identification process in the future streamlined and repeatable. Also make sure you carefully evaluate the impact these will have on your work plan, include relevant

actions so that you can track progress and deliver the required results in a timely manner.

2. Obtain

The ability to analyse large volumes of data effectively is a significant advantage that CAATs gives an auditor, particularly when resource is limited. By employing the use of CAATs we can increase attention to every item and therefore the level of assurance that can be provided.

Involve data owners. The more visibility they have of the work you perform the more credibility you can gain, resulting in increased confidence in your abilities to use data effectively to benefit the business.

Involve any technical or data specialist as early as possible.

Only extract what you are going to use. As tempting as it may be don't extract absolutely everything you can.

Make sure you use the data requirements document, keep it relevant to ensure the process is repeatable.

Tip
Do not underestimate the length of time it may take to find the resources and even to perform the extraction of the data You could be looking at a lead time of 6–8 weeks. With all the best will and planning in the world we all sometimes get caught out by business as usual (BAU) incidents or outside influences which place pressure on key resource.

3. Test

CAATs allow us to become more efficient, working towards repeatable and automated testing. Employing these tests delivers value and insight, not just evidence, as a result improving the way the business sees internal audit. Invest time upfront to be more efficient and effective later.

There are two important principles that can vastly increase the value from using CAATs:

1. Test entire populations rather than samples, where possible. By constructing a logical test (e.g. VLOOKUP) an auditor should be able to test all cases, providing significantly more audit coverage and capturing 'corner cases' that would otherwise be missed by a sample test.
2. Spend a little more time to make the test repeatable in future audits. Rather than designing a tool for a single use, consider the structure of your source data. If this is unlikely to undergo major changes (e.g. column order and column header remains the same) then your CAATs could be used again next year by overwriting with new data.

Leverage the usefulness of CAATs by considering the suggestions below as part of your testing. Once you have identified those tests applicable to your requirements make sure you document them and include the queries, formulas, sorting etc. methods used in a logical manner, so that anyone can re-perform them in the future.

- Testing large volumes of data accurately and quickly

- Testing automated controls such as configuration parameters, or general IT controls such as passwords
- Testing the source data rather than printouts from the system which could be incorrect
- Identifying outliers to policy requirements. Loan to value (LTV), loan amount, age of borrower
- Identifying duplicate vendors based on the same or similar vendor name
- Identifying simple and/or complex duplicated payments in payroll, claims or expense report line-items
- Identifying missing values in sequential data or datasets for example postcodes or national insurance numbers
- Identifying data entry times that are outside regular working hours
- Testing transactions and balance calculations, such as recalculating interest
- Testing compliance with general controls, configuration of the operating system network access user rights or inappropriate access
- Testing compliance with application controls, for example, that automatic three-way matching is enabled in a finance program by testing the system configuration file.

Tip

Word can be used to highlight the differences between data files using the 'Compare' functionality. This ability can be utilised in a unique way: by using word to open text versions of a spreadsheet you can use the compare function to identify any changes. This is useful if you have a previous year's spreadsheet and want to identify if any changes have been made to formulas in the current version. This does not provide an audit trail but does allow you to make a point in time judgement. This type of spreadsheet checking works best if performed at random points throughout the year.

Excel has multiple abilities such as 'sorting' to identify highs and lows, matching through conditional formatting and the use of functions such as VLOOKUP which allows you to return specific elements from a matching row in a defined data table. This could be used to match a sample of invoice numbers to invoice line item data to rebuild the invoice value.

Don't forget Excel has a comprehensive help facility which can provide a lot of guidance and examples about functions.

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4. Articulate

Creating an accurate and relevant audit report is dependent on members of the team understanding the value of the testing results and which items should be clearly articulated in the report.

A major benefit of CAATs is that you can now test the full population size, allowing you to claim this in your report. This can add more weight to your observations and make it easier for you to communicate to the business how you reached your conclusion.

When reporting on CAATs, it is worth keeping in mind that the depth of information CAATs can provide gives the opportunity to include positive findings and practices.

Make sure you use your judgement and knowledge before forming an opinion on your findings. The output of CAATs testing can be a powerful tool to help you form your overall audit opinion, by identifying control weaknesses or areas for improvement. However, don't just report the facts. Issues observed through CAATs testing could well be symptoms of a larger root cause.

If you feel the data and detailed results would be beneficial to the business make them available either in an appendix or other appropriate means. Allow the business to make informed decisions that lead to pertinent remediating actions.

Tip

Be careful, as a result of using CAATs you will be handling larger volumes of data and the observation of errors may become more frequent. This is normal. It is important not to get swamped by the results and to consider them as you would any other audit evidence.

Including comments where departments are meeting appropriate business defined standards gives positive assurance over controls and shows the additional value and insight that internal audit are providing.

Example: Putting CAATS into use

The following is based on a real life scenario faced by an internal audit team in the financial services sector. As part of a regulatory requirements review of the "Depositor Guarantee Scheme" it was identified that there would be an opportunity to use CAATs to analyse a critical business data file.

The internal audit team took the decision to analyse the data file using CAATs after being informed that checks performed by the business had been sample based. By leveraging CAATs, a 100% check would be achievable and the results would deliver greater assurance to the business.

Through conversation with the business it was identified that the file needed to contain key requirements set out by the Financial Services Compensation Scheme (FSCS)/Prudential Regulation Authority (PRA):

• Header record – contained information such as creation date, society identifier, total number of records and number of records in specific criteria
• Body records – containing individual details and key identifier to allow records to be segregated appropriately
• Footer record – identifies the end of the file

Using the business knowledge of the file layout and expected content, a mind mapping session was held which focused on matching the data requirements to a test which would verify their appropriateness. This process identified the following tests.

1. Total number of records in the file matches the total recorded in the file header record.
2. A count of the number of records flagged with a specific criteria identifier matches the totals for each criteria recorded in the header record.
3. Check for negative balance.
4. Check for multiple entries e.g. society head office address is being used as the customer address.
5. Check for anomalies such as missing post code or date of birth or date of birth greater than 150 years.
6. Perform keyword matches to return groups of records which can be analysed further. E.g. the records returned by a search for the word 'solicitor' are checked to ensure they have been allocated to the correct criteria.

In this instance the team decided to use a data analytics tool called IDEA due to the number of records (rows) involved (approx. 750,000). However testing would have been achievable using Excel 2007* and above. The team were able to interrogate the data file and identify a list of issues which were reported back to the business in person and used to pass on knowledge and experience of CAATs. Alongside this the team highlighted the need for the business to investigate the possible root cause around data capture procedures and a lack of quality control.

Examples of Excel functions which could have been used during the process:

=**COUNTIF(Cell Range,Criteria cell or text)**
Count the rows containing a specific criteria type, eg =COUNTIF($A$1:$A$5,"Criteria123")

=**VLOOKUP(What to match,Cell Range,Display Column,Match type)**
Find blanks in ColA and return ColB, eg =VLOOKUP("",$A$2:$B$5,2,FALSE)

* The maximum number of rows supported by Excel 97, 2000, 2002 and 2003 is 65536. For Excel 2007, 2010 and 2013 it is 1,048,576 rows.

Further reading

Supplemental guidance
GTAG16 Data Analysis Technologies

Research report
Data analytics – is it time to take the first step