DATA ANALYTICS: WORKING
SMARTER AND HARDER WITH BIG DATA
TURNING DATA ANALYSIS INTO DOLLARS

Data analysis is often still thought of as a foreign concept. Many companies that have implemented data analysis have not aligned it with strategy, audit plan, fraud discovery, and creating value. But there is power in data analytics—the power to create value in an organization. This integrated and technology-driven session will demonstrate recent trends, real-life case studies, and interactive tools using a minimum of two providers. It will also provide a guide to turn data analysis into dollars.

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Katrina Kiselinchev has extensive experience in consulting, project management, finance, accounting, and marketing. She has directly managed or been responsible for fraud findings of $1 million+ in a variety of financial and operational areas. These have included, but are not limited to, payroll, p-cards, travel, and accounts receivable and payables. These fraud investigations have all included 100 percent use of data analytics software with more than 200 percent ROI.

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Big World, Big Data
The world’s data is doubling every 1.2 years according to Forbes. Big data is real, and the challenges with increasing data will only continue to grow in our data driven world.

(YouTube Video: Big Data Analytics, William Hakes, Link Analytics CEO, SAS Conference, December 7, 2012.)

As a result, having a data analysis program in place will assist leaders in the organization to focus on revenue-generating and cost-reduction methods strategically.

By constantly adapting to data and considering new methods to uncover trends, you will find opportunities that will bring real dollars to the bottom line.

An effective data analysis program builds awareness, creates opportunity, and is ever evolving while allowing both employees and leaders to work together to create a better organization and world.

Trends of Data Analysis
Ernst & Young highlighted recent trends in data analysis in an October 2013 “Audit Committee Bulletin.”

The bulletin illustrates from companies surveyed:
- 12 percent of continuous data analysis use
- 55 percent of occasional data analysis use
- 33 percent no data analysis use

This presents a vast opportunity within companies, governments, and clients to find both immediate dollars as well as future opportunities for the business.
Audimation conducted a survey of 500+ participants in January 2014 and released *Digging Deeper with Data Analysis*. Here are some of the highlights:
**Audience: Who Has Found Money?**

- Two or three audience examples

**Service Providers**

This is by no means an all-inclusive list. These are simply some recognized names providing data analysis tools.

If you don’t have a tool, I encourage you to look at these and others you may find.
Case Study in Data Analysis: SAS and Scotiabank
This is an example of how data analysis is being used to expand market share.

Some of you might be familiar with only using data analysis for audit and fraud. It is time to expand your view and realize data analysis can truly be used in all areas of business.

[Image: sas.com]


Proactive Versus Reactive Solutions
Data analysis has often been used as a reactive tool. Increasingly, there is awareness to use it proactively to uncover opportunities and problems as they occur rather than after the fact.

<table>
<thead>
<tr>
<th>Proactive</th>
<th>Reactive</th>
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</thead>
<tbody>
<tr>
<td>Optimization</td>
<td>Ad-hoc reporting</td>
</tr>
<tr>
<td>Predictive modeling</td>
<td>Analyzing based on problem(s)</td>
</tr>
<tr>
<td>Text mining</td>
<td>Tied to prior year audit plan(s)</td>
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<tr>
<td>Forecasting</td>
<td>Limited situations analyzed</td>
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<tr>
<td>Statistical analysis</td>
<td></td>
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<tr>
<td>Exceptions at occurrence</td>
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<tr>
<td>Artificial intelligence</td>
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</table>
Interactive Case Study: Finding the Fraudster
Included: 30-Day Trial with Providers
Workshop: Active and IDEA Case
1 test in each live
Billing versus rates

You will be completing a case study with test data in two different data analysis software programs. This is designed to be approximately a 30-minute maximum sneak peak at two different providers. This case study is a combination of real frauds that have been identified at various companies.

Finding the Fraudster Case Study Facts
- You have been hired to help the company “find the fraudster.”
- You are a data analysis expert.
- The company leadership is convinced of fraud but have no proof.
- There was a tip related to vendors and billing.

Finding the Fraudster Data Provided
- Billing
- Employees
- Budgets
- Rates

Active Data Test: Billing Versus Rates
The purpose of this exercise is to make sure that the unit costs billed in the 2012 billings sheet are consistent with those in the 2012 rates sheet.

This is a good test to run to ensure you are not paying more to vendors, and that you are receiving correct rates from bills you send to customers.
- Select the 2012 Billings sheet.
- Click on cell E2 (UnitCost).
• Click on the *Join (Merge) Sheets*.

Next, you’ll be asked to select the sheet you’d like to join.

• Select *2012 Rates*.

• Insert a column next to the *Unit Cost* column.

• The column contains the unit costs from the *2012 Rates* sheet.

• Then compare them to make sure they agree.

• Use the *Item Code* column as the matching group column between worksheets.

• Select *Item Code* as your *Group By* column.

• Check the *Unit Cost* column on the right.
- Check the *Insert Merged Data into Current Sheet* option.

- Click on the *Finished* button.
- ActiveData will insert the unit cost values from the 2012 rates sheet.
We will now use one of Active Data’s tagging features to help identify rows where the Unit Costs don’t match.

Note: Blank Unit Costs will be inserted if there is no corresponding Item Code.

From the ActiveData ribbon, select Tags -> Tag Rows -> Tag Rows by Formula.

In the Criteria Builder, click the 2012 Rates
Unit Cost column.
Click the <> button.
Click the Unit Cost column.
Click the Finished button.
There will be a tag (+) in a column on the right
This tag indicates the unit costs don’t match.
The next steps would be:
- Total the amount.
- Contact the vendor for explanations.
- Receive applicable vendor refunds.
- Receive additional customer payments.
Active Data lets you double click on a column’s name in row 1.

This is so that the column can be sorted.

Double-click on the word Tags in cell O1.

This will sort the worksheet.

All tagged items will be displayed on top.
Examining the tagged items reveals a number of discrepancies.

These include the wrong unit cost being charged for Item Code 123.

There are instances of charges that refer to a nonexistent Item Code (126).

**IDEA Test: Billing Versus Rates**

The purpose of this exercise is to make sure that the unit costs billed in the 2012 billings sheet are consistent with those in the 2012 rates sheet.

- Go back to the files.
- Click the 2012 Rates file.
- Go back to the File Explorer.
- Double click the 2012 Billings to open it.
- Now we will compare the billed versus the contracted rates.
- This will involve joining the databases.
- Click Join from the toolbar or the Analysis.

- Your primary database is 2012 Billings. That is where you started.
• Next to *Secondary Database*, Click *Select*.

• Select 2012 Rates.
• Click *OK*.

• Click *Fields*.
• Under primary database, click *fields*.
• Follow graphic below.
• This will provide a cleaner exception file.
• Under the secondary database 2012 rates, there are only three lines.
• All of this data is needed in the comparison.

• Rename the File Name to Billings Versus Rates.
• Click Match.

• The Match is the critical component that joins the databases together.
• The common identifier in both files for the test is the Item Code.
• Select Item Code (C) in Primary.
• The C indicates a Character Type.
• Select Item Code (C) in Secondary.
• The C indicates a Character Type.
• If the types are different, you can’t join.
• You would have to append the type.
• Then join.
- Under File Name, make sure the All records in both files is selected.
- The test is designed so any mismatch between the two will be an exception.
- This aids in no elimination of any exceptions.
- If the choice was matches only, billings not on the rate sheet would not show.

- Rename the File Name *Billing Versus Rates*.
- Click OK.
- Double click anywhere in the results file.
- Click Append to add a new field to the database.
NOTES

- Name New Field Unit Cost Issue.
- Select Character as Type to get to Parameter.
- Enter 2 for Len (Length).
- Double click in Parameter.
- Enter the formula.
- Double click on Unit Cost1 under Field Below.
- This is the Unit Cost from one of the databases.
- Enter < > for Does not Equal or click the symbol in the tool bar.
- Double click on Unit Cost under Field Below.
- Click the Green Validation Check.
- Go back to Type, change to Numeric.
- Click OK.
- This is a formula, so it must be numeric.
TURNING DATA ANALYSIS INTO DOLLARS

- Scroll to your far right in the database.
- The Unit Cost Issue column is added.
- Double click.
- Select Unit Cost Issue Equals 1.
- This indicates exceptions following formula.
- This means the billing isn’t included and/or does not equal the rates.

- The exception file is demonstrated below.
- There are items billed with no item code.
- There are items with dollars billed that vary.
- This is why all records in both files are selected in the join.

- To summarize the exceptions, click Summarize.
- Click Fields to **Summarize** by: Item Code, Vendor ID, Vendor Name.
- Click Numeric Fields to Total by: Unit Cost, Quantity, Unit Cost1.
- Rename the file at the bottom to **Item Code Rate Issues**.
- Click OK.

- The Summary displays the **Item ID, Vendor, Records, and Sum**.
- The individual records may be seen by double clicking blue hyperlinks.
• Returning to the exception file will also show all individual exceptions.

Additional Tests

**Vendor and Customer**
- Budget Versus Actual
- Cutoff Review
- Duplicate Review

**Sales**
- Market Analysis
- Trends
- Opportunities
- Compensation Tie-outs

**Vendor**
- Vendor Versus Employee Address
- Vendor Account Versus Employee Account

**Show Me the Money!**
The company and/or the boss are concerned with the bottom line. As a result, when it comes to presenting
something new or at least new to them we have to give them “WIFM”—What’s in it for Me!

Video: *Jerry McGuire*

**Cost Versus Benefit and ROI**
This is a model I created to help determine return on investment for data analysis.

The solutions in green demonstrate the providers with pricing online. The ones in black a quote must be requested.

*The costs, average findings, and return on investment are based on the assumptions and hours listed below.*

The assumptions were factored for a $500 million company at a conservative spend of 20 percent. The findings were estimated solely at 3 percent. This demonstrates a vast opportunity. Adjust the average findings by inputting your company size, spend, and estimated findings percent. If you want to increase the ROI, simply estimate percent of other areas (e.g., revenue, payroll, etc.).

<table>
<thead>
<tr>
<th>Solution</th>
<th>Risk Assessment &amp; Audit Plan Alignment</th>
<th>Continuous Monitoring Implementation</th>
<th>Total Costs Excluding License &amp; Training Costs</th>
<th>Avg Findings%</th>
<th>ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDAT</td>
<td>$12,000</td>
<td>$45,000</td>
<td>$57,000</td>
<td>$3,000,000,000</td>
<td>2632%</td>
</tr>
<tr>
<td>ACL</td>
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</tr>
<tr>
<td>IDEA</td>
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<td>Rapid Miner</td>
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<td>$45,000</td>
<td>$57,000</td>
<td>$3,000,000,000</td>
<td>2632%</td>
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<td>$45,000</td>
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<tr>
<td>Tableau Information Active Excel</td>
<td>$12,000</td>
<td>$45,000</td>
<td>$57,000</td>
<td>$3,000,000,000</td>
<td>2632%</td>
</tr>
</tbody>
</table>
Suggested Areas to Look for Money

- **Step 1:** For your company or client, take every area of the business and prioritize from highest to lowest currently.
- **Step 2:** Think about opportunities in each area.
- **Step 3:** Prioritize and estimate percentages of opportunities and findings.
- **Step 4:** Align data analysis tests to objectives for opportunities and findings.
- **Step 5:** Compare estimates to actuals periodically.
- **Step 6:** Highlight areas for future analysis.

**Step 7:** Modify tests and perform:
- Sales
- Expansion of Market
- Expansion of Services
- Contracts, Margins, Actual versus Negotiated
- Accounts Receivable
- Cost of Goods Sold
- Expenses:
  - Payroll
  - Accounts Payable
  - Travel
  - Per Diem
  - Mileage

**Sample ROI Model**

This provides one example of an ROI model with estimates for a company.
You will note that the actual accounts payable were similar to estimates.

In comparison, in the revenue area and contracts, a much larger opportunity was found. This was mainly due to varied contracts, under billing, and non-standard systems. This resulted in direct EBITDA (Earnings Before Interest Depreciation and Amortization) add back.

**Data Analysis Case Studies**
These are only a few examples of value with data analysis I have been directly involved in. This is simply to give you a snapshot of a few cases to get your wheels turning on how to turn data analysis into dollars.

I recommend that any endeavor in a company should follow metrics of payback, cost, benefit, and return on investment. The estimated bottom line impact should be clearly known. The development of data analysis is strategically correlated to adding value.

**Speaking of the Future**
This video, *Data Analytics*, with Tom Herald, Senior Fellow, provides insight into technology, big data, and the mesh networks of the future.
Activity: Creating a ROI Model
Dream first. This video, *Unstoppable*, speaks of reinvention, testing, and endurance. This falls directly in line with composing a new or revamped data analysis program.

**CREATING A DATA ANALYSIS PROGRAM WITH ROI IN MIND**

- Use Prior Model & Areas as a Starting Point
- Prioritize by Total $ or Desired $ in Each Area
- Estimate Cost of Your Implementation and/or Expansion
- Create a Draft Return on Investment for Your Company
- Estimate Planned Opportunity for Each Area

**Tests by Area**

![See Workbook](image)
![Select 5 to Implement in Next 15-90 Days](image)

There are examples of tests below for accounts receivable, accounts payable, fixed assets, inventory, and travel and entertainment.

**Accounts Receivable Sample Tests**
1. Day sales outstanding by customer and rep
2. Invoices versus Receipts versus Payment application
3. Prices charged to contracts
4. Separate cash paying from non-cash
5. Summarize by product and price
6. Variances
7. Miscellaneous or offsetting entries

**Income Sample Tests**
1. Anticipated sales to actual
2. Returns or credits by customer and rep
3. Cut-off trends by customer and rep
### Accounts Payable Sample Tests
1. Duplicate payments
2. Vendor comparisons to employees
3. Rounded invoice amounts
4. Invoices below approval thresholds
5. Returns and credits owed
6. Abnormal volume and time activity
7. Over budget by vendor
8. Contracted amount versus charged amounts

### Fixed Asset and Inventory Sample Tests
1. Unusual growth in number of days purchases
2. Unusual change in fixed assets versus dep.
3. Capital assets versus maintenance records
4. Capital asset approvers
5. Standard versus actual costs
6. Inventory by classes for utilization review
7. High value balances by age
8. Inventory turnover
9. Obsolete inventory by usage
10. Inventory cost to retail price
11. Trends between costs and depreciation
12. Financial viability of depreciation methods

### Travel and Entertainment Sample Tests
1. Travelers by dollars, frequency, and dep.
2. Executive management
3. Types of expenses
4. Trends in spending
5. Weekend travel
6. Same date overlap of mileage versus travel
7. Mileage trends
8. Expenses with non-employees
9. Event amount expenses
10. Duplicate reimbursements by amount and individual
11. Top location by city, air, car, hotel, meals
12. Timely submission
13. Pre-approval on travel
14. Compliance for early purchases
15. Credit card charges versus reconciliations

Summary
With data analysis it is key to dream. Removing limitations is key because data knows no limitations. It is imperative to strategically consider all areas of the business, opportunities, and fraud and involve the right team players. Then identity the plan and execute it step by step.

The plan and the program will evolve based on your business. There will always be new dollars to find.

I hope you enjoyed this session of Turning Data Analysis into Dollars.

Q & A