CliftonLarsonAllen

Using Data Analytics for Fraud Prevention

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Agenda

- Introduction and Fraud Investigation Approach
- Fraud Auditing and Internal Audit
- Introduction to Data Analytics and CLA's Data Analysis Methodology
- Applying Forensic Techniques to Design Data Analytics that Address Risk and Proactive Application of Data Analytics
- Implementation Considerations
- Summary and Q&A

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At the end of the session you will know how to avoid:

Analysis Paralysis

over-analyzing (or over-thinking) a situation so that a decision or action is never taken.

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Objectives

- Discuss fraud and internal audit
- Discuss the overall process of how data analytics is applied
- Discuss how data analytics can be used to better identify risks and improve fraud prevention.
- Demonstrate the power of data analytics using a case study

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About CLA

CLA Promise

We are

A professional services firm with three integrated businesses working together to advance our clients' success, create uncommon careers for our people, and do what is right for the public, our clients, and each other.

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Forensic Thinking and Weaknesses That Contribute to Fraud

How does a fraudster look

- Owners/executives accounted for a small percentage but $850k median loss
- Losses caused by men were 75% larger than losses caused by women
- Only 4% of perpetrators had a prior fraud conviction
- Long time employees stole twice as much than new comers
  - More than 5 years, $200k median loss
  - Less than 5 years, $100k median loss

Source: ASSOCIATION OF CERTIFIED FRAUD EXAMINER, 2018 REPORT TO THE NATIONS 2018 GLOBAL STUDY ON OCCUPATIONAL FRAUD AND ABUSE

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How does a fraudster look

- Embezzlers don't fit the criminal stereotypes; they appear to be trustworthy, sincere, likeable, sociable, etc.
- Background checks in 90% of perpetrators did not reveal red flags
  - Employment history
  - Criminal checks
  - References
  - Education
  - Credit checks
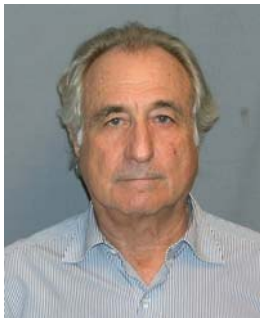
Source: ASSOCIATION OF CERTIFIED FRAUD EXAMINER, 2018 REPORT TO THE NATIONS 2018 GLOBAL STUDY ON OCCUPATIONAL FRAUD AND ABUSE

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How does a fraudster look

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How does a fraudster look

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How does a fraudster look

Fraud- Contributing Factors

Pressure (Albrecht book)
- Personal financial factors that may lead to fraud:
  1. Financial difficulties
     a. High personal debts or financial losses
     b. Inadequate income
  2. Living beyond one's means
- Personal habits that may lead to fraud:
  1. Extensive gambling
  2. Illicit affairs
  3. Excessive use of alcohol or drugs (12%)

Source: Steve Albrecht, Fraud Examination

The Rationalization of Fraud

Opportunity

Rationalization   Pressure
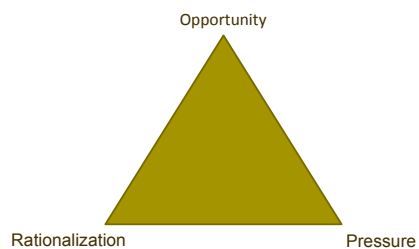
Fraud and Opportunity

- Opportunity: The ONLY thing your organization can control!
  i. Chances of being detected are very slim
  ii. Punishment is very light
  iii. Weak internal controls
  iv. Absence of periodic rotation in job duties
  v. Constantly operating under a crisis environment
  vi. Little attention to details
  vii. Poor morale

Fraud and Rationalization

Personal Emotions that may lead to fraud:

a. Perception of being treated unfairly by the organization
b. Resentment towards superiors
c. Frustration with job
d. Insatiable desire for self-enrichment or personal gain

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Six Elements of Fraud

- A representation
- About a material point
- Which is false
- And intentionally or recklessly made
- Which is relied upon
- Victim suffers damage

DECEPTION!

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Overt/Covert Investigative Techniques

- **Data Analytics of financial records**
- Search warrants
- **Interviews**
- Undercover agents
- **Cooperating witnesses/sources**
- Title IIIs
- Surveillance
- Database checks

- Computer Forensics
- Consensual monitoring
- Mail cover
- Trash cover
- Polygraph
- **Liaison with counterparts**
- Toll register

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Concealment

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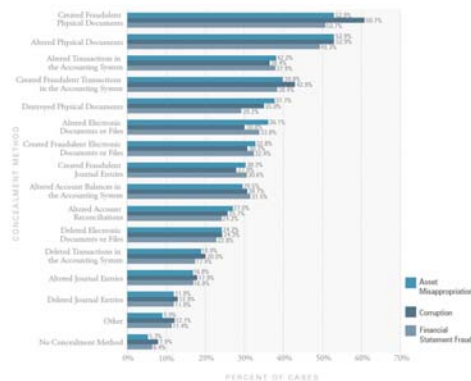
Figure 63: Primary Internal Control Weakness Observed by CFE
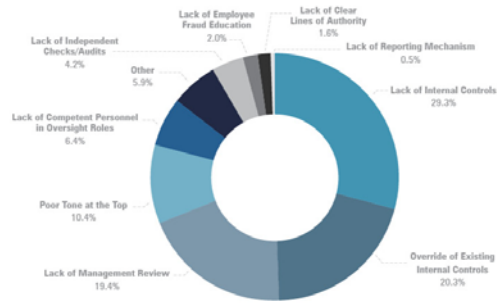
The Fraud Tree
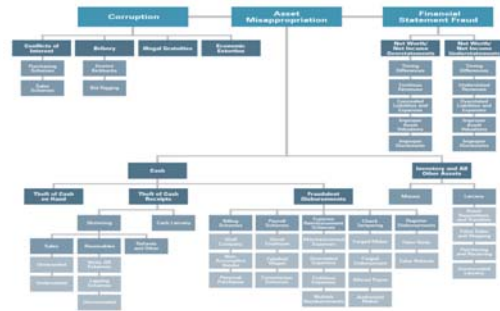
Internal Controls

The Impact of Internal Audit
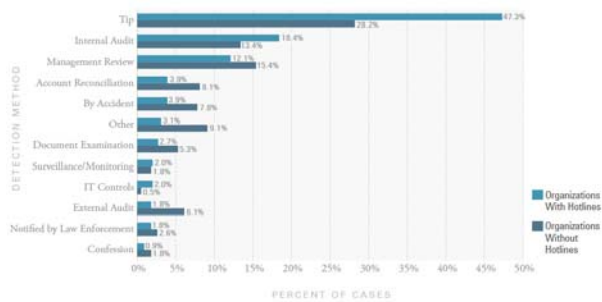
Median Loss and Duration
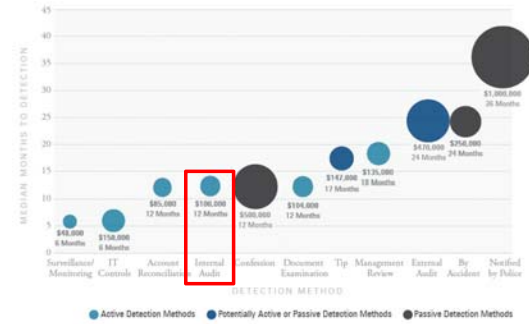
Controls – Segregation of Duties

Organizations with limited resources can still have effective segregation of duties controls.

- Focus on preventive controls rather than detective controls.
- Alternate sequential tasks, so that no one person has complete responsibility for the entire transaction.
- Functions to separate:
  - Authorization,
  - Payment,
  - Custody, and
  - Recording.
- Consider outsourcing if there simply are not enough people to separate the necessary functions.

Effectiveness of Controls

VICTIM ORGANIZATIONS THAT **LACKED ANTI-FRAUD CONTROLS** SUFFERED GREATER MEDIAN LOSSES—**IN FACT TWICE AS MUCH**

$92,000
$200,000
PROACTIVE DATA MONITORING/ANALYSIS

$100,000
$200,000
MANAGEMENT REVIEW

$100,000
$200,000
HOTLINE

CONTROL IN PLACE   CONTROL NOT IN PLACE

Effectiveness of Controls-Lower Losses

Control	Percent of Cases	Control in Place	Control Not in Place	Percent Reduction
Proactive Data Monitoring/Analysis	36.7%	$92,000	$200,000	54.0%
Management Review	64.7%	$100,000	$200,000	50.0%
Hotline	60.1%	$100,000	$200,000	50.0%
Management Certification of Financial Statements	71.9%	$104,000	$205,000	49.3%
Surprise Audits	37.8%	$100,000	$195,000	48.7%
Dedicated Fraud Department, Function, or Team	41.2%	$100,000	$192,000	47.9%
Job Rotation/Mandatory Vacation	19.4%	$89,000	$170,000	47.6%
External Audit of Internal Controls over Financial Reporting	67.6%	$105,000	$200,000	47.5%
Fraud Training for Managers/Executives	51.3%	$100,000	$190,000	47.4%
Fraud Training for Employees	51.6%	$100,000	$188,000	46.8%
Formal Fraud Risk Assessments	39.3%	$100,000	$187,000	46.5%
Employer Support Programs	56.1%	$100,000	$183,000	45.4%
Anti-Fraud Policy	49.6%	$100,000	$175,000	42.9%
Internal Audit Department	73.7%	$123,000	$215,000	42.8%
Code of Conduct	81.1%	$120,000	$200,000	40.0%
Rewards for Whistleblowers	12.1%	$100,000	$163,000	38.7%
Independent Audit Committee	62.5%	$114,000	$180,000	36.7%
External Audit of Financial Statements	81.7%	$150,000	$175,000	14.3%

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Quick Poll

- How well is (or is) your team utilizing *Computer Assisted Audit Techniques* (CAAT) and data analytics?
- What tools are being used for data analysis?
- What is keeping you from performing *better* data analysis?

It is difficult to explain what data analysis is, but you know it when you see it.

Excel

Data

IDEA / ACL

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CLA's Robust Data Analysis Methodology

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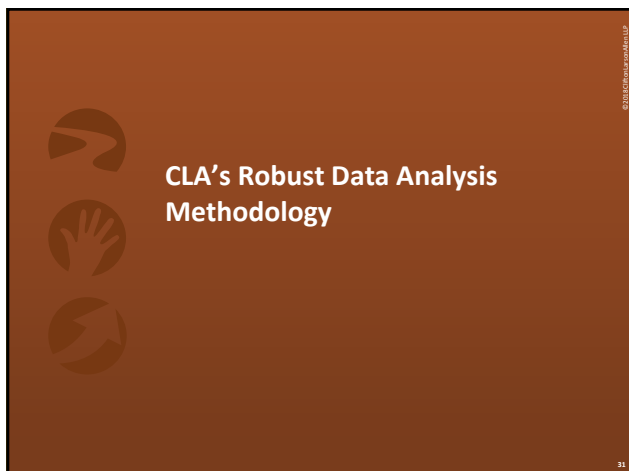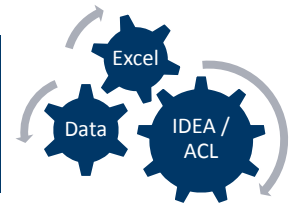
Value of Data Analytics

Data analytics can improve the effectiveness and efficiency of your engagement by:

- Focusing attention on areas of high risk
- Identifying previously unknown risks
- Providing greater insight and interpretive value
- Improving compliance with professional standards
- Enhancing capabilities by leveraging available technology to work smarter and more comprehensively

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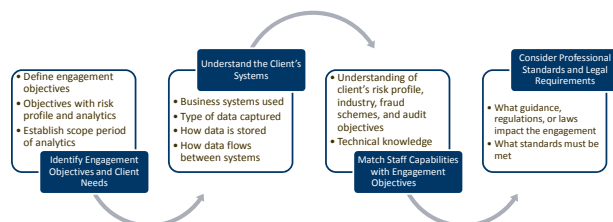
Risk Based Approach to Analytics

- Systematically identify greatest risk areas specific to the client
- Tailor analytics to assess and better understand those areas
- Readily analyze 100% of the data rather than extrapolating from samples
- Compare results across time, by location, by supervisor, etc.

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Data Analysis Methodology – 5 Phases

- 1. Planning and Risk Assessment
- 2. Data Acquisition
- 3. Data Analysis
- 4. Collaborative Interpretation of Results
- 5. Response and Report

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Planning

Planning is a team effort, staff to principal should contribute to ensure that analytics are well directed and focused on accomplishing objectives

- Define engagement objectives
- Objectives with risk profile and analytics
- Establish scope period of analytics

Identify Engagement Objectives and Client Needs

Understand the Client's Systems
- Business systems used
- Type of data captured
- How data is stored
- How data flows between systems

- Understanding of client's risk profile, industry, fraud schemes, and audit objectives
- Technical knowledge

Match Staff Capabilities with Engagement Objectives

Consider Professional Standards and Legal Requirements
- What guidance, regulations, or laws impact the engagement
- What standards must be met

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Commonly Requested Information

- **Accounting, General Ledger**
- **Accounts Receivable**
- **Accounts Payable**
- **Inventory Manufacturing**
- **Sales**
- **Cash Disbursements**
- **Procurement**
- **Payroll**
- **Entity Credit Cards**
- **Travel and Entertainment Expenses**
- **Activity logs**

- **Along with the aforementioned data sets, the following information is usually needed to adequately interpret the data files:**
  – Chart of Accounts
  – Data Dictionary
  – File Source Listing – indicating from which systems and locations the data was extracted
  – Vendor Master File (A/P, A/R, Sales)
  – Employee Master File (Payroll, Travel and Entertainment, Credit Cards)

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Key Elements of a Data Request List

- **Addressed to the IT Person knowledgeable of the entity's systems**
- **Delivery dates**
  - Date requested
  - Expected delivery date
- **Source of the information requested**
  - Primary source (i.e., accounting system)
  - Any secondary sources (i.e., sub-ledger systems)
- **Data date range**
  - Dates expected to be included in data
- **Preferred and accepted data format**
  - Text files, Microsoft Excel, and Adobe PDF

- **Expected data elements**
  - For example a cash disbursement data set should include: date, amount, vendor/payee, description, check#/payment#, etc.
- **Supplemental files required to interpret data**
  - Data dictionaries
- **Method of data transmission**
  - FTP site/LeapFILE
  - External hard drive
  - Email

Fundamental Skills

Fundamental skills that are common across data analysis software packages.

- Project organization/data management
- Importing
- Normalizing
- Calculated/modified fields
- Appending/merging
- Joining/connecting

- Indexing/sorting
- Filtering/extracting
- Summarizing
- Stratification
- Aging
- Benford's Law
- Duplicate testing
- Gap testing
- Sampling

- Cross tabulation/pivot table
- Searching
- Statistical analysis
- Charting
- Exporting

Ensure Complete and Accurate Data

It is <u>critical</u> for effective analytics to ensure that the data from the client is both complete and accurate
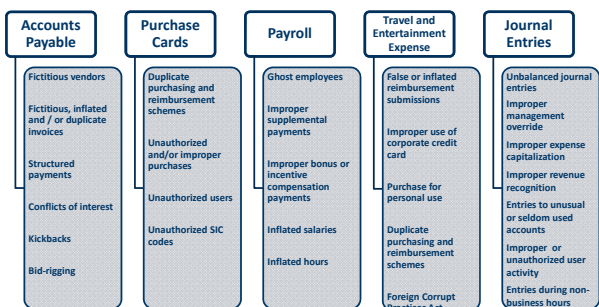
- **Proper Importation** – verify that the imported data accurately reflects the files provided by the client
  - Verify field type definitions (character, numeric, date/time)

- **Completeness** – verify that the information provided by the client reflects all transactions or data expected
  - Compare data to another source (e.g., recalculate account balances from general ledger detail and compare to trial balance report)
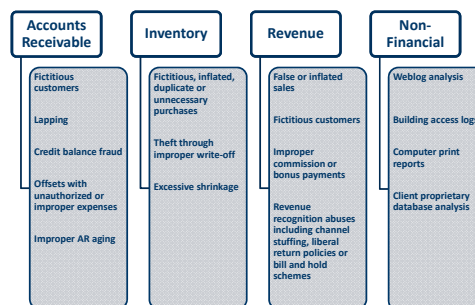
Ensure Complete and Accurate Data

Ensure Complete and Accurate Data

Prepare Data for Analytic Tests

Once verified as complete, data must be normalized or prepared for analysis

- **Reformatting**
  - Convert fields imported as one field type into another (e.g., dates as character fields)
  - Merging or separating fields (e.g., to segregate or join fund and account codes)
- **Extracting only necessary information**
  - Transactions out of the scope period or extraneous fields can be extracted to streamline testing
- **Joining data**
  - Linking information from supplemental files or disparate sources

Example Areas of Focus and Analyses that may be considered:

Types of Risks and Areas of Analysis

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Accounts Payable	Purchase Cards	Payroll	Travel and Entertainment Expense	Journal Entries
Fictitious vendors	Duplicate purchasing and reimbursement schemes	Ghost employees	False or inflated reimbursement submissions	Unbalanced journal entries
Fictitious, inflated and / or duplicate invoices	Unauthorized and/or improper purchases	Improper supplemental payments	Improper use of corporate credit card	Improper management override
Structured payments	Unauthorized users	Improper bonus or incentive compensation payments	Purchase for personal use	Improper expense capitalization
Conflicts of interest	Unauthorized SIC codes	Inflated salaries	Duplicate purchasing and reimbursement schemes	Improper revenue recognition
Kickbacks		Inflated hours		Entries to unusual or seldom used accounts
Bid-rigging			Foreign Corrupt Practices Act	Improper or unauthorized user activity
				Entries during non-business hours

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Types of Risks and Areas of Analysis

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Accounts Receivable	Inventory	Revenue	Non-Financial
Fictitious customers	Fictitious, inflated, duplicate or unnecessary purchases	False or inflated sales	Weblog analysis
Lapping	Theft through improper write-off	Fictitious customers	Building access logs
Credit balance fraud	Excessive shrinkage	Improper commission or bonus payments	Computer print reports
Offsets with unauthorized or improper expenses		Revenue recognition abuses including channel stuffing, liberal return policies or bill and hold schemes	Client proprietary database analysis
Improper AR aging			

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General Ledger

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- Ensure reconciliation and completeness of systems and subledgers flowing in the trial balance
- Assess and review the activity of subledgers, understand manual vs. automated
- Identify user access, user threshold level controls and consistency of access and control across the organization
- Trend results over time, such as monthly:
  - Account level results
  - Business unity level results
  - Geography based results
  - Relevant Revenue and Expense groupings
- Identify suspicious entries such has transactions to suspense accounts, reversals, or entries occurring with strange timing

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Cash Disbursement

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- Understand vendor relationships,
  - Identify key vendors
  - Identify new/unapproved vendors
  - Identify related party vendors
  - Identify vendors receiving suspicious recurring or one-time payments
- Reconcile Inter-company and Inter-branch transactions
- Identify duplicate payments
- Identify payments that were structured to evade threshold level controls
- Identify unapproved disbursements
- Understand out of sequence payments
- Understand compliance with threshold level controls
- Analyze disbursements by vendor type, review for reasonableness
- Trend vendor level disbursements by time period to identify increasing or strange trends

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Payroll

- Ensure all paid employees are on the appropriate approved lists
- Ensure paid employees are receiving correct salary and hourly rates
- Analyze and understand overtime payments
- Identify payments made before hire date over after term date
- Understand bonus, commission and other non-standard payments
- Analyze pay and pay rates by:
  - Business Unit
  - Geography
  - Job Function
- Understand headcount by functional area
- Identify manual adjustments to payroll
- Ensure hours logged in timekeeping software is reasonable, identify employees with excessive overtime
- Review employee master file for:
  - Unusual updates and changes
  - Multiple employees that share contact information and/or bank accounts
  - Missing or unusual personal information
  - Assess Active and Inactive employees for reasonableness

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Travel and Expense Reimbursement

- Group payments by meaningful classifications, such as hotel, airfare, meals, mileage, transportation, etc.
- Group payments by meaningful classifications, such as administrative, sales, production, etc.
- Group payments by employee,
- Identify duplicate submissions. This can be run on invoice number, amount, employee, month, description.
- Conduct digital frequency testing. Often, transactions that occur more often than expected are a result of subjective or created amounts. Look for evasion of approval limits, irregular amounts and number invention.
- Identify payments made outside of understood business hours.
- Organizations commonly use credit cards for business expenses. Each credit card transaction will include a Standard Industry Code (SIC), which classifies the expense by meaningful type, such as airfare, lodging, dining, etc. These codes can be used to analyze expenses
- Identify gifts and charitable donations.
- Identify Multiple Gifts to the same person
- Identify instances where the submitter is the same as the approver
- Identify excessive cash reimbursements
- Understand excessive mileage
- Identify abuse and non-compliance with policies

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Customer Account Maintenance

- Identify instances were employees update/change information to their own or their families' accounts
- Identify dormant accounts, where account information was changed, then financial transactions occurred
- Identify significant changes to accounts, such as PIN changes, contact names changes, and the methods of such changes
- Review number of changes to accounts for reasonableness
- Identify accounts held by significant others' of employees
- Identify multiple accounts that owned by the same person or group of people
- Review nature of access to account maintenance, via online, phone, branch visit, other, etc.

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Applying Forensic Techniques to Design Analytics that Address Risk

Skepticism and Forensic Thinking

Add value through application of "forensic thinking":

- An investigative <u>mindset</u> - more than skeptical
- An <u>understanding of fraud schemes</u> and indicia of fraud
- <u>Experience</u> in dealing with fraud, risk and compliance issues
- <u>Knowledge</u> of certain investigative, analytical and technology-based <u>techniques</u>
- <u>Knowledge of legal process</u> (pitfalls, ramifications, etc. on engagements that may be subject to litigation)

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Design and Perform Tests

Design a well rounded and comprehensive set of tests. Give specific consideration to learned insight. Assess known risk, collaborate to identify unknown risk.

Analytic tests selected from the following five categories will provide insight into the areas being examined.

1. **Population Analytics** – Conducted to gain an understanding of the entire population.
2. **Grouping Analytics** – Summarize transactions into meaningful groups.
3. **People Analytics** – Designed to provide insight into who benefits from a transaction and who is responsible for the transaction.
4. **Trending Analytics** – Provide interpretive value by showing data results over time.
5. **Transaction Analytics** – Isolate transactions exhibiting particular traits or have a certain "DNA".

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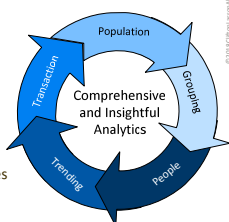
Interpret Results and Subsequent Risk Assessment

Interpretation of the results requires team collaboration to evaluate the data analysis output within the context of the entity's risk profile.

TEAM EFFORT

Together the most knowledgeable members of the engagement team should be determine which results are relevant to accomplishing the engagement objectives.

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Slide 1

Proactive Application of Data Analytics: Techniques to Apply to Multiple Populations to Address Risk

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Slide 2

Pre and Post Data Analytic Approach

Pre-Data Analytics
- Segmented by business unit, time period, geography
- Sample Based Approach
- Time consuming
- Limited findings and measurement of policy adherence
- Results and insights not utilized outside of internal audit group

Post -Data Analytics
- Holistic enterprise wide scope, includes **100% of transactions**
- Utilize long periods of results to generate better understand and identify anomalies
- Deploy a **Risk-Based** Approach
- More Efficient and periodic reporting; can be done near real time
- Actionable measurement of compliance
- Insights valued and utilized by the management outside of internal audit
- Abuses identified more timely resulting in cost savings

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Slide 3

Technical Data Analysis – Population Testing

- 16 months of information
- 661,000 transactions
- $87.8 million in expense
- 3,397 Employees, ranging from near 0 to $3.2M in spend
- Approximately 46K Vendors, approximately the top 0.1% or 40 responsible for receiving $48M+ or 55%
- Max Single Item Spend $99.4K
- Max Month, March 2015 $9.5M
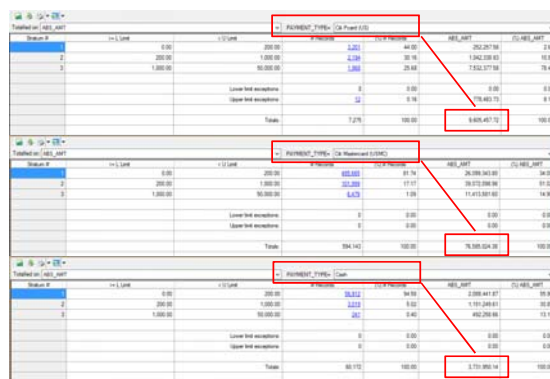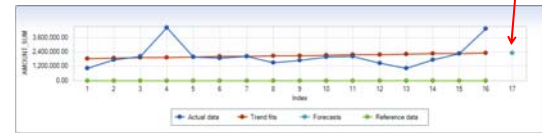
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Slide 4

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Technical Data Analysis – Trending

Total Spend by Month:

Total Spend by Organization Unit by Month:

Technical Data Analysis – Trending

Total by Organization Unit by Month Chart *with Forecast* (Sales):
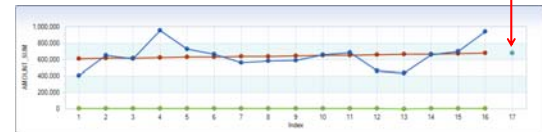
Total by Expense Type by Month Chart *with Forecast* (Air Travel):

Technical Data Analysis – People

- Analysis to understand how individuals submit T&E by Payment Type, employees who submit > 50% and $10K or more in Cash

Technical Data Analysis – People

"Relatively Large Spender" Analysis

- Stats were calculated for all 99 expense types (Airfare, Accommodation/Hotel, meals, etc.) including Max, Min, Ave, Standard Deviation.
- Large was defined as any single expense that was 3 times the standard deviation from the average and greater than $1,000 for the pay type.
  - For example, for Accommodation/Hotel there were 126,623 transactions, the average was $260.92, the standard deviation was $266.49. Any Accommodation/Hotel Expense that was greater than $1,060.39 would be considered "Relatively Large." The math is (3*266.49+260.92)
- There were 4,192 expenses that satisfied this criteria
- We then summarized these items by employee to measure who had the most items

Technical Data Analysis - Grouping

- Grouped by Name, 37,220 Merchants paid, average of $2,359
- Less than 2% of the vendors account for approximately 80% of the dollar value (including Cash)

- Total Spend by Vendor

Cash

Technical Data Analysis - Grouping

Cash Transactions grouped by employee and expense type, sorted descending by total amount

Cash Transactions grouped by employee and expense type, sorted descending by total number of records

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Technical Data Analysis – Specific Risk

"Relatively Large" Analysis

- Grouped by Expense Type reveals areas of potential risk
- Individual items are large, grouping reveals potential risk

Round Dollar by Employee by Merchant

- Reveals risk of repeated round amounts to the same merchant

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Selected Tests Performed by Areas

Population Analytics:

1. Population Stats – Max, Min, Ave, No of Records, Total
2. Cash vs. Credit Card vs. P-Card
3. Expenses by Geographic region
4. Stratification of expenses by amount, understand large and small and where the data lies
5. Benford's law to identify excessive frequency
6. Benford's law to identify impact of threshold controls
7. Perform completeness checking procedures
8. Identify lack of use and or implementation of controls such as blank description fields, generic usernames
9. Identify expenses to unauthorized SIC/MCC codes

Trending Analytics:

1. Late Report Submissions
2. Transactions on holidays, weekends, and on Personal time off days
3. Flights booked in close proximity to travel days
4. Trending expenses by Organization Unit by Month
5. Trending expenses by Type (Hotel, flights, mileage, meals, etc.) by month
6. Expenses by date
7. Organizational Unit monthly results and forecasting
8. Top "X" transactions by Type by Month
9. Top "X" transactions by Expense Type by Month

Selected Tests Performed by Areas

People Analytics:

1. Headcount – total, department
2. Spend by Employee by Business Unit
3. Identify Employees whose spend is increasing at "x" rate
4. Personal and Non- business expenses by Industry code
5. Compare Number of purchases and amount of purchase over time to other with similar job tiles
6. Identify employees with more volume and large dollar value of credit transactions
7. Identify employees who approved their own expense reports
8. Identify Employees who spent large amounts by expense type (for example a hotel stay of $1,250/night, when the average was $200 for hotel in city)
9. Identify employees with excessive lack of supporting documentation
10. Expenses at Merchants that are related

Grouping Analytics:

1. T&E Spend by Organization Unit
2. T&E Spend per Expense Type
3. Calculate totals and average per day for travel by location, identify lavish locations and trips to known locations outside of the norm
4. Spend by Merchant, review merchant names for personal use (PayPal, Apple stores, etc.)
5. Group transactions by type by time period for reasonableness (for example, 2+ parking expenses per day)
6. Group by description and search for suspicious words, such as cash, consulting fees, misc., government official

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Selected Tests Performed by Areas

Specific Risks:

1. Duplicates where the Amount, Date, and Employee were the same
2. Duplicates where the Amount, Month/Quarter and Employee were the same
3. Duplicates where the same item was charged to the credit card and P-card
4. Duplicates submitted within 90 days
5. Policy non-compliance
6. Hotel stays with no corresponding flights
7. ID Payments to electronic currency vendors (PayPal, google wallet, apple pay, bitcoin, etc.)
8. ID third party CC fraud, such as stolen CC numbers
9. Excessive mileage/parking/per diem
10. Excessive submission below threshold
11. Excessive travel in "x" period of time
12. Split (or structured) transactions that are broken down into smaller amounts
13. Mileage on the same days as rental car
14. Identify instances where the employee received a credit from the airline, for example booked a first class seat, then flew coach and took the difference

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Implementation Considerations

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Data Analytics is a Team Effort

1. *Planning* is required to ensure that analytics are well directed and focused on accomplishing objectives.
2. *Risk identification* is necessary to focus our analytics,
3. *Accessing the Data* is the process by which we obtain information
4. *Technical Analysis* of the data *requires* the skillful blend of knowledge and technical capability. The analysis should follow the plan established in the planning and risk identification phases,
5. *Interpreting the Results* of the data analysis is a team effort, the most knowledgeable members of the engagement team should be relied up to identify which results are relevant to accomplishing the engagement objectives
6. *Reporting* we report in compliance with our professional standards, we express results in an impactful way and we document the procedures we performed.

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Implementation Considerations

- Generally, the data analysis should be performed at the <u>beginning stages</u> of the engagement
  - It can be utilized to focus procedures and identify areas of risk
  - It can be used as a benchmark for expectations
  - Data issues can be vetted early, while still allowing time to accomplish engagement objectives
    - ◊ Completeness Testing

Implementation Considerations

- Engagements **small and large** can benefit from data analytics
  - Applied on engagements with as little as 10 hours
- Well conducted data analytics makes engagements more efficient and effective
  - Better match procedures to areas of consequence and high risk
  - Automate, otherwise time consuming and less effective procedures

Budgeting Considerations

- Planning 15%
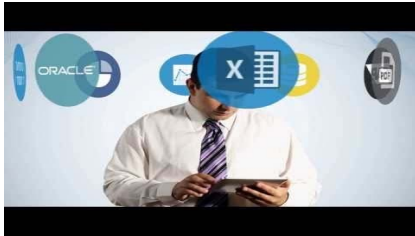- Data ID and Access 10%
- Data Normalization 15%
- Completeness Testing 10%
- Data Analysis 40%
- Reporting 10%

Upcoming Events

CLA Government Training Academy
>**July 20, 2018**
>**Turf Valley Resort, Ellicott City, Maryland**

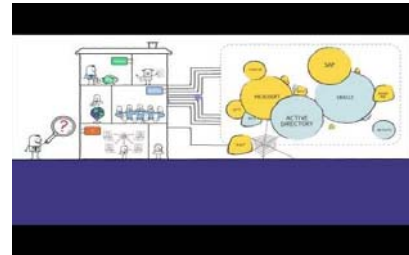>https://www.claconnect.com/events/2018/2018-baltimore-government-training-academy

IDEA DEMO

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ACL DEMO

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Do you have further questions?

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