Getting Started with Continuous Auditing and Continuous Monitoring

Prepared for Raleigh-Durham IIA Chapter
May 10, 2013
Session Agenda

- Headlines - the “Why” behind Data Analysis and Continuous Auditing (CA)
- IIA Guidance and Definitions (Global Technology Audit Guides #3, #13, #16)
- Visual Risk IQ’s QuickStartsm Methodology
- Brainstorming Exercise: P-Card Audit Planning
- State of the Art in Continuous Auditing and Continuous Monitoring
- Q&A
- Additional Resources
Headlines - who uses data analytics?

Longtime LaSalle employee fired in alleged fraud

June 29, 2010 | By Susan Snyder, Inquirer Staff Writer

A longtime La Salle University employee was fired this month after officials said they discovered several million dollars missing in an alleged fraud scheme dating back at least 20 years.

La Salle officials confirmed the employee was Stephen C. Greb, 58, director of auxiliary services.

He is accused of setting up a fictitious food company through which he authorized payments from La Salle, said university spokesman Joseph Donovan. Greb’s job included oversight of food services. He was also in charge of on-campus catering, mail distribution and printing, and the campus store.

“The fraudulent scheme extends back at least to 1990 and involves several million dollars,” Donovan said.

Tech Professor Arrested In $2M Racketeering Scheme

ATLANTA — A star professor at Georgia Tech and two other employees surrendered at the Fulton County Jail to face $2 million racketeering charges on Friday, Channel 2 Action News had the only cameras rolling as microchip professor Joy Laskar, research engineer Stephane Pinel and office administrator Chris Evans were arrested.

Professor Accused Of Stealing $2M From Ga. Tech

Laskar and his team were behind a microchip breakthrough that his lawyer said is potentially worth millions of dollars. But their activities were put under the microscope when internal auditors spotted strange financial transfers to a microchip company partly owned by Laskar.
Data Analysis definition(s)

- **ACFE** – “the practice of assessing bodies of data to identify potential indicators of fraud”

- **IIA** – “is the process of identifying, gathering, validating, analyzing, and interpreting various forms of data within an organization to further the purpose and mission of internal auditing”

- **Wikipedia** – “the process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, conclusions, and supporting decision making”

- **Thomas Davenport** (Harvard professor and consultant) – see following slide
### Data Analysis definition(s)

**source:** Thomas Davenport

<table>
<thead>
<tr>
<th>Information</th>
<th>Past</th>
<th>Present</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What happened?</strong></td>
<td>Data Analysis as reporting</td>
<td>What is happening now?</td>
<td>Data analysis as extrapolation</td>
</tr>
<tr>
<td><strong>Insight</strong></td>
<td>How and why did it happen?</td>
<td>What’s the next best action?</td>
<td>What’s the best / worst that can happen?</td>
</tr>
<tr>
<td><strong>Data analysis as modeling / design</strong></td>
<td>Data analysis as recommendation (value add)</td>
<td>Data analysis as prediction / simulation</td>
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</tbody>
</table>
What & Why of Data Analytics

Why are we here?

- An auditor’s best (only?) friend – the Sample
- Increasing digital audit universe
- Relatively unchanged audit approach
- Post-SOX pressures on the Profession
- Practical ways to do more with less

- Think about the Fraud Triangle
- Financial Pressure, even Rationalization are increasing
- What is the Audit Profession doing about Opportunity
Review of IIA Guidance

- **Continuous Auditing**
  - Method used to perform audit-related activities on a continuous basis. Includes control and risk assessment
  - Activities performed by the Internal Audit function

- **Continuous Monitoring**
  - Process to ensure policies/processes are operating effectively and to assess adequacy of controls
  - Performed by Operational/Financial Management; audit independently evaluates the

- **Continuous Assurance**
  - Combination of Continuous Auditing and Audit Oversight of Continuous Monitoring Activities

- **CAATs (Computer Assisted Audit Techniques)**
  - Using data analysis in executing audit programs
Reiterates IIA Professional Standards

- 2120.A2 – The internal audit activity must evaluate the potential for the occurrence of fraud and the manner in which the organization manages fraud risk
- The internal auditors must consider the probability of significant errors, fraud, non-compliance, and other exposures when developing the engagement objectives.

Advocates use of technology

- Provides examples of fraud schemes and data analysis tests that are designed to identify each schemes.
- No endorsement of a specific software product
- Analysis tools for structured and unstructured data
IIA GTAG #16
Data Analysis Technologies

- Provides implementation guidance
  - Consider Key Performance Indicators and Metrics
  - Also consider mean, variance, and outliers
  - Patterns, including digital analysis / Benford’s Law
  - Introduces Data Analysis Maturity Model
  - Methodology is plan, prepare, test, review

- Barriers
  - Poorly defined scope
  - Data location and access
  - Data understanding and preparation
  - Manually maintained data

“Internal auditors who don't use data mining and analytics should get on their horse & buggy and go home” @rfchambers
Continuous Auditing has been hot for years. But what is continuous?

CA / CM become “right time” when the timing and frequency of evaluation matches business requirements.

What frequency interval is right for revenue transactions? Supply chain?
QuickStart\textsuperscript{sm} Methodology

Brainstorming

- Review Audit Objectives
- Explore Internal Data Sources
- Compare vs External Data Sources
- Consider with other Audit Tests

Kinds of Queries
- Metrics and Trending Queries (Top 10)
- Outlier Queries (Statistics Tables)
- Exception Queries (Needles in the Hay)
Data Analytics is the Connect between thoughtful Questions, and (Digital) Data

- What business or control questions would you like to answer? Why?
- How would you identify the answer today?
- Would knowing the answer in greater depth be useful?
- What about knowing the answer more often (i.e. greater frequency)
- Disparate data files, especially external ones, often hold the key.
- Who is best for brainstorming?
QuickStart\textsuperscript{sm} Methodology

Acquire and Map Data

- Acquire and Map Data
  - Identify specific sources
  - Explore direct vs. flat file access
  - Submit written data request, including control totals
  - Tie out record counts and control totals
  - Trace control totals back to ledger or other source systems

Refine and Sustain

Brainstorm

Analyze and Report

Write Queries
Assumptions:
• Data acquisition is easy and free. Any interesting, relevant data file, whether internal or external, can easily be made available on our audit department server (PC, USB Drive, etc.)
• Programming resources are plentiful. Most any query that the team brainstorms can be developed at a reasonable cost.
• There is sufficient time between planning and fieldwork, such that the queries can be developed, tested, and executed.

So….
• Begin with audit objectives. What questions should we answer?
• Besides P-Card data, what else is useful to answer those questions?
• And what relevant queries would you want to write?
• Consider Metric, Outlier, and also Exception queries
• Any other thoughtful and logical ways to group the queries
## Exercise #1: Cross-reference Business Questions to Data Sources

<table>
<thead>
<tr>
<th>Query</th>
<th>Card Holder Master Data</th>
<th>Charge and/or Expense Data</th>
<th>Employee Master Data</th>
<th>Other Payment Data (Fleet, AP, etc.)</th>
<th>Other Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Test #1</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Your Test #2</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Your Test #3</td>
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<td>Your Test #4</td>
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<td>Your Test #5</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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</table>
Exercise Results: Cross-reference Questions to Data Sources in Excel
Data Acquisition
Overcoming Barriers

- Find the Business Analyst – how do they obtain data for their job?
- Understanding Tables and Relationships
- Data dictionary / local customizations
- Requesting data from Information Technology Staff / Vendors
  - Fixed vs. Variable Length
  - Delimited Files
  - Quoted Text
  - Column Headers
QuickStart<sup>sm</sup> Methodology
Write Queries

Brainstorm

Refine and Sustain

Acquire and Map Data

Write Queries
- Virtual Fields
- Join
- Summarize
- Stratify
- Extract
- Filtering Criteria
- Trending
- many other command and techniques

Analyze and Report

Refine and Sustain
Understanding and Planning for False Positives

Type I Error (Incorrect Rejection)

Type II Error (False Positive)

The Test Reports that the Condition is False

The Test Reports that the Condition is True

Real Condition is True

Real Condition is False

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Relative Size Factor
Another Tool for Outlier Analysis

<table>
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<tr>
<th>Largest to 2\textsuperscript{nd}</th>
<th>Largest to Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>$343,291.00 \quad \text{RSF}=100$</td>
<td>$34,329 \quad \text{Avg}=$2,230 \text{ RSF}=15</td>
</tr>
<tr>
<td>$3,432.91$</td>
<td>$2,876$</td>
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<td>$3,432.91$</td>
<td>$1,725$</td>
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<td>$3,432.91$</td>
<td>$2,254$</td>
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<tr>
<td>$3,432.91$</td>
<td>$1,929$</td>
</tr>
<tr>
<td>$3,432.91$</td>
<td>$2,367$</td>
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Look for uniquely high RSF or RSF in multiples of 10 or 12.
Did your organization pay the “per dozen” price for each unit?

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Discussion: Split Limits
Analyzing for Proper Approvals

So how do you feel about validating whether a receipt over (or under) a particular limit is in fact a valid business expense...
QuickStart™ Methodology
Analyze and Report

- Brainstorm
- Acquire and Map Data
  - Analyze and Report
    - Consider Trends and Exception Queries
    - Graphs and Tables
    - Correlation analysis
    - Pivot Tables
    - Other Techniques
    - Charts / color / directionality
- Write Queries
- Refine and Sustain

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Analyze and Report - Outlier Queries
Mean and Standard Deviation

Z-Score

Inflection point

Inflection point

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Benford’s Law – A Special Case for Mean and Standard Deviation

What do these spikes tell us?
Benford’s Law – continued
Second Digit vs. First Two Digits
QuickStart<sup>sm</sup> Methodology
Refine and Sustain

Refine and Sustain
• After-Action Review
• Re-use Queries for Follow-up Tests
• Re-use Queries for Risk Assessment
• Transition Queries to Management

Brainstorm

Refine and Sustain

Acquire and Map Data

Analyze and Report

Write Queries

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Refine and Sustain Examples

- After Action Review

- Consider timing of key audit tasks
  - What should we do earlier?
  - What could we do later?
  - Who else should we involve? Why?

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<th>Start</th>
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Case Study 1 – Research University (Beginning to Intermediate)

- Where was “here” for them?
  - New software / no experience using it
  - Difficulties getting data from IT
  - Excellent analysis and reporting skills

- Where was “way point” (an interim “there”) for them?
  - Practical success using the new software
  - Methods and templates for broadening use of the software on their team
  - Repeatable methods and scripts for getting data from IT
Focus for QuickStart℠
Research University

Brainstorm

Refine and Sustain

Acquire and Map Data

Analyze and Report

Write Queries
Case Study 2 – Health Insurance / Payer (Intermediate to Advanced)

- Where was “here” for them?
  - No confidence in experience with business process targeted
  - No experts in ACL to which they have a license
  - No knowledge of their ERP or how to request data required
  - No knowledge of writing complex duplicate search queries
  - Excellent analysis and reporting skills (with SAS / SQL)

- Where was “way point” (an interim “there”) for them?
  - Practical success using SQL skills they had
  - Methods and templates for broadening use of SQL for other similar data analysis projects
  - Better understanding of their ERP and repeatable methods and scripts for getting data from IT
Focus for QuickStart<sup>sm</sup>

Health Insurance / Payer

- Brainstorm
- Acquire and Map Data
- Write Queries
- Analyze and Report
- Refine and Sustain
State of the Art in CA / CM
What does it look like?

The Platform

Knowledge Maintenance Console

Extract & Mapping Rules
Common Data Models
Risk and Performance Checks
Workflow & Platform Configuration

The Platform

Extract, Map & Load
Audit Database
Reasoning & Analytics Engine
Workflow Engine

Visual Reporting / User Interface

Platform Data & Logs

Systems of Record

AP, HR, and/or GL Data
Contract or Project Data
Watch List data

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Key Capabilities of Advanced CM / CCM Solutions

- Non-invasive extraction from systems of record
- Ability to define and easily map into common data models
- Identify and track revisions to master data
- Modern, easily configured data analytics engine
- Interactive review, filtering, and assignment of exceptions
- Dashboard with click- and drill-through to row-level exceptions
- Query results can be configured to track exceptions AND activities / results of exception research
Coming Soon(er) … or later?

- Visual reporting / trend analysis by anomaly count, type, severity
- Drill through / drill around
- Charts and tables, re-configurable with user defined thresholds
- Linking of disparate, comparative external data sets
  - Purchasing
  - Time capture system
  - Relationships between order, dispense, administration, billing
- Combining analysis of structured and unstructured data
- Comparison of transaction exceptions with User ID, workstation ID, network / MAC address, and more
Wrap-up Thoughts

- Assess where your audit team is on the Maturity Curve. Where do you want to be? Find a small win opportunity and get started.

- Begin with more frequent risk assessment. What questions should we ask each quarter to tell us whether our risk assessment is still on target?

- Identify an audit where you can be data-driven in your analysis. What questions do you want to answer? How does management know?

- Identify management reports that audit can use to validate financial or operational performance? Would accessing the data sources directly answer other questions?

- Challenge your teams to be the R&D lab for innovation in continuous monitoring and data analysis.
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Additional Reading and Resources

https://na.theiia.org/standards-guidance/recommended-guidance/practice-guides/ (For GTAG’s #3, #13, and #16)

Rutgers University Continuous Auditing and Reporting Lab (CAR-LAB)

LinkedIn Groups:
- Continuous Controls Monitoring
- Various IDEA and ACL User Groups
- Continuous Audit
- IDEA Audit Software User’s Group
- Tableau Software Fans and Friends

Authors:
- Thomas Davenport (academic view of data analytics)
- Malcolm Gladwell (layperson’s view of data analytics)
- Edward Tufte (visual reporting)
The Rutgers CAR-LAB
Host of 27 Symposia, and counting