Data Analytics for Internal Auditors
Getting Started and Beyond

A Presentation for Auditors
Christopher Mishler, CMA, CIA, CISA
SME – User-Developed Application Risks
Experis Finance
Experis Finance

- Experis Finance is the risk advisory, tax and finance & accounting organization within the $1.4 billion professional services firm Experis
  - Experis is the premier professional services organization within ManpowerGroup, a $21 billion global workforce solutions organization
- National directors oversee each dedicated practice area – Risk Advisory, Tax and Finance & Accounting – and associated Centers of Expertise

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<thead>
<tr>
<th>Risk Advisory</th>
<th>Tax</th>
<th>Finance &amp; Accounting</th>
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<td>• Internal Audit, Controls, and Regulatory Compliance</td>
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<td>• Process Optimization</td>
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<td>• Finance Organization Support</td>
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<td>Internal Audit Strategic Sourcing</td>
<td>Fraud Risk Assessment</td>
<td>Disaster Recovery</td>
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<td>Internal Control Optimization</td>
<td>Technology Risk Assessment</td>
<td>Information Technology Audit</td>
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<td>Quality Assessment Review</td>
<td>Information Technology Governance</td>
<td>System Controls and Security</td>
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<td>Sarbanes-Oxley Compliance</td>
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<td>Enterprise Data Management, Technology Governance, and Business Analytics</td>
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<td>Financial Institution</td>
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<td>Regulatory Compliance and Internal Audit</td>
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Today’s Objectives

• Introduction to Data Analytics
• Why It’s Important to Internal Auditors
• Overview of the Key Elements, Attributes, Challenges
• Steps in the Data Analytics Process
• Data Analytic Tools
• Roles and Responsibilities
• Applications for Internal Audit
• Resources
What is Data Analytics?

A definition

The process of inspecting, cleansing, transforming and modeling data with the objective of highlighting meaningful information, suggesting conclusions, and supporting decision-making.

“There are two kinds of people. Those who can extrapolate conclusions from incomplete data.”
What is Data Analytics?

MORE!

• Problem-solving process
• Extracts **insights**
• Historical, real-time, or predictive
• Data Analytics (DA) can be:
  ✓ **Risk-focused**: i.e., controls effectiveness, fraud, waste, policy/regulatory non-compliance or
  ✓ **Performance-focused**: i.e., increased sales, decreased costs, improved profitability.
What is Data Analytics?

FOCUS on Relationships

Identify and interpret relationships among variables to facilitate decision-making using the 5 W’s:

Who
What
Why
Where
When
<table>
<thead>
<tr>
<th>Strategic Area</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Expectations</td>
<td>Audit coverage, quality, business impact, on a finite audit budget</td>
</tr>
<tr>
<td>Regulatory Expectations</td>
<td>Stronger assurance and quantifiable results</td>
</tr>
<tr>
<td>Competitive Landscape</td>
<td>Strengthen capabilities</td>
</tr>
<tr>
<td></td>
<td>Seek new talent</td>
</tr>
<tr>
<td>Increased Value</td>
<td>Deeper discussion on issues</td>
</tr>
<tr>
<td></td>
<td>(Higher cost recovery?)</td>
</tr>
<tr>
<td></td>
<td>Develop/strengthen relationships</td>
</tr>
<tr>
<td>Talent Development</td>
<td>Strengthen business skills</td>
</tr>
<tr>
<td></td>
<td>Appeal to other staff members</td>
</tr>
<tr>
<td></td>
<td>Boost recruiting</td>
</tr>
<tr>
<td>Business Partnership</td>
<td>Transition skills and methods to the rest of the business</td>
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</table>
Why is Data Analytics Important to Internal Audit?

Internal audit departments leverage data analytics in order to:

- Identify additional
- Better understand existing risks
- Provide more assurance coverage
- Provide insights to management
Why is Data Analytics Important to Internal Audit?

Some areas that benefit from data analytics:

• Sales & Operations
• Finance & Accounting
• Order to Cash, Procure-to-Pay
• Legal & Regulatory Compliance
• IT infrastructure
**Why analytics matter**

CIOs rank analytics as the #1 factor contributing to an organization’s competitiveness.¹

8 out of 10 CEOs expect complexity to increase significantly in the next five years.²

Financial outperformers are 64% more likely to use analytics to evaluate talent supply and demand on an ongoing basis.³

Enterprises that apply advanced analytics have 33% more revenue growth and 12X more profit growth.⁴

Organizations that embrace analytics are more than 2X as likely to outperform their peers.⁵

Top-performing enterprises use business analytics 5X more than lower performers.⁶

Challenges to using Data Analytics
Challenges to Using Data Analytics

People

• Limited resources (financial and human) to execute on a sustained basis

• Appetite for investment in time and training needed to develop an effective DA process

• Someone needs to create, run, and maintain the queries
  - Proficiency using analytic software
  - Proficiency in performing analysis

_The top barrier for implementation of big data analytics is “inadequate staffing or skills for big data analytics.”_ (Source: The Data Warehousing Institute (TDWI))
Challenges to Using Data Analytics

Senior Analysts

- Greater New York City: 19,836
- Greater Chicago: 11,283
- Washington D.C. Metro Area: 9,292

**SUPPLY**

- New York City: 55,567
- Chicago: 21,354
- Atlanta: 19,724

**DEMAND**

Source: CareerBuilder, 2014
Challenges to Using Data Analytics

## Process

<table>
<thead>
<tr>
<th>Process Area</th>
<th>Components for Success</th>
</tr>
</thead>
</table>
| Objectives                 | Determine them  
Establish consensus                                                                  |
| Strategy and Governance    | 1) Change Management  
2) Validation  
3) Access  
4) Data Security  
5) Documentation  
6) Maintenance           |
| Measuring Success          | Cost-benefit ratio or KRI/KPIs  
Asset recovery  
Reduced fines  
Increased labor efficiency |
| Pilot First                | Deliberately small  
Low-hanging fruit (T & E?)  
Easily automated  
Refine the process       |
Challenges to Using Data Analytics

Technology

• Tool selection
• Available support
• Initial and ongoing costs $$$
• Integrating with systems
• Data considerations
• Training
Challenges to Using Data Analytics

Data

• Availability
• Accessibility
• Quality
• Format
• Centralized
• Storage
• Security
• Privacy
Data Analytic Process Steps
## BADIR Framework

<table>
<thead>
<tr>
<th>PROCESS STEP</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B</strong>usiness Questions</td>
<td>Understand what’s really going on. Ask the right, relevant questions about the business process. (“6 questions”)</td>
</tr>
<tr>
<td><strong>A</strong>nalystical Plan</td>
<td>Goals, Hypotheses, Method/Data Spec, Project Plan</td>
</tr>
<tr>
<td><strong>D</strong>ata Collection</td>
<td>Pull, cleanse, validate (GIGO!)</td>
</tr>
<tr>
<td><strong>I</strong>nsights</td>
<td>Review patterns, prove/disprove hypotheses, present findings in quantified impacts for easy priorities</td>
</tr>
<tr>
<td><strong>R</strong>ecommendations</td>
<td>Based on key insights, supported by detailed findings. Actionable! One Story – Key Message</td>
</tr>
</tbody>
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*Adapted from *Behind Every Good Decision* by Piyanka Jain & Puneet Sharma*
OR, A four-phased approach for deploying Data Analytics.

Phase 1: Scope & Plan
Phase 2: Obtain & Validate Data
Phase 3: Perform Analysis
Phase 4: Interpret & Report Results
Phase 1 – Scope & Plan

Objective
Define the objective(s) or business questions and plan to conduct the analytic.

Key Activities
- Identify the audit objective(s) of the analytic
- Determine the approach to achieve the audit objective of the analytic
- Identify the data elements required to execute the approach
- Discuss the approach with data owners, IT Department and key stakeholders
- Identify Systems, Data Storage, Data Owners, Data Format (specs) and File Requirements
- Plan, prioritize and document the tests (in plain language)

Deliverables
- Analytic Requirements Document
- List of data sources and expected outputs
- Resource plan, timelines and estimated effort
Phase 2 – Obtain & Validate Data

Objective

Obtain the data necessary to achieve the analytic objectives.

Key Activities

• Develop Request for Required Data
• Determine Method(s) and facilitate delivery and storage of Data
• Verify Completeness and Accuracy of Data (validate)
• Identify any Gaps in Required Data (cleanse if needed)

Deliverables

• Formalized data request
• Verification of receipt and functionality of required data sets
• Established data and script repositories
• List of identified gaps in data
Objective
Using standard tools, perform analysis consistent with analytic objectives.

Key Activities
• Finalize Analysis Approach
• Develop Test Scripts and Queries
• Execute Test Scripts
• Interpret & Analyze Results

Deliverables
• Documented Test Scripts and logs
• Detailed analysis of data sets and outputs
Phase 4 – Interpret and Report Results

Objective
Report results of data analysis.

Key Activities
- Evaluate and summarize the analysis results
- Assess the results against the analytic objectives
- Document all scripts and queries
- Move scripts and queries into established repositories

Deliverables
- Final Report on Results
- Presentation to Management
- Documented scripts and queries
An overview of a DA Approach

Data Analytics Approach – Detailed Phases

**Objective**
- Define the objective of the analytic
- Obtain the data necessary to achieve the audit objectives
- Using standard tools, perform analysis consistent with analytic objectives
- Report results of data analysis

**Key Activities**
- Identify the audit objective
- Determine the approach
- Discuss the approach with data owners, IT Department and key stakeholders
- Identify Systems, Data Storage, Data Owners, Format and File Requirements
- Plan, prioritize and document the tests
- Develop Request for Required Data
- Determine Method(s) and facilitate delivery and storage of the data
- Verify Completeness and Accuracy of Data
- Identify any Gaps in Required Data
- Cleanse data (data type mismatches)
- Finalize Analysis Approach
- Develop Test Scripts and Queries
- Execute Test Scripts
- Interpret & Analyze Results
- Evaluate and summarize the analysis results
- Assess the results against the analytic objectives
- Document all scripts and queries
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**Deliverables**
- Analytic Requirements Document
- List of data sources and expected outputs
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- List of identified gaps in data
- Documented Test Scripts
- Detailed analysis of data sets and outputs
- Final Report on Results
- Presentation to Management
- Documented scripts and queries
Data Analytics Maturity

- Tool Selection
- Query Development
- Process Implementation
- Risk Management
Data Analytics Tools
<table>
<thead>
<tr>
<th>METHOD</th>
<th>DESCRIPTION</th>
<th>USES, EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate</td>
<td>Describe &amp; compare population(s)/segments</td>
<td>Descriptive, profiling, campaign, winner-loser</td>
</tr>
<tr>
<td>Correlation</td>
<td>Relationships between 2 or more factors to explain/drive the other</td>
<td>Pre and post, tests, drivers, dashboards</td>
</tr>
<tr>
<td>Trends</td>
<td>Aggregate/correlation over time</td>
<td>Sales, drivers over period of time</td>
</tr>
<tr>
<td>Sizing/Estimation</td>
<td>Structured way to estimate w/o history</td>
<td>Business cases depend on external data, assump</td>
</tr>
<tr>
<td>Predictive/Time Series</td>
<td>Current &amp; history to predict future events</td>
<td>Drivers of sales conversion, consumer forecasts, other KPI, KRI</td>
</tr>
<tr>
<td>Segmentation</td>
<td>Group for meaning</td>
<td>Customization</td>
</tr>
<tr>
<td>Customer Life Cycle</td>
<td>Understand buying stages</td>
<td>Sales funnel, progression</td>
</tr>
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*Adapted from *Behind Every Good Decision* by Piyanka Jain & Puneet Sharma*
The right Data Analytic software will:

• Handle large data sets efficiently
• Integrate well with big-data
• Include wide array of analytical and statistical functions and procedures
• Be relatively easy to program
The right Data Analytic software will also:

- Log procedures performed on data
- Allow users to easily re-run analysis with minor changes
- Be scalable with regards to the platform
- Ensure that the vendor’s vision is in-line with the organization’s vision
- Include training and support
Data Analytics Tools

- **Basic Desk top**
  - Microsoft Excel
  - Microsoft Access

- **Integrated query tools**
  - PeopleSoft
  - SAP
  - Oracle
  - JDE

- **Report writers**
  - Cognos
  - Business Objects

- **Server-based (SQL)**

- **Specialized auditing software**
  - ACL
  - IDEA
  - Arbutus
  - SAS

- **Specialized DA Visualization software**
  - Tableau
  - Qlikview/Qlik Sense
Data Analytic Team
Roles and Responsibilities
### Key Roles and Responsibilities

#### Internal Audit Team Members
- CAE
- Directors and Managers
- Internal Audit Staff
- IT Auditors
- Data Specialist
- Data Analytics SME

#### Inside Business Partners
- Senior-Level Sponsor
- Business Process Owners
- IT Management
- Business Intelligence Team
- Risk Management and Compliance

#### Outside Business Partners
- 3rd Party Software Alliances
- 3rd Party Data Analytics Services Providers
- IIA / ISACA
Key Roles and Responsibilities within Internal Audit

Splitting the analytics roles - essential ingredients…

1. Audit Management & Staff
   - Provides comprehensive understanding of the audit objectives
   - Identifies opportunities to introduce data analytics into the audit process
   - Drives demand through personal insights and relationships
   - Keeps focus on solving audit related issues
Key Roles and Responsibilities within Internal Audit

Splitting the analytics roles - essential ingredients…

2. Data Analytics SME

– Proficient in use of DA tools and is able to design queries and manipulate data easily
– Experienced auditor with a knack for analysis
– May have knowledge of advanced statistical topics and modeling
– Excellent problem solving skills
Splitting the analytics roles - essential ingredients…

3. Data Specialist
- Strong programming and coding proficiency
- Has been a database administrator or systems analyst
- Has spent time as developer and has built applications
- Expertise in core IT related functions in querying, data extraction, cleansing, and manipulation
Key Roles and Responsibilities within Internal Audit

Utilization of Other Resources – Consultants to

- **Internal Audit Team:**
  - Consultants are seasoned auditors trained with basic understanding of data analytics

- **Technical Team:**
  - Consultants with moderate to advanced knowledge in Data Analytic or other tools to assist in developing queries
  - Internal or Third Party Resource Assists in Coding / Scripting

Rotate assignments to assist and develop in identifying data analytic opportunities and participating on client Data Analytic activities.
Data Analytic Applications for Internal Audit
Data Analytics Applied to Accounts Payable

- AP Tests can be designed to address risks, cost savings and/or recoveries
- Data analytic tests can be designed to identify any of the following:

**Improper Disbursements**
- Duplicate Payments
- Unapproved Purchases
- Payments for items not received
- Payments in excess of approval levels
- Missed discounts or credits
Accounts Payable Analysis – a few ideas

**Improper payments or questionable disbursements**

- **Detect duplicate payments using dates, payees, vendor invoice numbers and amounts.***
- Identify invoices or payments to vendors without a valid purchase order. *
- Look for invoices from vendors not in approved vendor file.
- Find invoices for more than one purchase order authorization. *
- Identify multiple invoices with the same item description. *
- Extract vendors with duplicate invoice numbers. *
- Look for multiple invoices for the same amount on the same date. *
- Find invoice payments issued on non-business days (Saturdays and Sundays).
- Identify multiple invoices at or just under approval cut-off levels.
- **Identify credits issued by or outstanding with vendors.**
- Identify goods invoiced and paid, but not shown as being received
- Look for payments to vendors not on contract.

Note - * signifies potential for recoveries
Accounts Payable Analysis – a more few ideas

• Look for multiple payments to the same vendor on the same date or for the same amount (excluding recurring charges, such as rent). *

• **Stratify vendor balances, check amounts, invoice amounts, PO amounts, etc., for unusual trends or exceptions.***

• Calculate and validate annualized unit price changes in PO/payments for the same product over time.*

• Review sequence of check numbers for gaps.

• Identify payments where no discount was taken.*

• Review changes to the vendor master file.
Data Analytics Applied to Accounts Payable

Schemes

- Phantom Vendors
- Kickback or Conflict-of-Interest
- Bidding and Contracting
- Dormant Accounts
- Capital Assets
Accounts Payable Schemes

Phantom Vendor Schemes

• Match names, addresses, phone numbers, bank accounts and taxpayer identification numbers between vendor source documents.

• Verify existence of vendors who use a post office box for an address

Kickback or Conflict-of-Interest Schemes

• Look for vendor prices greater than standard.

• Identify price increases greater than acceptable percentages.

• Check for continued purchases in spite of high rates of returns, rejects, or credits.

• Look for high volume purchases from one vendor.

• Look for frequent change orders.

• Identify payments to vendors with same names, addresses, phone numbers, etc., as employees.

Bidding and Contracting Schemes

• Look for patterns of rotation among vendors.

• Look for bids that are exceptionally lower than those of other vendors.
More Accounts Payable Schemes

• Look for low winning bids followed by numerous change orders.

• **Look for excessive use of one contractor in a competitive field.**

• Look for patterns in awards to vendors.

• Look for identical bids.

• Look for multilateral drops in bid prices (accompanied by the entry of new competitor).

• Look for competitors with the same addresses, same principals, same sales agents, same phone numbers, etc.

• **Look for vendors with same names, addresses, phone numbers, etc., as employees.**

Dormant Account Schemes

• **Check that all applicable accounts have been flagged as dormant.**

• Identify dormant accounts with activity.

• Check for transfers from dormant accounts to employee accounts.

• Check changes of addresses on dormant accounts.

• Cross check new addresses to employee addresses.

Capital Assets Schemes

• **Extract large additions or disposals for review.**
Other Applications for Data Analytics

Accounts Receivable
- Valid Sales Orders
- Accurate Product Pricing
- Authorized Shipments
- Proper Invoicing
- Valid Cash Receipts
- Timely Collections & Write offs
- Sales contract compliance
- Other Adjustments

Payroll
- Accurate & Authorized Payments
- Timely and Accurate Hires & Terms
- Reasonable Overtime & Commissions
- Proper Timekeeping and Attendance
- Search for non-existent employees and other payroll schemes
- Comparison of periods for unusual trends
Other Applications for Data Analytics

General Ledger
- Journal entries
- Closing activities
- Adjustments

Master Files
- Customers
- Employees
- Vendors
- Inventory

Travel and Entertainment

Purchasing Cards

Data Quality
- Reasonable
- Within expected range
- Validity
- Complete

Compliance
- FCPA
- SOX
- Tax
- Regulated Transactions
Resources & Guidance for Internal Auditors
Resources – IIA Standards & Guidance

- IPPF Standard 2300 – Performing the Engagement
  Internal auditors must identify, analyze, evaluate, and document sufficient information to achieve the engagement’s objectives.

- IPPF Standard 2310 – Identifying Information
  Internal auditors must identify sufficient, reliable, relevant, and useful information to achieve the engagement’s objectives.

- IPPF Standard 2320 – Analysis and Evaluation
  Internal auditors must base conclusions and engagement results on appropriate analyses and evaluations.

- PA 2320-1 – Analytical Procedures
- PA 2320-4 – Continuous Assurance
- GTAG 3 – Continuous Assurance
- GTAG 13 – Fraud Prevention and Detection in an Automated World
- GTAG 16 – Data Analysis Technologies
Don't cry because it's over. Smile because it happened.

Dr. Seuss
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