

Data Analytics for Internal Auditors

Getting Started and Beyond

A Presentation for Auditors





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SME – User-Developed Application Risks
Experis Finance

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• Internal Audit, Controls, and Regulatory Compliance • Governance and Risk Management • Information Technology	• Federal Tax Compliance and Consulting • Tax Accounting Reporting and Consulting • Tax Risk Management	• Financial Reporting and Compliance • Process Optimization • Finance Organization Support

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Internal Audit, Controls and Regulatory Compliance	Governance and Risk Management	Information Technology	Business System Services Center of Expertise	Construction Services Center of Expertise	Information Security Center of Expertise
Contract Compliance and Cost Recovery Internal Audit Strategic Sourcing Financial Institution Internal Audit Internal Control Optimization Quality Assessment Review Sarbanes-Oxley Compliance Financial Institution Regulatory Compliance and Internal Audit	Enterprise Risk Assessment and Management Fraud Risk Assessment Technology Risk Assessment	Business Continuity Management Disaster Recovery Information Technology Audit Information Technology Governance	Business Case Development and Software Selection System Rationalization Systems Management and Risk Management ERP Solution Delivery System Controls and Security Enterprise Data Management, Technology Governance, and Business Analytics	Construction Audit Construction Financial Management and Optimization	Information Security Governance Privacy and Regulatory Compliance Cyber Security PCI/DSS

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:

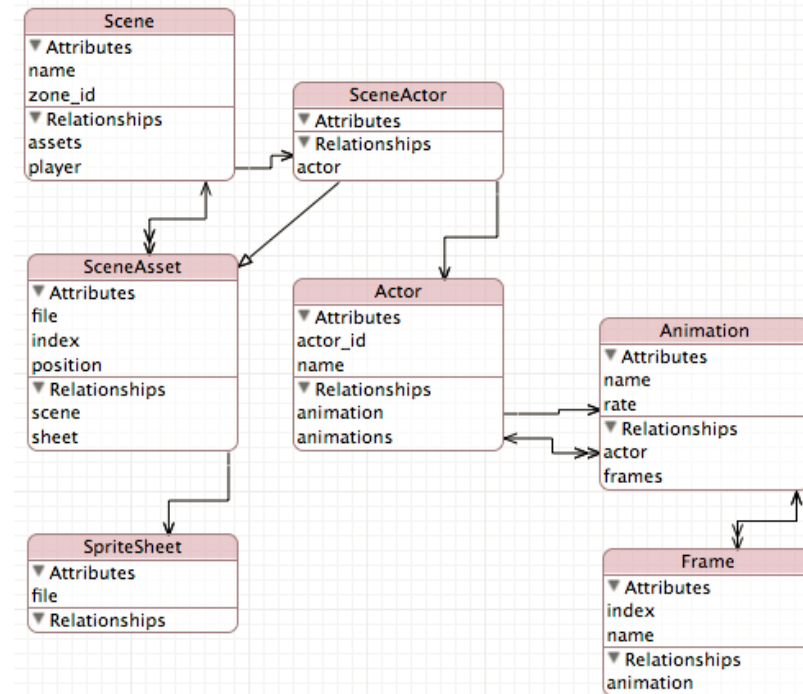
Who

What

Why

Where

When



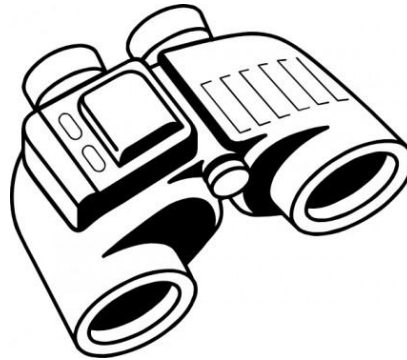
Why is Data Analytics Important to Internal Audit?

Strategic Area	Enhancement
Company Expectations	Audit coverage, quality, business impact, on a finite audit budget
Regulatory Expectations	Stronger assurance and quantifiable results
Competitive Landscape	Strengthen capabilities Seek new talent
Increased Value	Deeper discussion on issues (Higher cost recovery?) Develop/strengthen relationships
Talent Development	Strengthen business skills Appeal to other staff members Boost recruiting
Business Partnership	Transition skills and methods to the rest of the business

Why is Data Analytics Important to Internal Audit?

Internal audit departments leverage data analytics in order to:

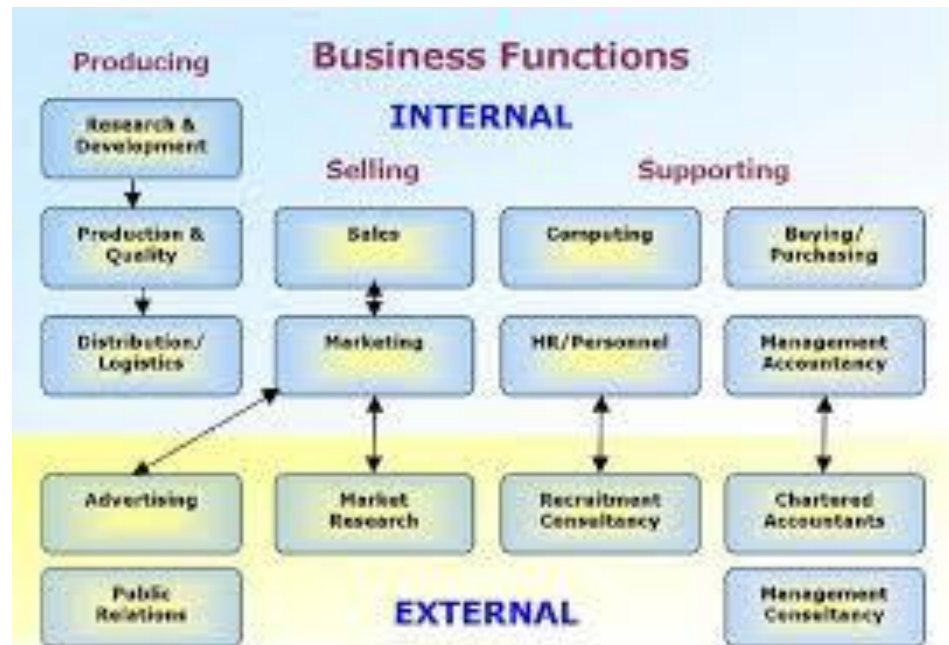
- Identify additional 
- Better understand existing risks
- Provide more assurance coverage
- Provide insights to management



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



Important to the Business – Important to IA

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

Source: <http://www-01.ibm.com/software/analytics/infographics/what-is-analytics/index.html>, Downloaded 12/8/15.

Challenges to using Data Analytics

Challenges to Using Data Analytics

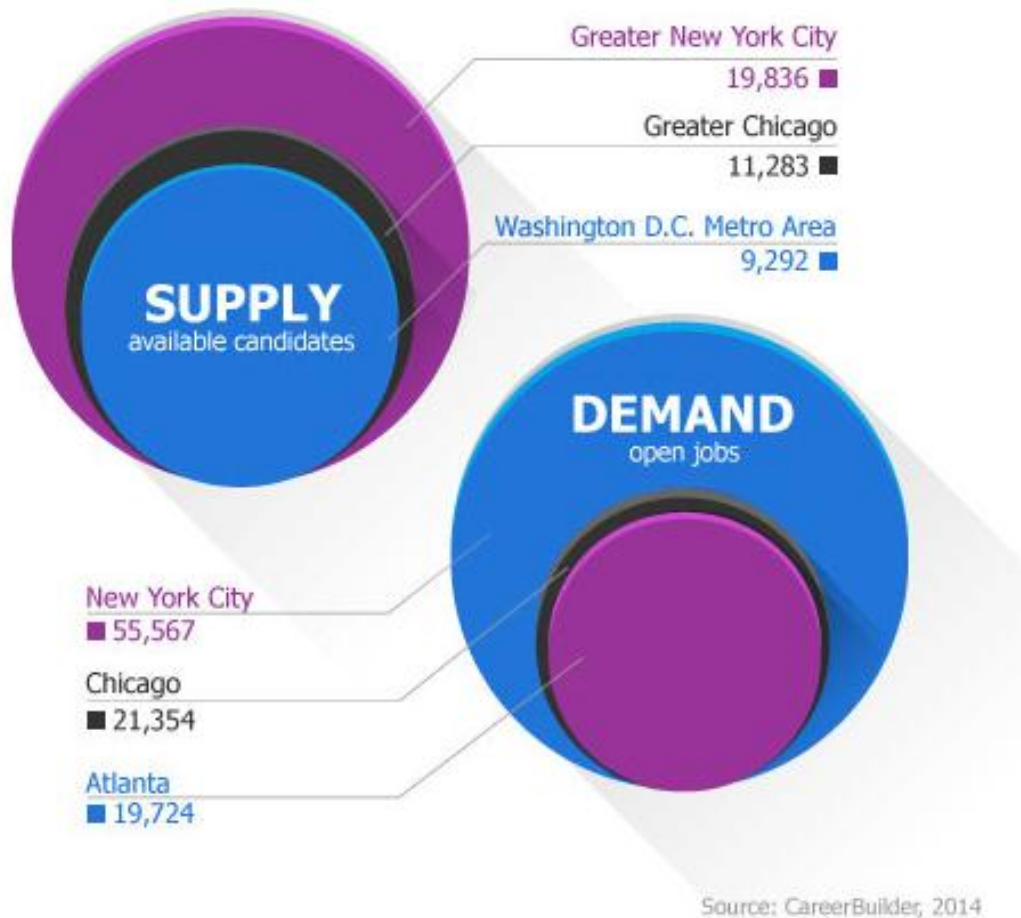
People

- 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



Challenges to Using Data Analytics

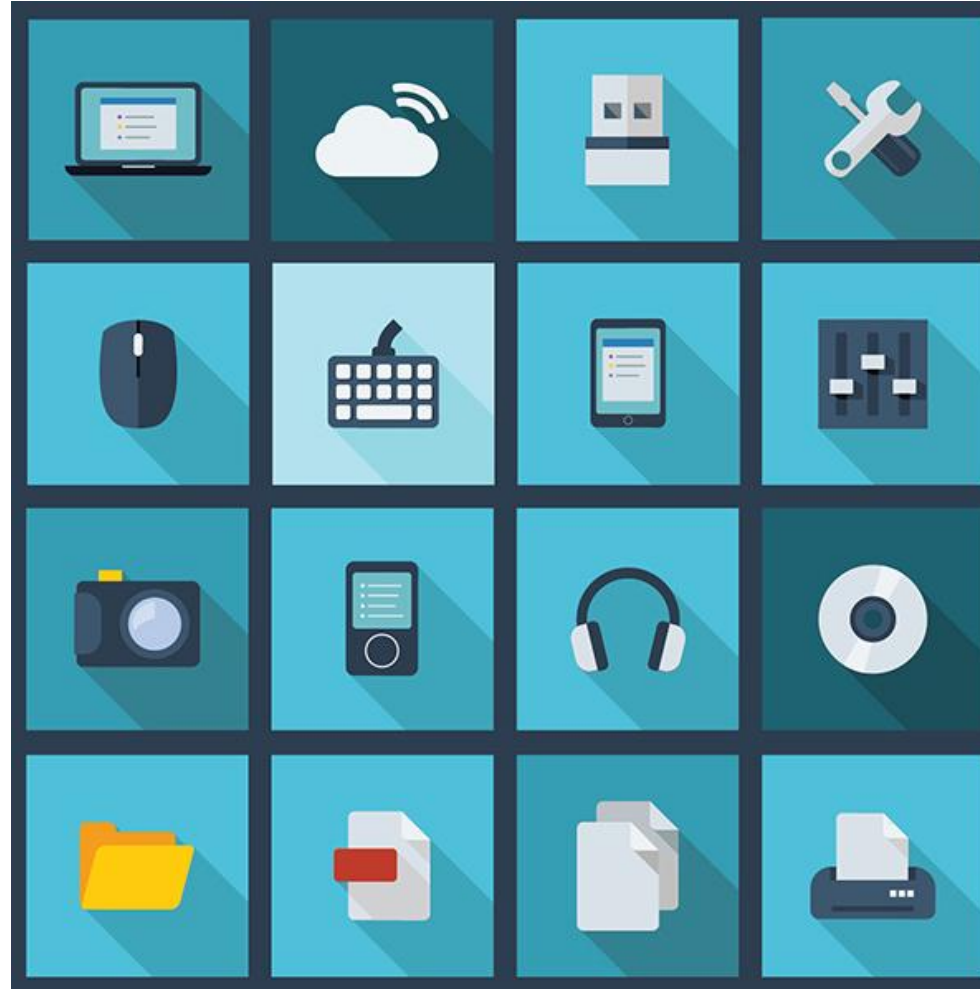
Process

Process Area	Components for Success
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

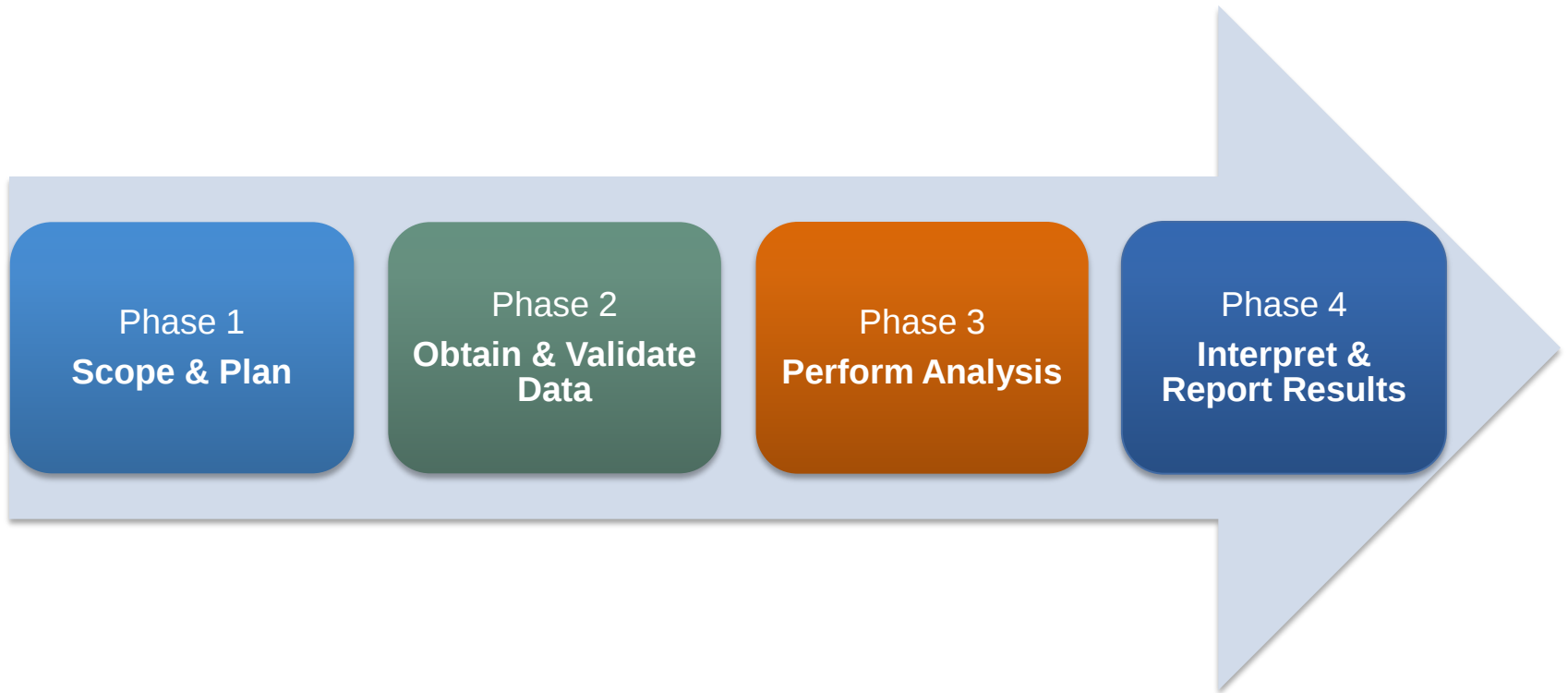
BADIR Framework

PROCESS STEP	DESCRIPTION
B usiness Questions	Understand what's really going on. Ask the right, relevant questions about the business process. ("6 questions")
A nalytical Plan	Goals, Hypotheses, Method/Data Spec, Project Plan
D ata Collection	Pull, cleanse, validate (GIGO!)
I nsights	Review patterns, prove/disprove hypotheses, present findings in quantified impacts for easy priorities
R ecommendations	Based on key insights, supported by detailed findings. Actionable! One Story – Key Message

*Adapted from *Behind Every Good Decision* by Piyanka Jain & Puneet Sharma

A Data Analytics Approach

OR, A four-phased approach for deploying Data Analytics.



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

Phase 3 – Perform Analysis

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

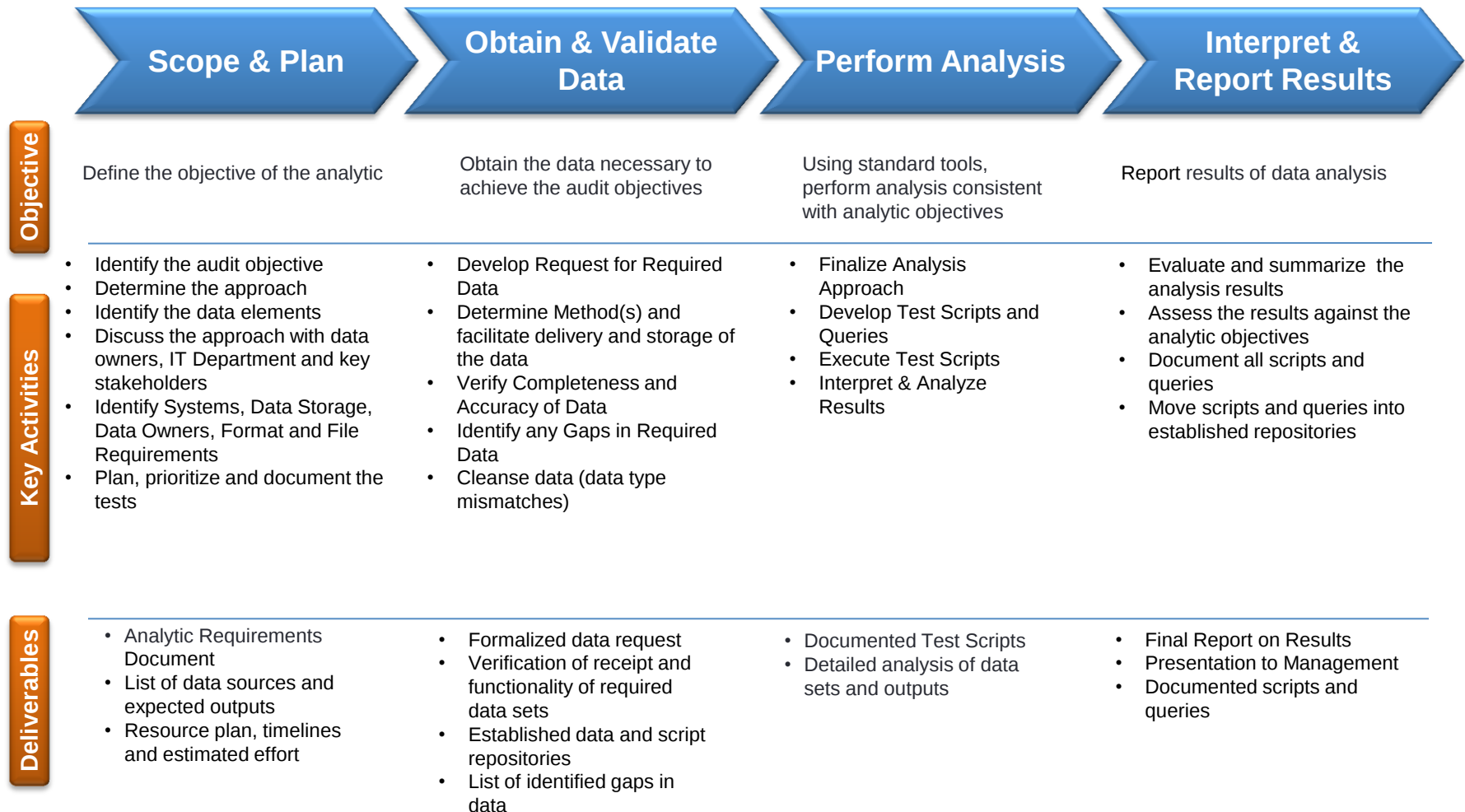
- Evaluate and summarize the analysis results
- Assess the results against the analytic objectives
- Document all scripts and queries
- Move scripts and queries into established repositories

Deliverables

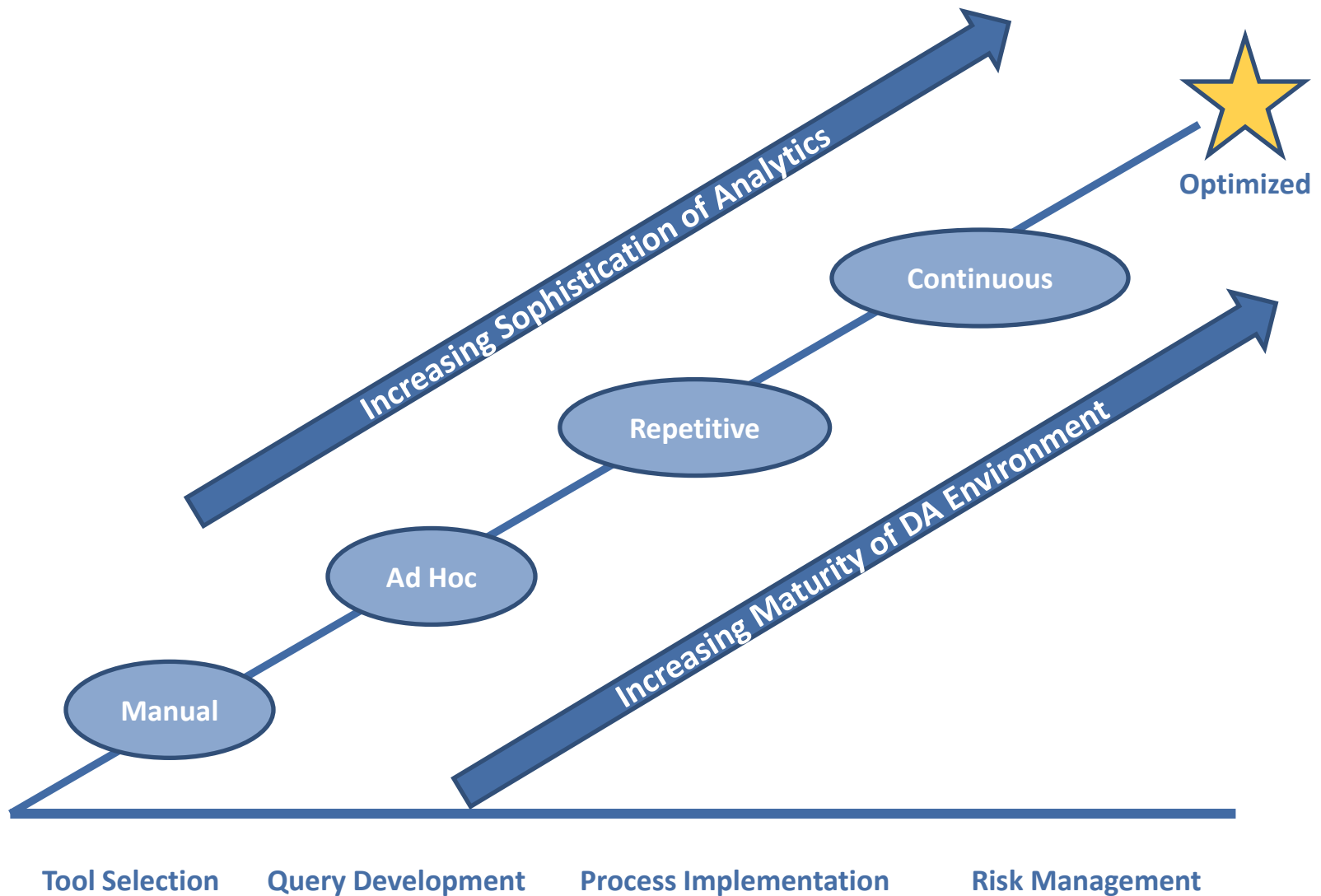
- Final Report on Results
- Presentation to Management
- Documented scripts and queries

An overview of a DA Approach

Data Analytics Approach – Detailed Phases



Data Analytics Maturity



Data Analytics Tools

Seven Common Methodologies*

METHOD	DESCRIPTION	USES, EXAMPLES
Aggregate	Describe & compare population(s)/segments	Descriptive, profiling, campaign, winner-loser
Correlation	Relationships between 2 or more factors to explain/drive the other	Pre and post, tests, drivers, dashboards
Trends	Aggregate/correlation over time	Sales, drivers over period of time
Sizing/Estimation	Structured way to estimate w/o history	Business cases depend on external data, assump
Predictive/Time Series	Current & history to predict future events	Drivers of sales conversion, consumer forecasts, other KPI, KRI
Segmentation	Group for meaning	Customization
Customer Life Cycle	Understand buying stages	Sales funnel, progression

*Adapted from *Behind Every Good Decision* by Piyanka Jain & Puneet Sharma

Data Analytics Tools

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



Data Analytics Tools

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



Key Roles and Responsibilities within Internal Audit

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

Q&A / Thank You!

Don't cry because it's over.
Smile because it happened.
Dr. Seuss



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