

What Audit Committees Need to Know about Big Data and Predictive Analytics

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- Managing Partner, Swenson Advisors, LLP
A full service accounting firm with global capabilities
- Over 22 years of experience as an Audit Partner with Price Waterhouse LLP and McGladrey & Pullen, LLP
- Serves as the Audit Committee Chairman of several entities including private, public and not-for-profit organizations and participates on over 12 Boards and related Board Committees
- B.S., Accounting from Bob Jones University and M.B.A. from University of Georgia
- Licensed as CPA in California and Georgia
- Member of American Institute of Certified Public Accountants and Association of Certified Fraud Examiners

Why Should Audit Committees be Concerned about Big Data?

What is “Big Data”?

- “Datasets whose size is beyond the ability of typical data base software tools to capture, store, manage, and analyze.” - McKinsey & Co.
- “A new attitude by businesses, non-profits, government agencies, and individuals that combining data from multiple sources could lead to better decisions.” - Forbes



Slide credit: Sheppard Mullin

Quantum Leap in Data

- 2.5 quintillion bytes of data are produced every day (that is 25,000,000,000,000,000,000!)
- Google, the largest “big data” Company in the world, processes 3.5 billion requests per day and stores 10 billion gigabytes.
- Facebook has over 2.5 billion pieces of content, 2.7 billion ‘likes’ and 300 million photos (this adds up to more than 500 terabytes of data.)

Slide credit: Sheppard Mullin

A world map is centered in the background, overlaid with a complex network of grey lines and nodes of various sizes, representing data connectivity. The map is rendered in a light grey tone. The text '90%' is prominently displayed in red at the top center, with a dashed white circle around it. Below it, a list item 'o of the data in the world was created in the last two years' is shown. Further down, a paragraph of text describes data sources. At the bottom, the title 'Big Data....Big Deal!' is written in a large, dark blue font. The footer contains three sections: a dark red bar on the left with white text, a dark blue bar in the middle with a white number, and a dark blue bar on the right with white text.

90%

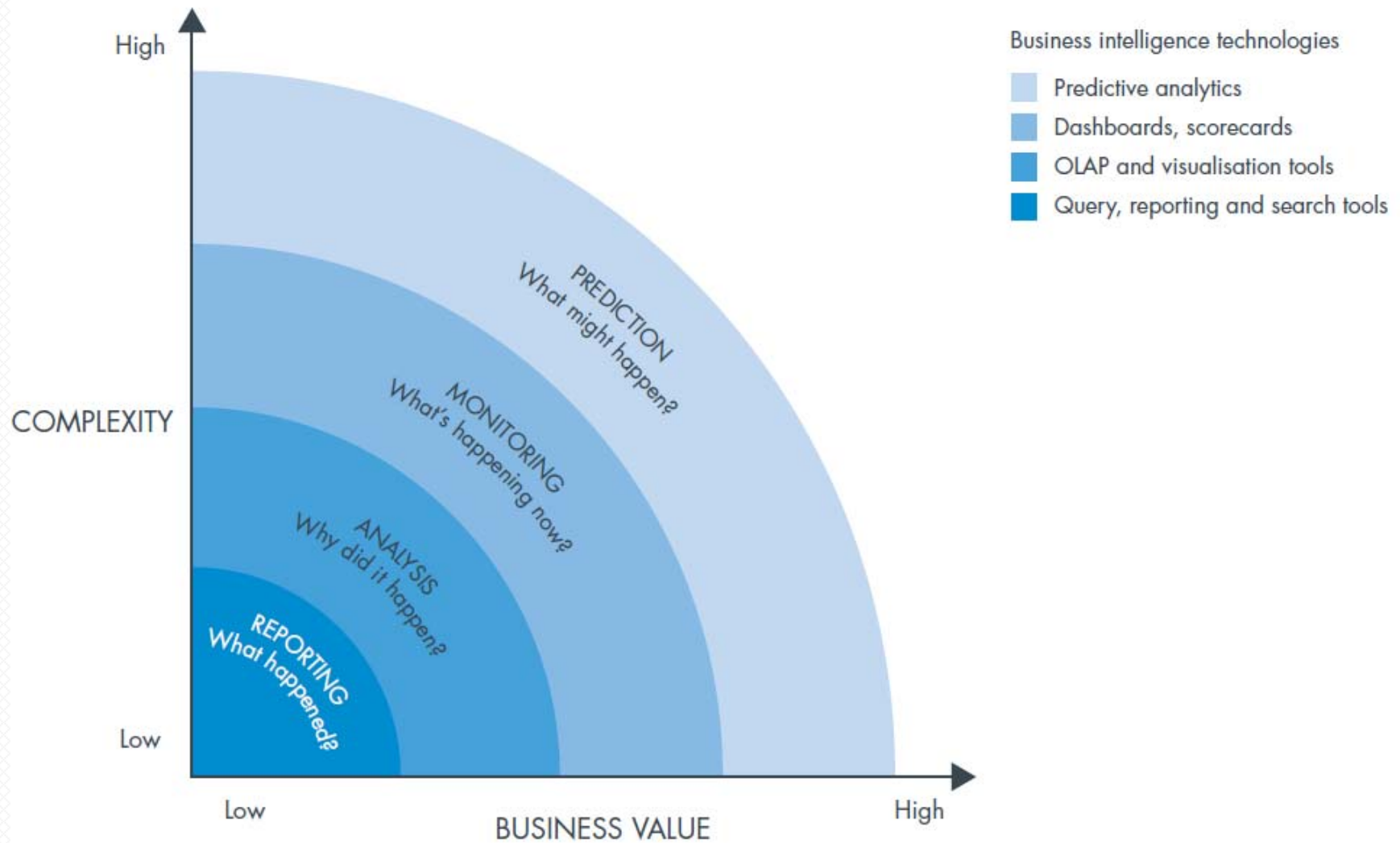
o of the data in the world was created in the last two years

Data comes from everywhere: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone GPS signals to name a few.

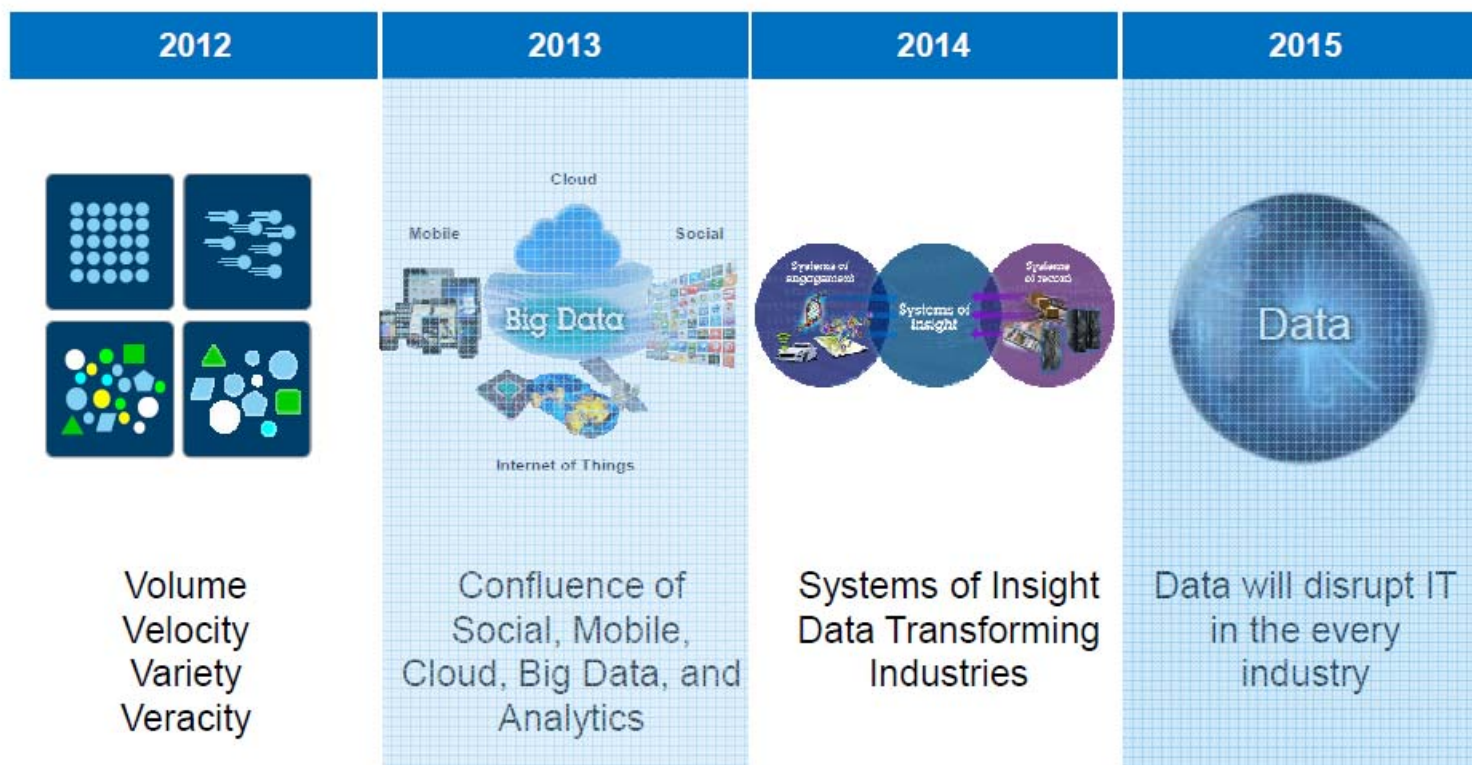
Big Data....Big Deal!

Data source: IBM.com

Levels of Data Analysis



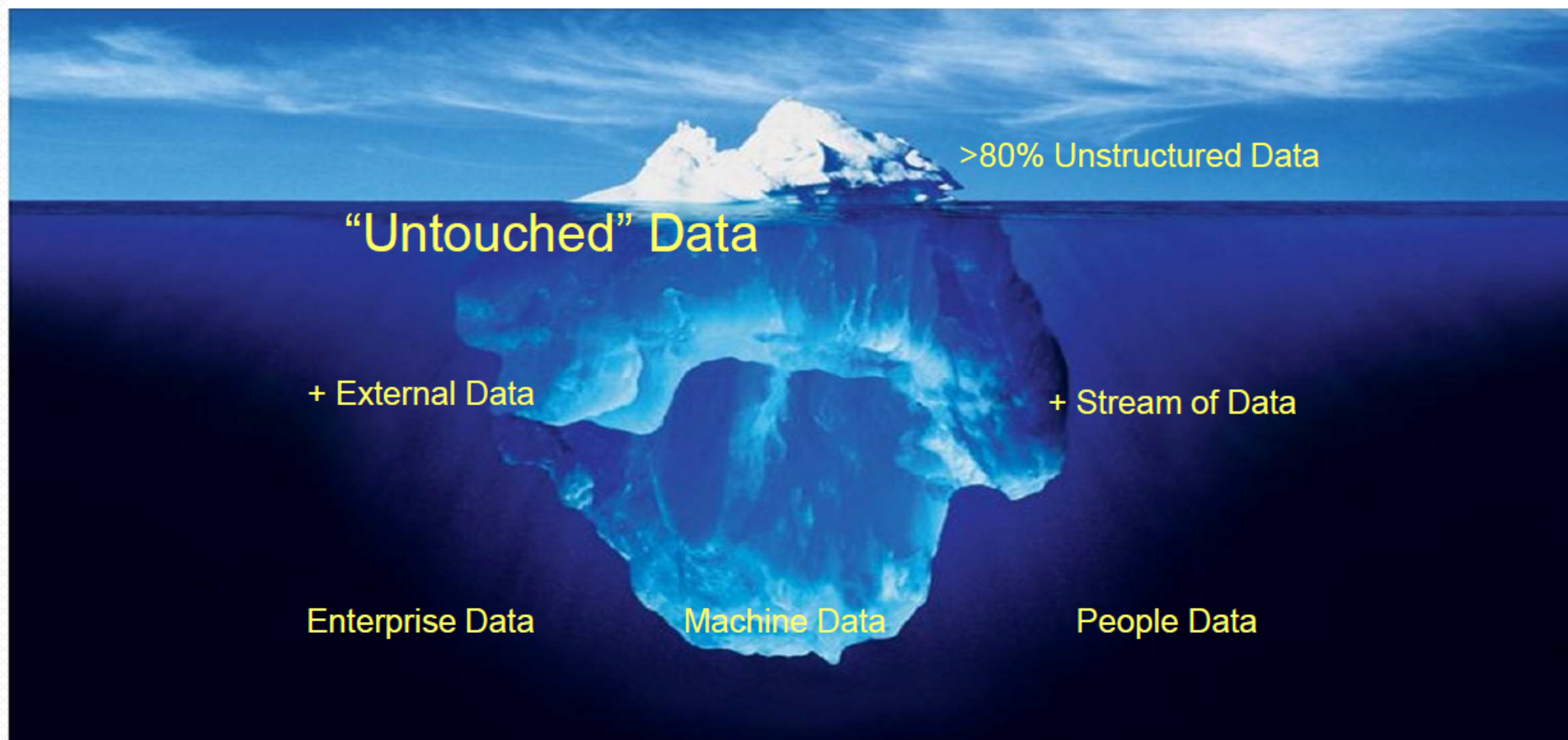
Big Data has been a popular topic in client discussions



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Slide credit: IBM

Visualizing the concept of Big Data



Slide credit: IBM



Business Users Want to Access More Data

Business Users Already Suffer from Information Overload

The Big Data Paradox

All You Can Eat Buffet

Slide credit: IBM

Popular use cases across all Industries

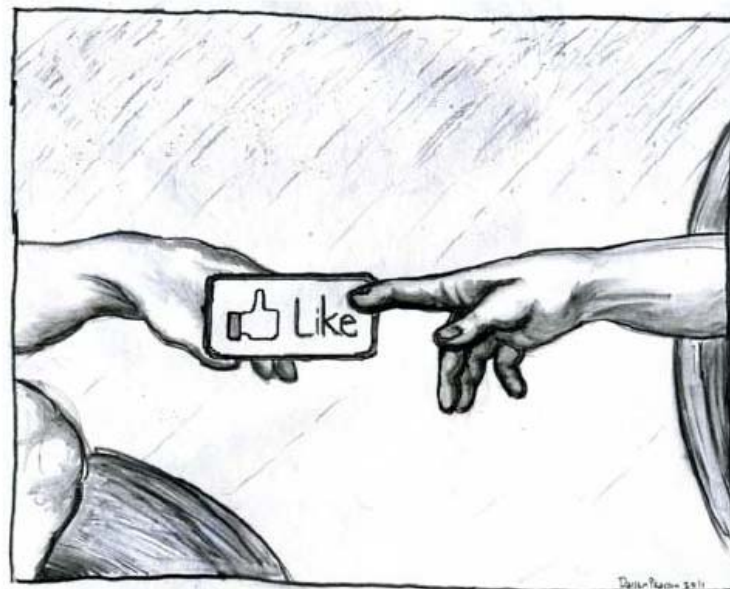


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Slide credit: IBM

Data is an invisible thread permeating our lives in many ways



Slide credit: IBM

5 Ways Data will drive our future



1. Hyper **Personalization** will become the norm
2. **Contextual and Cognitive** apps will make us smarter
3. Privacy will evaporate sooner than you think, while need for continuous refinement to boost **trustworthiness of data** will be paramount
4. Digital currencies will make way for a nearly **cashless society**
5. Innovative **Data Products** will mushroom around us boosting **Open Data movement** and creating opportunities to **disrupt or create entire industries**



Slide credit: IBM

The Booming Business of Data Analytics

Financial Times | 4/6/15

Changing rules

The ingrained practice of cherry-picking data to justify previously made decisions is being ousted making room for managers who can mine huge amounts of data in order to make reliable decisions.

**“ Every role in a marketing department
is now using data, ”**

Kevin Bishop

Vice-president at IBM ExperienceOne

As the pace of change in today's world continues to increase, CPAs and accountants need to focus their organization on anticipating change, rather than merely responding to it.

That will mean developing both a new skillset and a new mindset.

Dan Burrus

Futurist and technology educator

In a recent survey by the Chartered Global Management Accountants, almost 9 of 10 finance professionals agreed the revolution is not only coming, its already here.

The Anticipatory Organization: Accounting and Finance Edition

Dan Burrus

- Teach CPAs the skills needed to be “anticipatory” – to identify important trends and act upon them
- Accountants to learn how to identify “hard” trends that WILL happen versus “soft” trends that MIGHT happen

“Take an hour a week to unplug from the present and plug into the future. You’re going to spend the rest of your life there!”

-Burrus

What Are Predictive Analytics, Predictive Accounting, and Predictive Auditing

Predictive Analytics Is...

The practice of extracting information from existing data sets in order to **determine patterns and predict future outcomes and trends.**



Predictive analytics does not tell you what will happen in the future.

This Learning Process Discovers Insightful Gems, such as:

- **Early retirement decreases your life expectancy.**

Unhealthy habits such as smoking and drinking follow retirement.

- **Mac users book more expensive hotels.**

Macs are often more expensive than Windows computers, so Mac users may on average have greater financial resources.

- **Vegetarians miss fewer flights.**

The knowledge of a personalized meal awaiting the customer provides an incentive or establishes a sense of commitment.

- **Guys literally drool over sports cars.**

Consumer impulses are physiological cousins of hunger.

Examples of Predictive Analytics

What's predicted: Friendship



Sponsored a competition to improve the precision of suggested people you may know and wish to link to.

What's predicted: Cancellations (in order to retain customers)



Predicts which customers will defect to a competitor with 65 to 90 percent accuracy.

What's predicted: Influenza



Shown to foresee an increase in influenza cases at one hospital 7-10 days earlier than the Center for Disease Control by incorporating online search trends (e.g., related to symptoms)

Understanding the Coming Panorama: Historical Financial Reporting, Continuous Auditing and Monitoring, and Predictive Audit Metrics

The New Auditing Panorama

Traditional Auditing Model

- Historical look back
- Driving using the rear view mirror

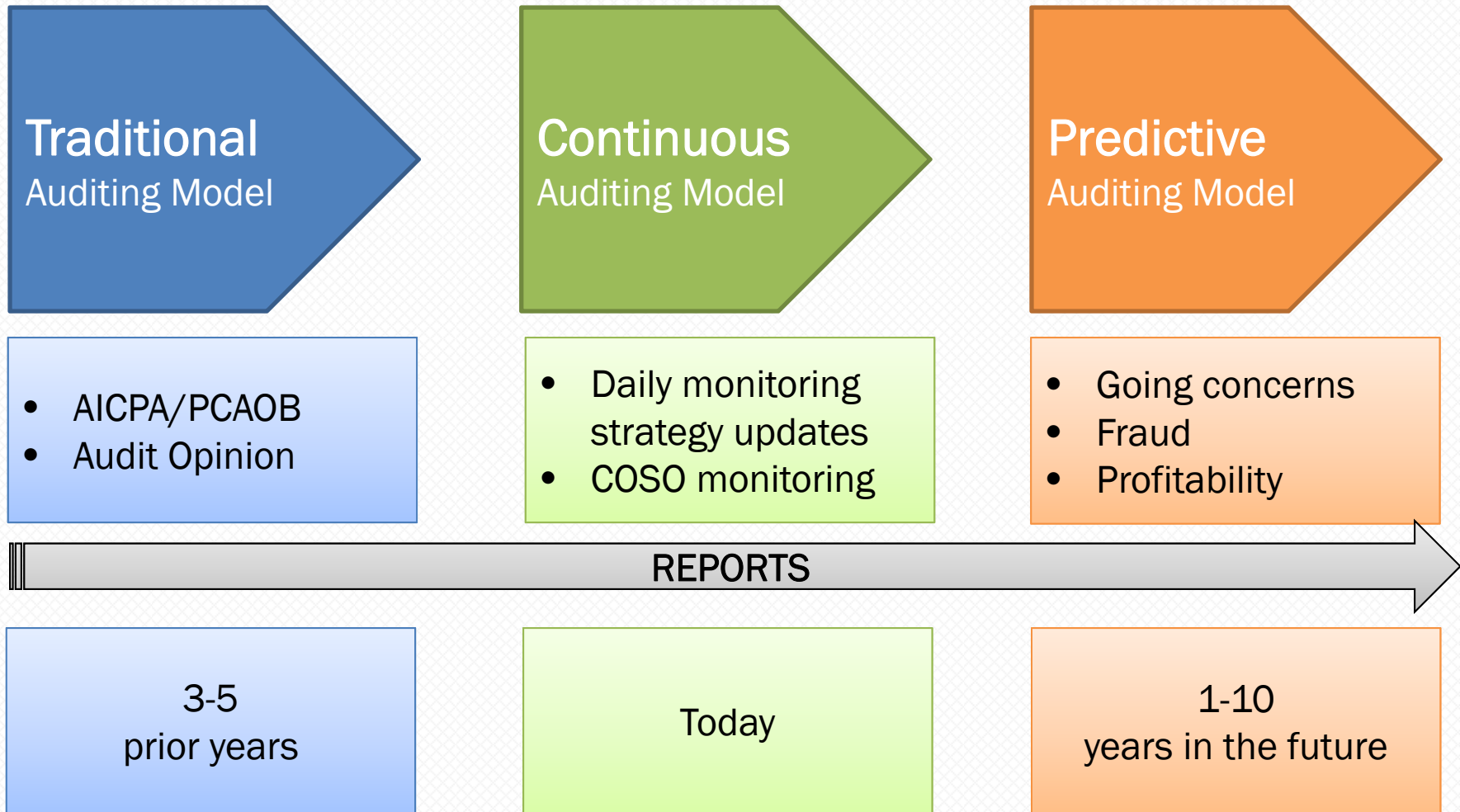
Continuous Auditing Model

- COSO/AICPA monitoring
- Today's facts

Predictive Auditing Model

- Future thinking
- Driving with a periscope

Audits of the Future



Focus of the Future

Management Accounting and Analysis

VS

Historical financial reporting

Predictive

VS

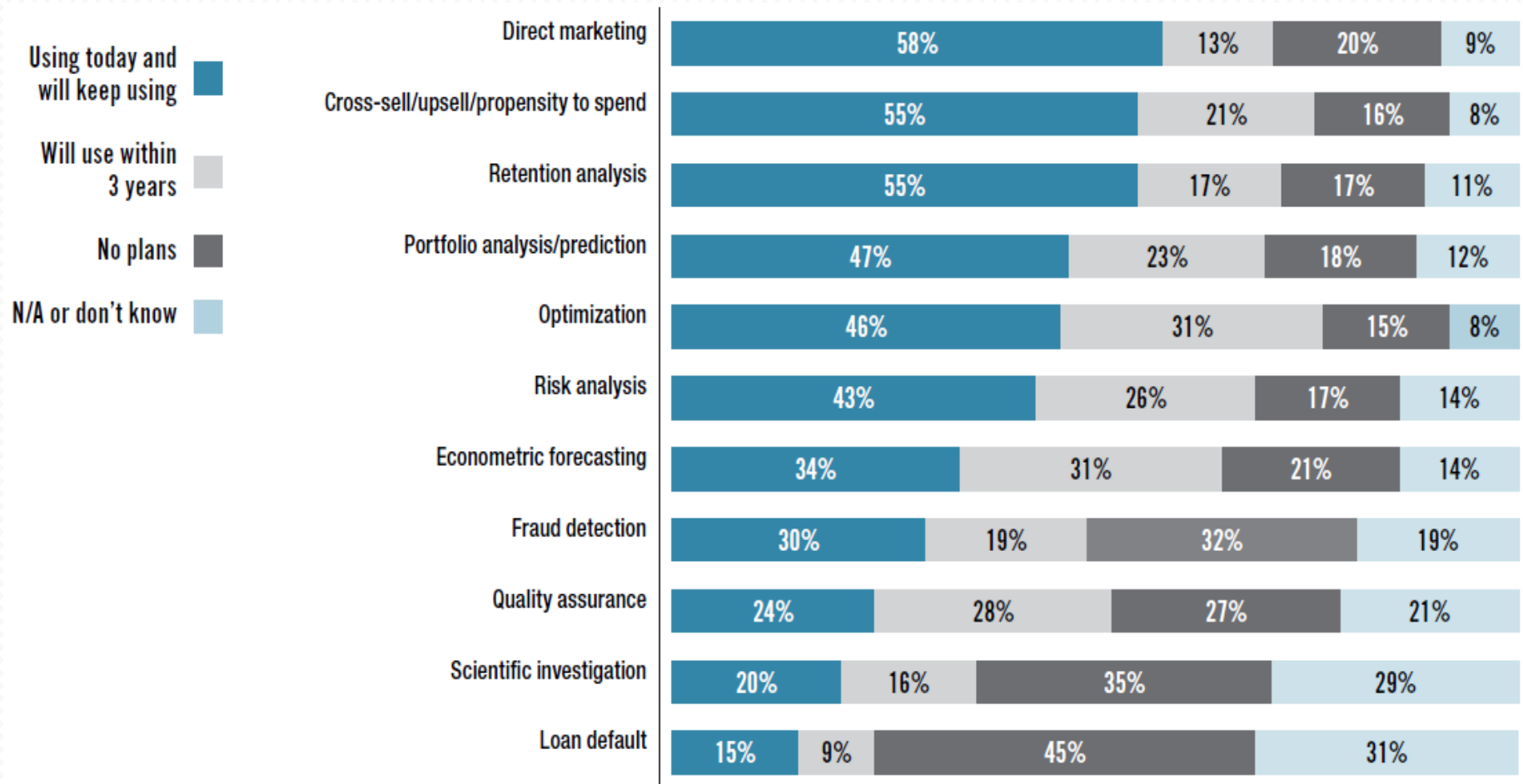
Hindsight

Predictive Accounting
is about
Adding Value in Today's
Rapid Response World

Predictive Analytics

- Becoming mainstream
- No longer realm of mathematicians
- Uses: Predicting trends, understanding customers and predicting behavior
 - ✓ Will my customer cancel my service?
 - ✓ Which customers are good candidates for up selling?
 - ✓ How can I control my process better?
 - ✓ How will demographic data affect my business?
- Business users best positioned to drive value
- Software is becoming easier to use

How Companies Are Using Predictive Analytics



Driving Faster Decisions

Journal of Accountancy | 4/13/15

How continuous monitoring and auditing are enabling HP – and many other organizations – to become more agile

- HP identified concern related to frequency/volume of manual JEs
- HP adopted a continuous auditing and continuous monitoring approach to identify the root cause of such transactions and to enable better decisions through standardization entries made under improved controls.
- Governance/compliance teams designed high-level analytics with drill-down capabilities.
- Success of program has prompted action to reduce number and risk of JEs

Driving Faster Decisions

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How continuous monitoring and auditing are enabling Hewlett Packard (HP) – and many other organizations – to become more agile

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Insights from the AICPA, Big 4, and Red Flag Group

Big Four Firms Face ‘Tsunami’ of Threats from Digital Groups

Financial Times | 9/24/15

Tudor Aw, partner and technology sector head at KPMG Europe, “Companies such as Google and Amazon have three core assets: data storage, data analytics and cloud technology. They underpin the business model that we need to embrace for the future.”

Innovate or die is the stark message for the professional services firms. Last year PwC signed a joint venture with Google to combine Google’s innovation and technology platform with PwC’s industry experience and corporate insight.

Reimagining Auditing in a Wired World

AICPA | August, 2014

White Paper issued by the AICPA envisions how the audit of the future could look, applying big data techniques and continuous auditing

- Audit Data Analytics (ADA) includes:
 - Methodologies for identifying and analyzing anomalous patterns and outliers in data
 - Mapping and visualizing financial performance and other data across operating units, systems, products, or other dimensions for the purpose of focusing the audit risks
 - Building statistical (for example, regression) or other models that explain the data in relation to other factors and identify significant fluctuations from the model
 - Combining information from disparate analyses and data sources for the purpose of gaining additional insights

Reimagining Auditing in a Wired World

AICPA | August, 2014

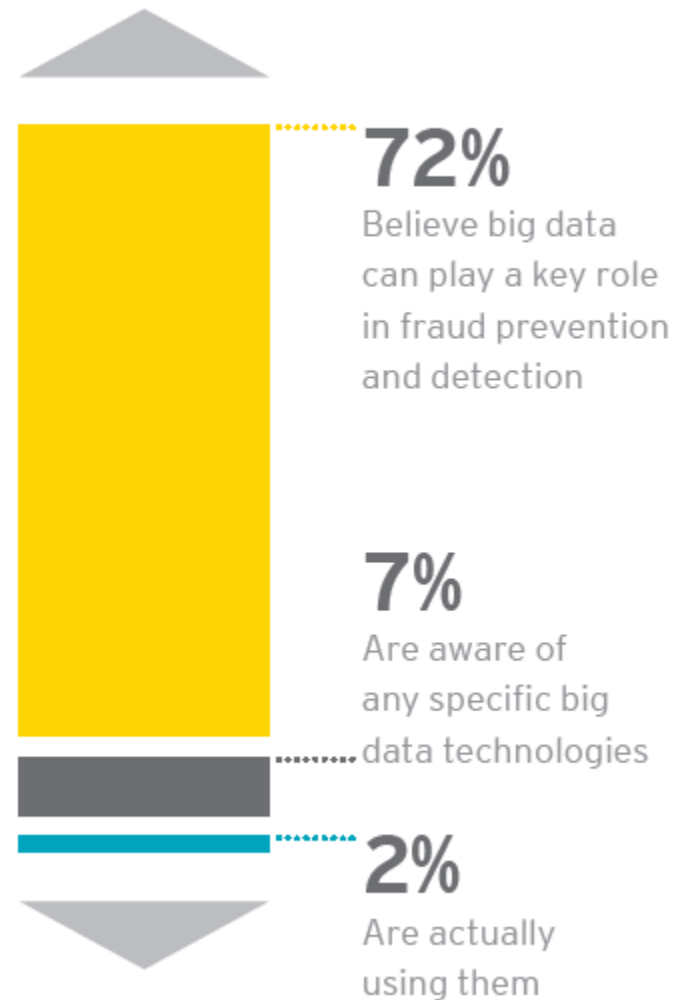
ADA can be incorporated into audits:

1. Identifying and assessing the risks associated with accepting or continuing an audit engagement (for example, the risks of bankruptcy or high-level management fraud).
2. Identifying and assessing the risks of material misstatement through understanding the entity and its environment. This includes performing preliminary analytical procedures as well as evaluating the design and implementation of internal controls and testing their operating effectiveness.
3. Performing substantive analytical procedures in response to the auditor's assessment of the risks of material misstatement.
4. Identifying and assessing the risks of material misstatement of the financial statements due to fraud, and testing for fraud having regard to the assessed risks.
5. Performing analytical procedures near the end of the audit to assist the auditor when forming an overall conclusion about whether the financial statements are consistent with the auditor's understanding of the entity.

Forensic Data Analytics (FDA)

How are companies leveraging forensic data analytics to mine big data?

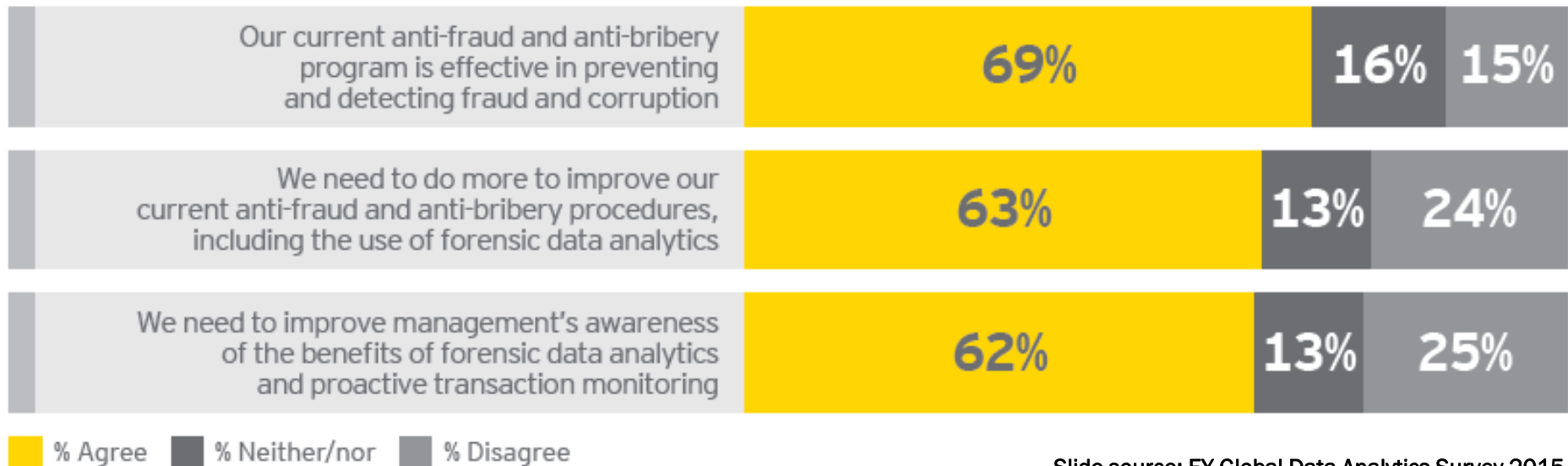
- Big data has big potential
 - Current regulatory landscape creates further impetus for new approaches in FDA
 - FDA efforts are aligned well with perceived company risks



Slide source: EY Global Data Analytics Survey 2015

The Biggest FDA Challenges

- Lack of awareness and expertise
- Getting the right tools
- Data volumes analyzed are relatively small
- Data sources analyzed are not aligned with technology
- Right risks, wrong tools?



Slide source: EY Global Data Analytics Survey 2015

Why Use FDA: Key Benefits and Adoptions

FDA enhances the risk assessment process and improves fraud detection. Top benefits according to respondents are:



Slide source: EY Global Data Analytics Survey 2015

KPMG Acquires McLaren Technology Group

Strategic alliance that aims to apply McLaren Applied Technologies (MAT) predictive analytics and technology to KPMG's audit and advisory services.

“ We believe this specialist knowledge has the power to radically transform audit, improving quality and providing greater insight to management teams, audit committees, and investors. ”

Simon Collins
UK Chairman of KPMG

In an interview with the KPMG Business Development Leaders' Network, Iain Moffatt:



“in the next five years, are big accountancy firms going to be our competition, or is it going to be Google or Amazon, or somebody else?”

While Google may not be licensed to perform audits, they could apply their data analysis techniques to advising companies or investors. **With investors looking more at forward-looking predictive data and less at historical audit data to aid decision-making, Moffatt's concern is valid.**

EY Sees Barriers to Use of Big Data for Audits

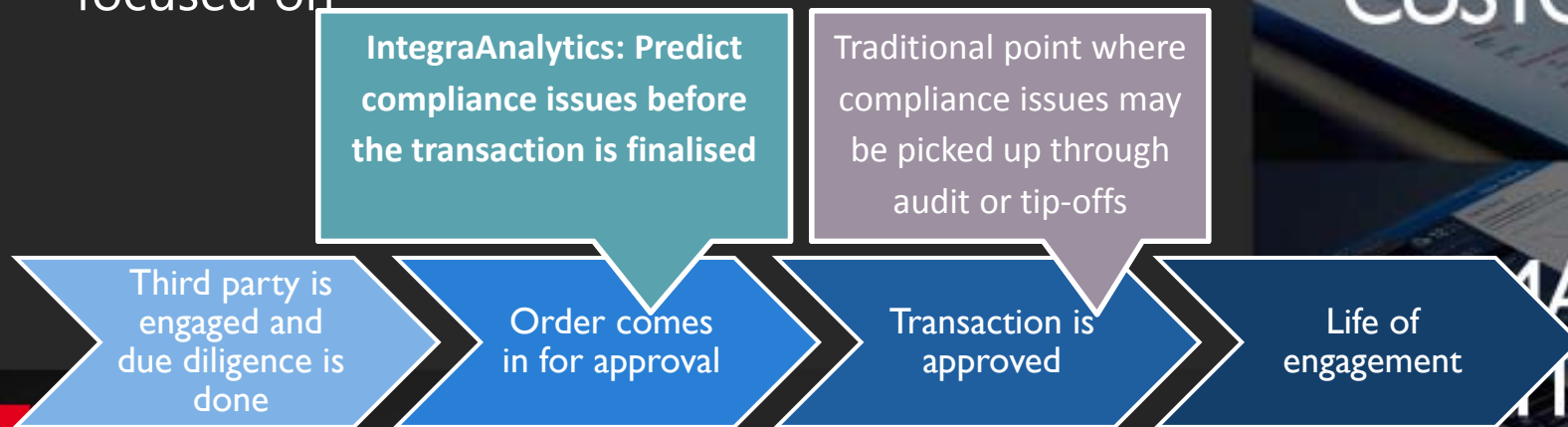
CFO | 4/17/15

- Big data and analytics promise to transform auditing, but there are still a number of barriers including:
 - Data capture – companies invest significantly in protecting their data, which makes the process of obtaining client approval for auditors time consuming
 - Complexity/volume – auditors encounter hundreds of different accounting systems and multiple systems within the same company, all containing different sets and types of data, adding complexity of data extraction and volumes of data to be processed

Case Study: Red Flag Group

The new approach

- ▶ IntegraAnalytics performs transaction screening
 - ▶ Monitor Suppliers/Sales transactions and related data sources
 - ▶ Identify potential Customers risks that lead to non-compliance
 - ▶ Intercept suspicious transactions through predictive analytics
 - ▶ Predict and discover the risk areas to be focused on



www.redflaggroup.com

SALES

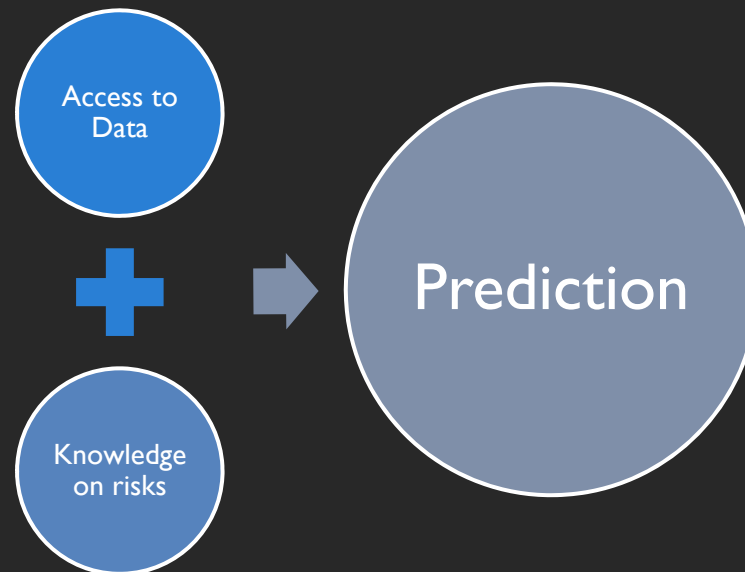
SUPPLIER

CUSTOMER

MAN
ITAL

Predictive Analytics and discovery

- ▶ “A little prediction goes a long way” wrote Eric Siegel in his popular “Predictive Analytics” book
- ▶ Every company needs to build private pattern for non-compliant events



Transaction Monitoring

- ▶ Ideally, you want to have a pattern in place and their overall integrity (and maintain that), but also:
 - ▶ Correlate the transaction with known patterns and aggregated data
 - ▶ Enable enterprise to learn specific pattern that is important for specific business problems.



SALES

SUPPLIER

CUSTOMER

HUMAN
CAPITAL

SCENARIO



SALES



SUPPLIER



CUSTOMER



HUMAN
CAPITAL

Bribery Scenario

- ▶ Distribution Partners are extension of company and its reputation risk can be passed on to the company
- ▶ Regulatory is increasing enforcement of actions, which leads to strong sales compliance program
- ▶ Salesperson may use extra margin to incentivize resellers to switch customer's purchase decisions, resellers, in turn, may repurpose some of the margin into bribe for end customer. This was a serious compliance issue



SALES

SUPPLIER

CUSTOMER

HUMAN
CAPITAL

Bribery Problem and RFG solution

- ▶ B2B transactions tend to involve RFP process
 - ▶ Transaction involves bidding process
 - ▶ Reseller partner may conduct bribery in order to win a competitive business
- ▶ RFG provides
 - ▶ Transaction Screening
 - ▶ Risk rating based on transaction analytics



SALES



SUPPLIER



CUSTOMER



HUMAN
CAPITAL

Ways that data analytics can help today's business executives run their businesses more effectively

Descriptive analytics help businesses understand what has happened and what's happening right now in an organization

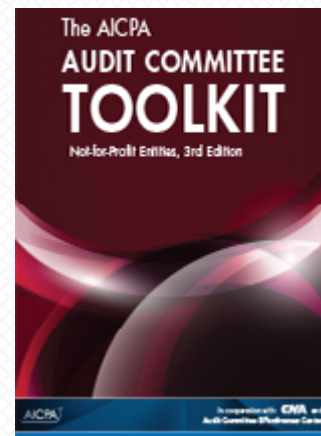
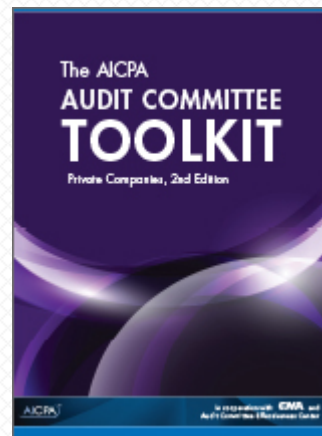
Diagnostic analytics aid in assessing why certain events and results occurred

Predictive analytics help businesses determine what will most likely happen based on a series of variables

Prescriptive analytics help develop a course of action in response to a series of events – what should happen and what is the best option

Resources

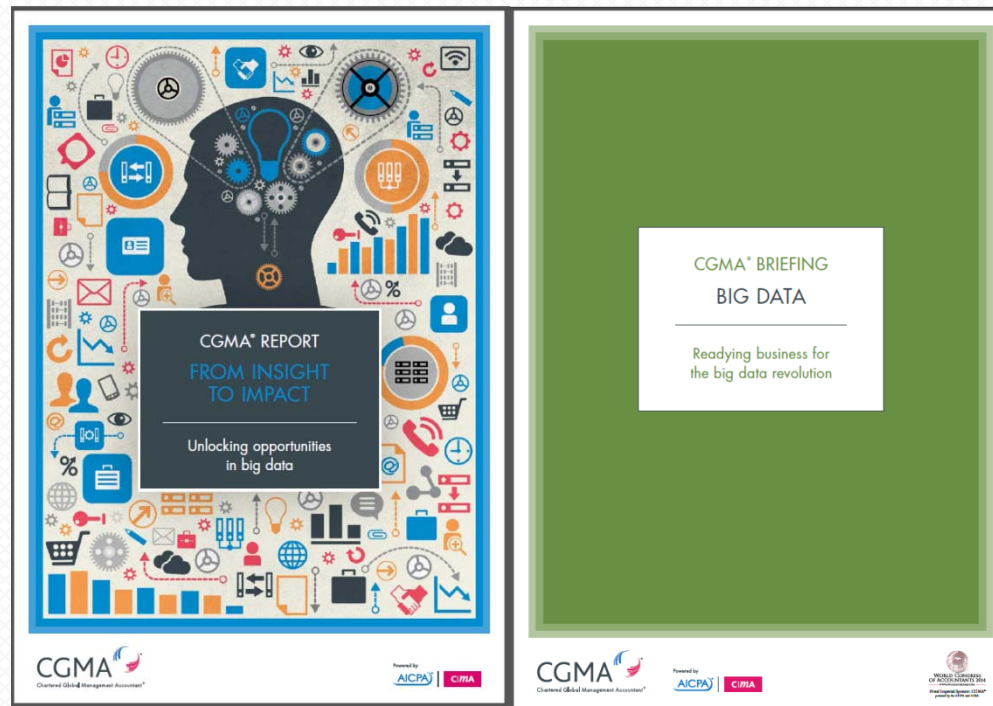
Audit Committee Toolkits



Available at www.cpa2biz.com

Resources

From insight to impact - unlocking opportunities in Big Data



Resources

www.AICPA.org

www.CGMA.org

www.coso.org

Tomorrow's Company –
www.tomorrowscorporategovernance.com

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