

# How Big Data and Predictive Analytics are Transforming the World of Accounting and Auditing

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Town & Country Hotel Convention Center  
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Steve Austin, CPA  
Swenson Advisors, LLP

# Presentation Outline



- A current perspective on big data
- What is San Diego's position in the big data world
- What are predictive analytics, predictive accounting, and predictive auditing
- Understanding the coming auditing panorama:
  - Historical Financial Reporting, Continuous Auditing and Monitoring, and Predictive Audit Metrics
- How does this impact our profession and your job skills for the future

# What is big data?

**2.5 quintillions bytes**

data created each day

**90%**

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!

IBM.com

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
- Burrus wants accountants to learn how to identify these “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)

# 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 mangers, 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,  
a provider of marketing solutions

# The booming business of data analytics

Financial Times | 4/6/15

According to Marshall Toplansky, managing director at KPMG's Center of Excellence in Data and Analytics, the shift in perspective is discernible.

“ There is a growing sense of the tangible value [of] those who[can] implement a data and analysis strategy. ”

**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

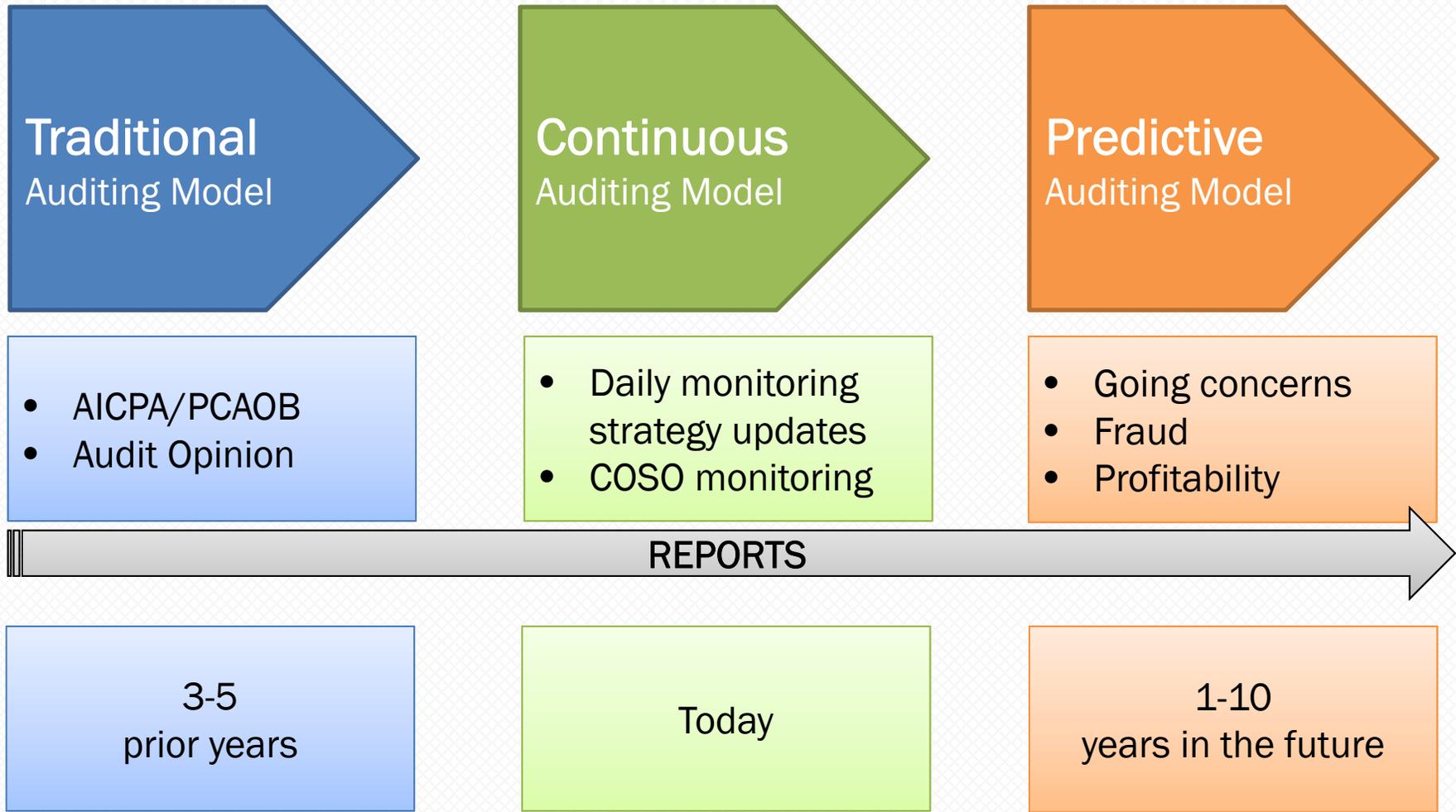
## Continuous Auditing Model

- 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

# Performance Management Accounting:

- Strategy mapping
- Accounting based consulting
- Forecasting
- Fair value projections
- Data mining

Predictive accounting  
is about  
adding value in today's  
rapid response world

# The Predictive Accounting Revolution: Why BPM is Key

BusinessFinanceMag.com | 2/22/15

Business Performance Management (BPM): What's wrong with management accounting as practiced today?

“ When you step back a bit and look at what's important, financial accounting simply deals with valuation – for example, what would an organization be worth if you were to sell it? It deals with compliance and regulatory for the external investment community and governments. But managerial accounting is about creating value – its information contributes to management decisions internal to an organization that financial accounting ultimately deals with afterwards. Which type of accounting is more important? ”

# Driving Faster Decisions

Journal of Accountancy | 4/13/15

How continuous monitoring and auditing are enabling Hewlett Packard (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

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# San Diego's Position in the Big Data World

# UCSD Hiring 'Big Data' Stars

UT San Diego | 4/15/15

“ Computers are the new microscopes,  
and data is the new blood draw, ”

Rajesh Gupta

Chair of the Department of Computer Science and Engineering  
University California San Diego

- San Diego is becoming the focal point of a nationwide effort to use high-speed computers and smart software to sift through mountains of biomedical data for clues about why people develop everything from cancer to Alzheimer's disease.
- In the past nine months, UCSD and J. Craig Venter Institute of La Jolla recruited three of the country's top "big data" researchers from Google, MIT, and University of Colorado.

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

# 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

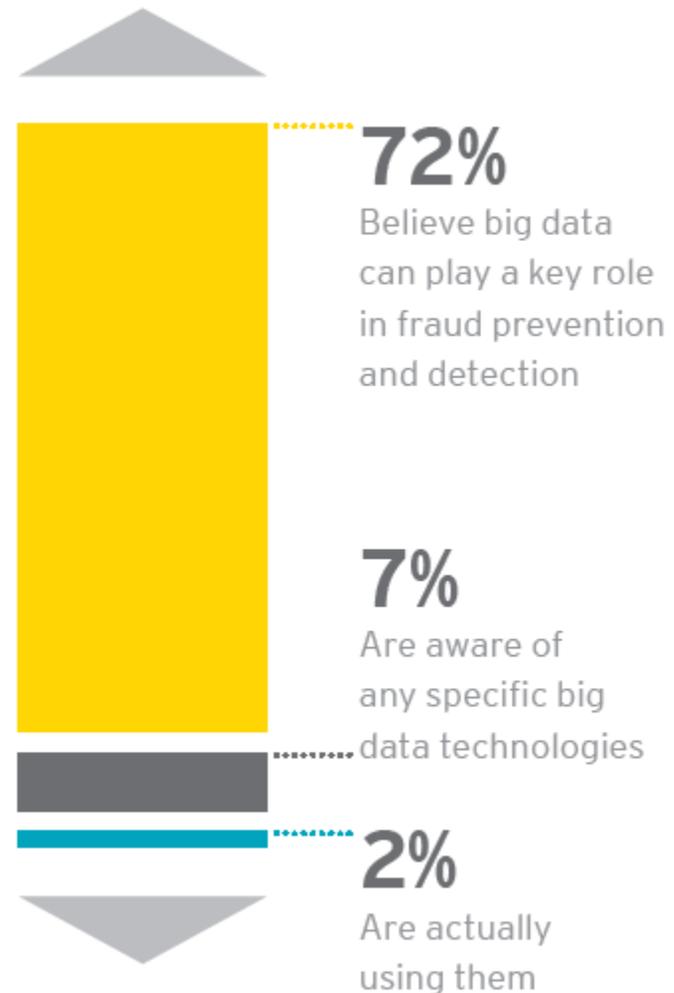
ADA can be incorporated into audits:

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?

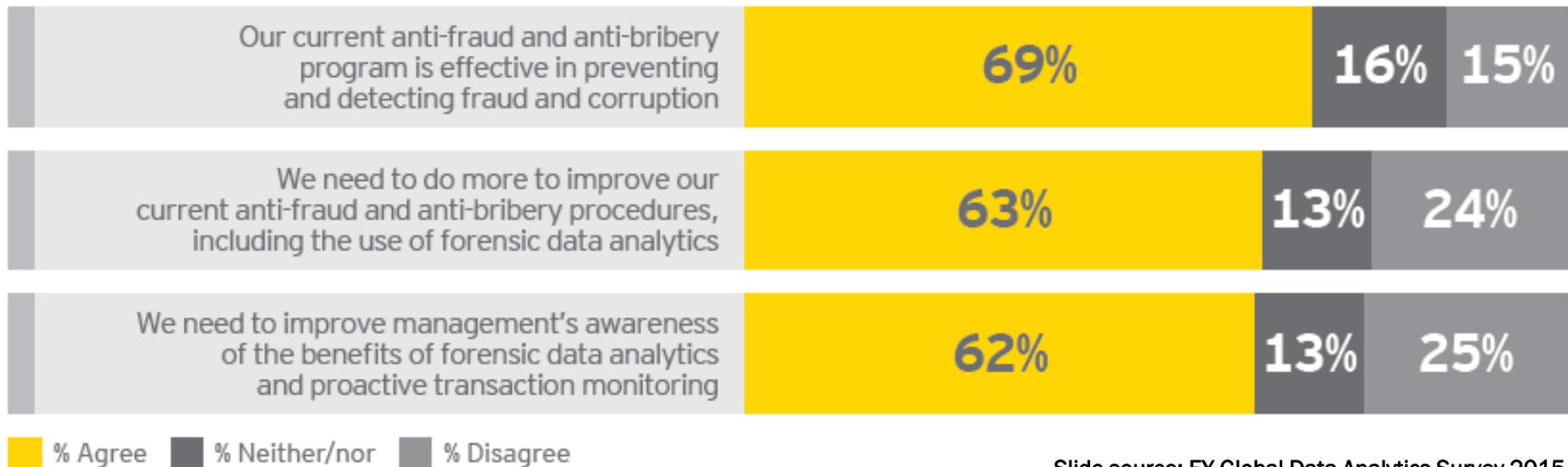
- Big data has big potential
  - Current regulatory landscape creates further impetus for new approaches in FDA
  - FDA efforts are aligned well with perceived company risks



Slide source: EY Global Data Analytics Survey 2015

# The Biggest FDA Challenges

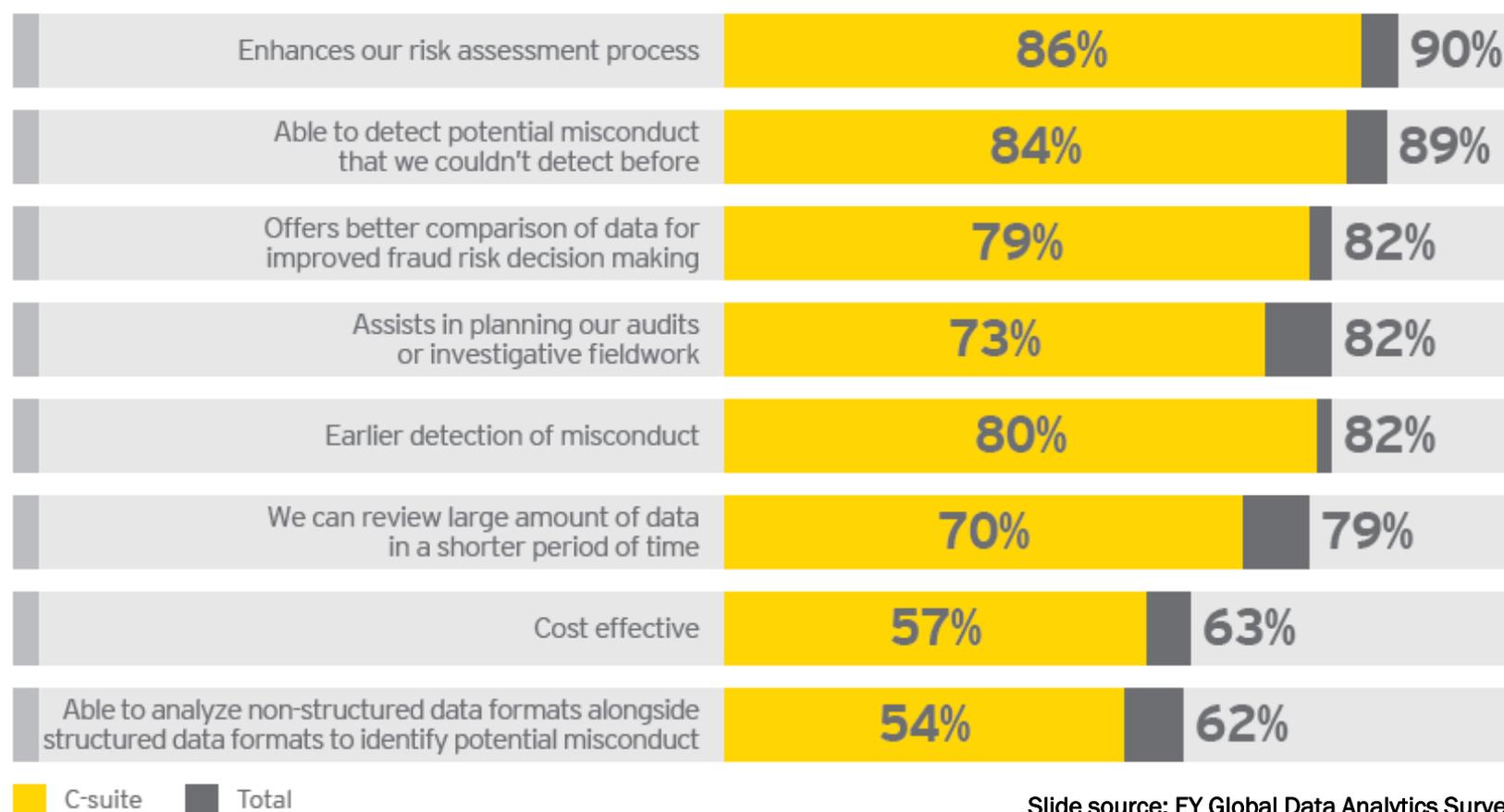
- Lack of awareness and expertise
- Getting the right tools
- Data volumes analyzed are relatively small
- Data sources analyzed are not aligned with technology
- Right risks, wrong tools?



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

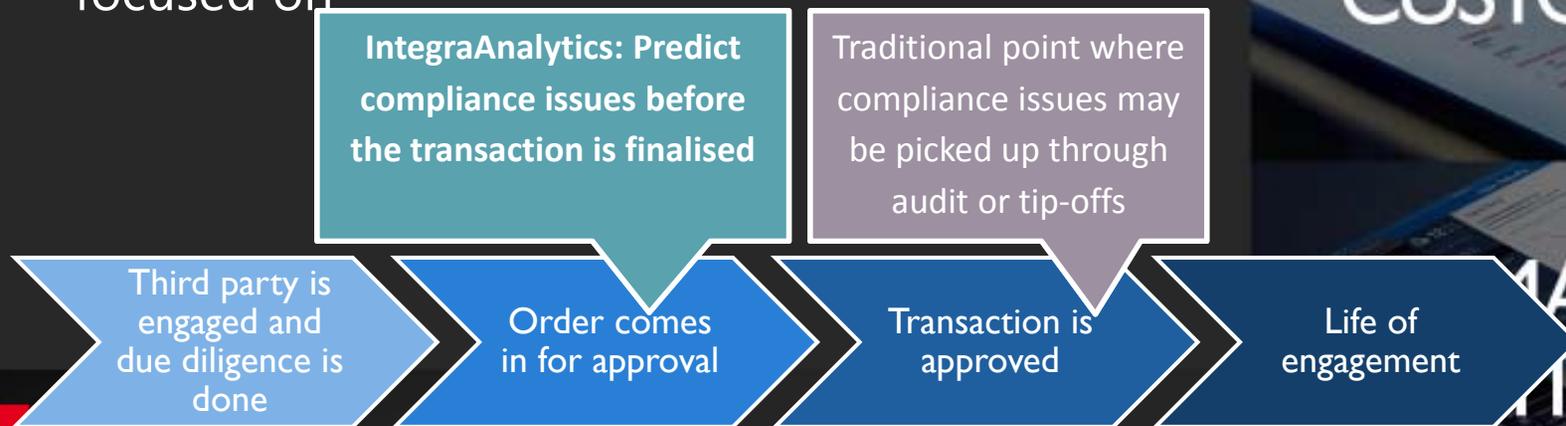
CFO | 4/17/15

- 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

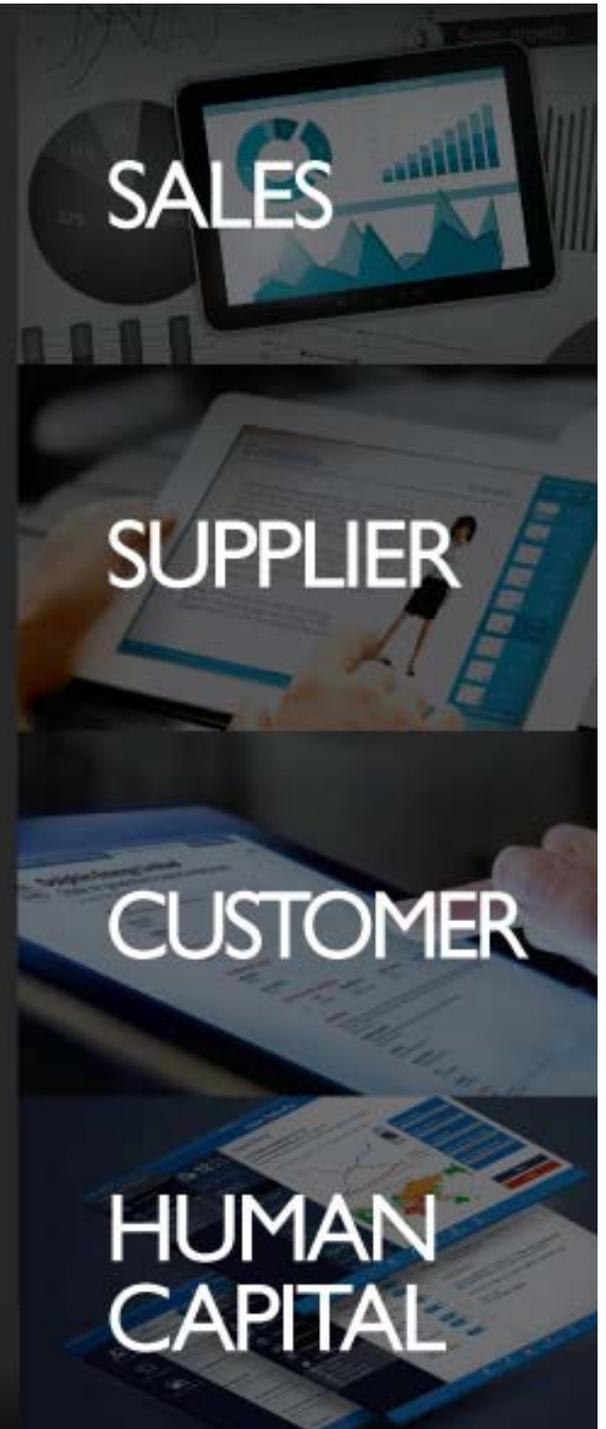
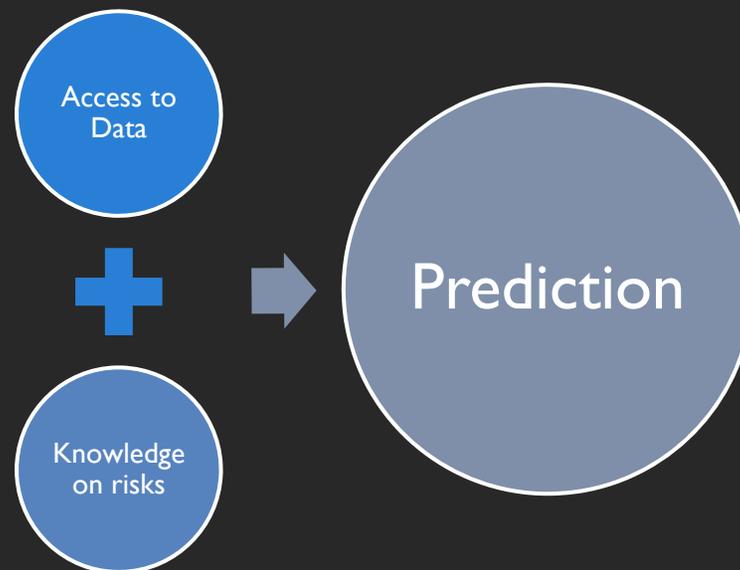
- ▶ IntegraAnalytics performs transaction screening
  - ▶ Monitor Suppliers/Sales transactions and related data sources
  - ▶ Identify potential Customers risks that lead to non-compliance
  - ▶ Intercept suspicious transactions through predictive analytics
  - ▶ Predict and discover the risk areas to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



[www.redflaggroup.com](http://www.redflaggroup.com)

# 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



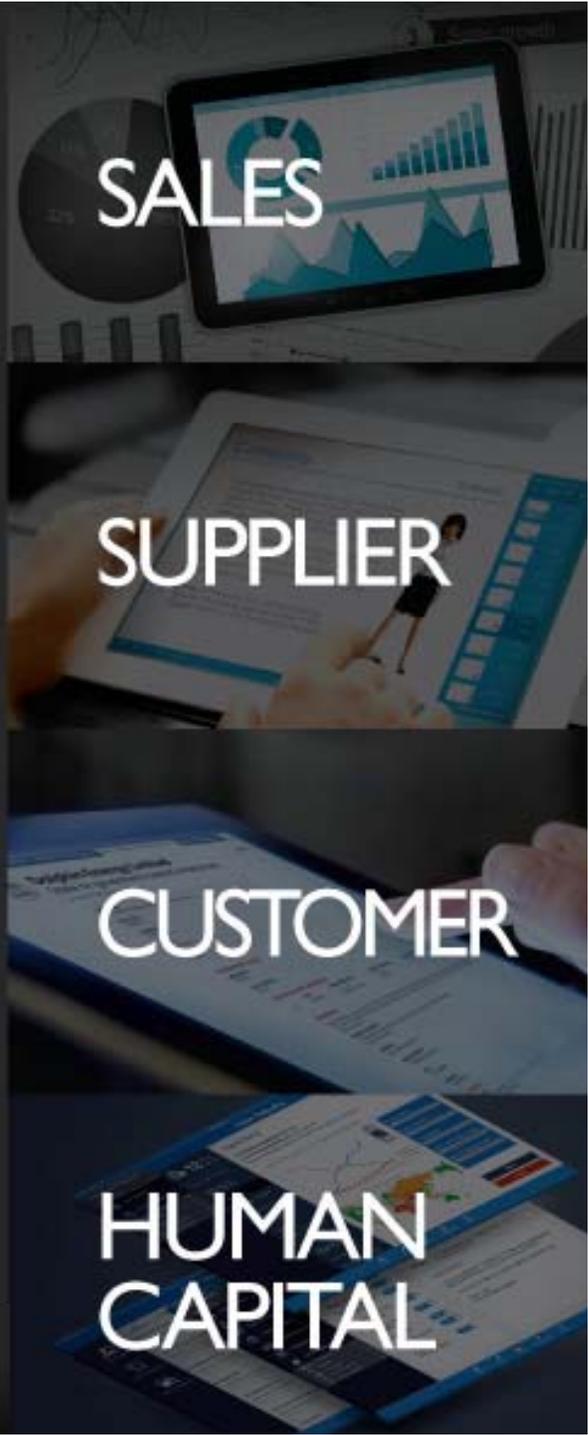
CUSTOMER



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

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- ▶ 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

# To serve investors, accounting must evolve

Accounting Today | 5/5/15

Sustainability accounting consists of defining metrics – Both qualitative and quantitative - that express a fair representation or “account for” company performance on material sustainability topics, and ensure that reasonable investors have access to decision-useful information in their decision process.

- Currently no sustainability accounting standards to guide this practice
- SASB founded to fill this void
- SASB standards provide accounting metrics useful to both managers and investors when making decisions



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

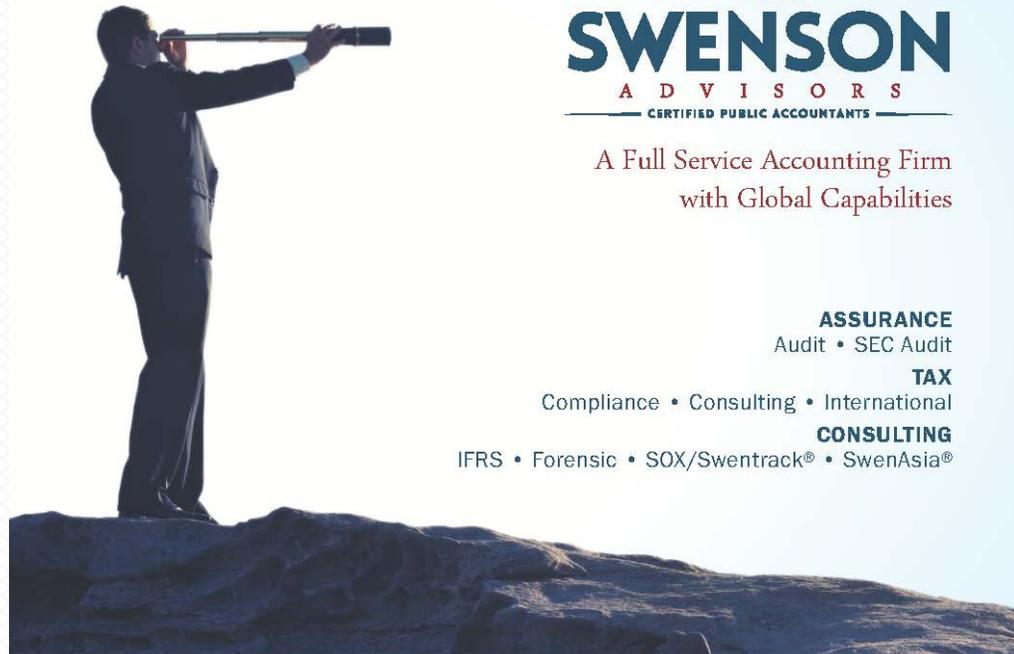
**Diagnostic** analytics aid in assessing why certain events and results occurred

**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

# WE SEE BEYOND YOUR NUMBERS

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