

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

Hot Topics Seminar
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Steve Austin, CPA
Swenson Advisors, LLP

What is Big Data?

“Big data” refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze.

(Big data: The next frontier for innovation, competition, and productivity, McKinsey Global Institute)

How Big 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!

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.

Focus of the Future

Management Accounting and Analysis

VS

Historical financial reporting

Predictive

VS

Hindsight

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.

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

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

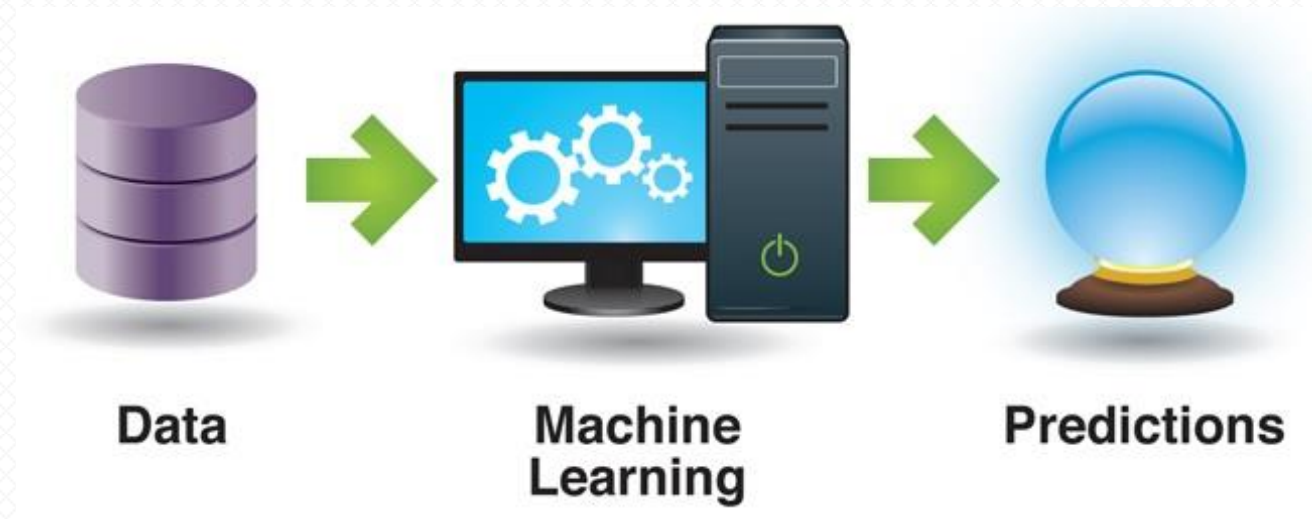
“Take an hour a week to unplug from the present and plug into the future. You’re going to spend the rest of your life there!”

-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.

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

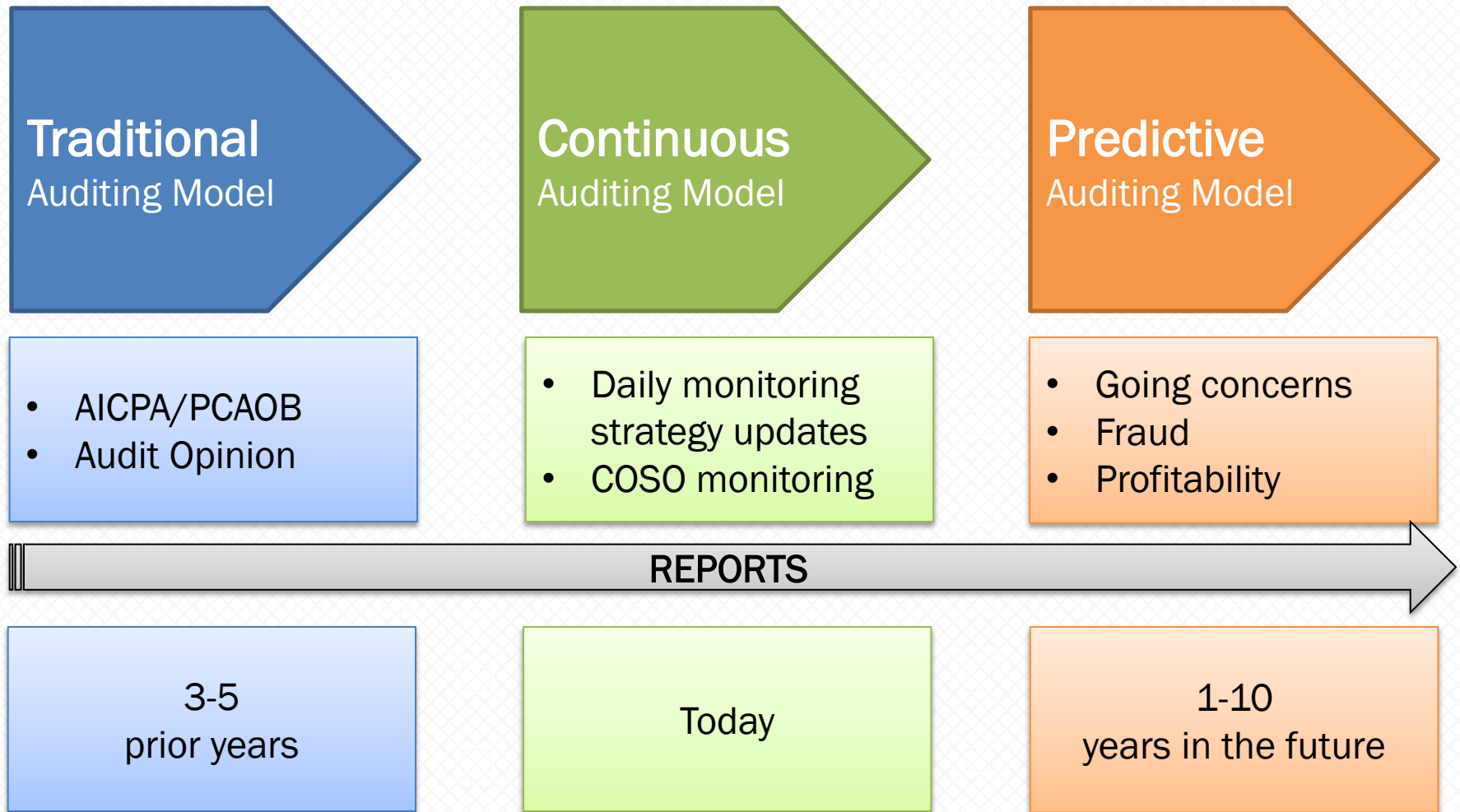
Continuous Auditing Model

- COSO/AICPA monitoring
- Today's facts

Predictive Auditing Model

- Future thinking
- Driving with a periscope

Audits of the Future



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

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.

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.

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

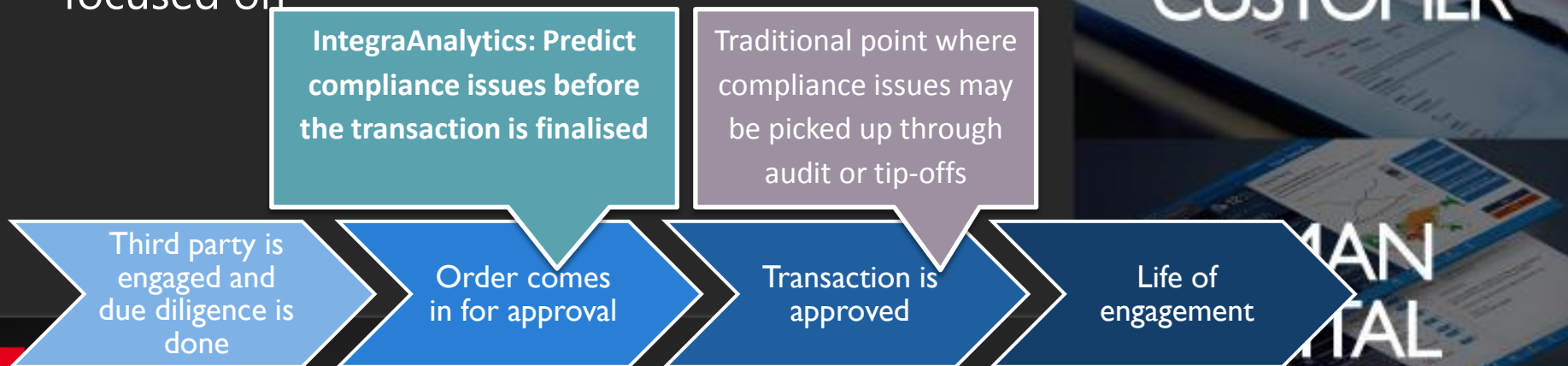
CFO | 4/17/15

- 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

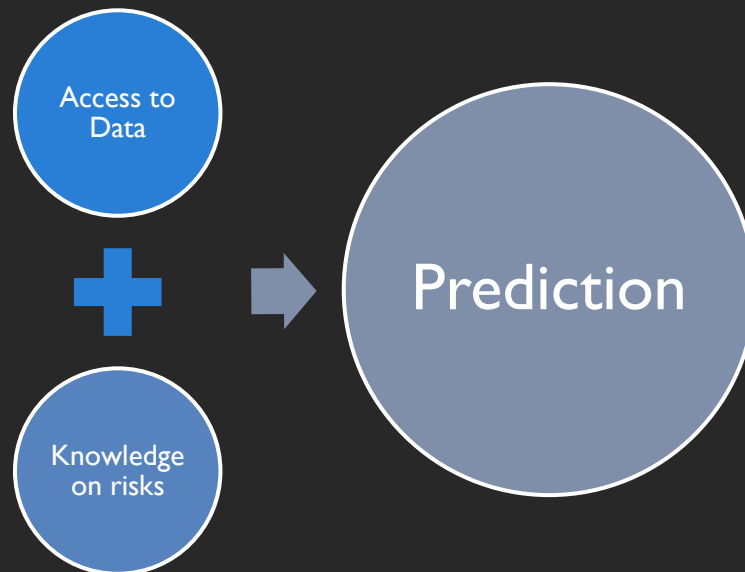
The new approach

- ▶ 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



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



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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.



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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



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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



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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

Steve Austin
Managing Firm Partner
Swenson Advisors
steve.austin@swensonadvisors.com

www.SwensonAdvisors.com