

G. EDWARD COMBS CONSULTING, LLC

At work with the Auto Insurance Industry.



CAS – Big Data

March 21, 2014

Outline

- I. Definition
- II. Trends Affecting Big Data -- Growth in Storage, Computing Power and Data
- III. Effect on the Organization -- Tasks and Roles
- IV. Data has always been crucial to insurance.
How is Big Data different?
- V. Where is Big Data likely to provide the most important insights?
- VI. Big Data Looking Forward

Definition

- At what point does:
 “Lots of” become “Big”?

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How Big?

Is Big Data an Economic Big Dud?

NY Times August 17, 2013

- World Economic Forum – “new oil” and “new asset class”
- Comparisons to industrial revolutions like steam engines, telephones and airplanes

“...far more useful is specialized data in the hands of analysts with a deep understanding of specific industries.”

Definition

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 “Lots of” become “Big”?
- Typically definition is operational, i.e. working with Big Data requires the coordination of multiple computers
- **New software (e.g. Hadoop) is needed to support distributed computing**

We Have Spent Our Work Lives Knee Deep in Data – What’s Really New Here?

- New data sources and dramatically increased volumes



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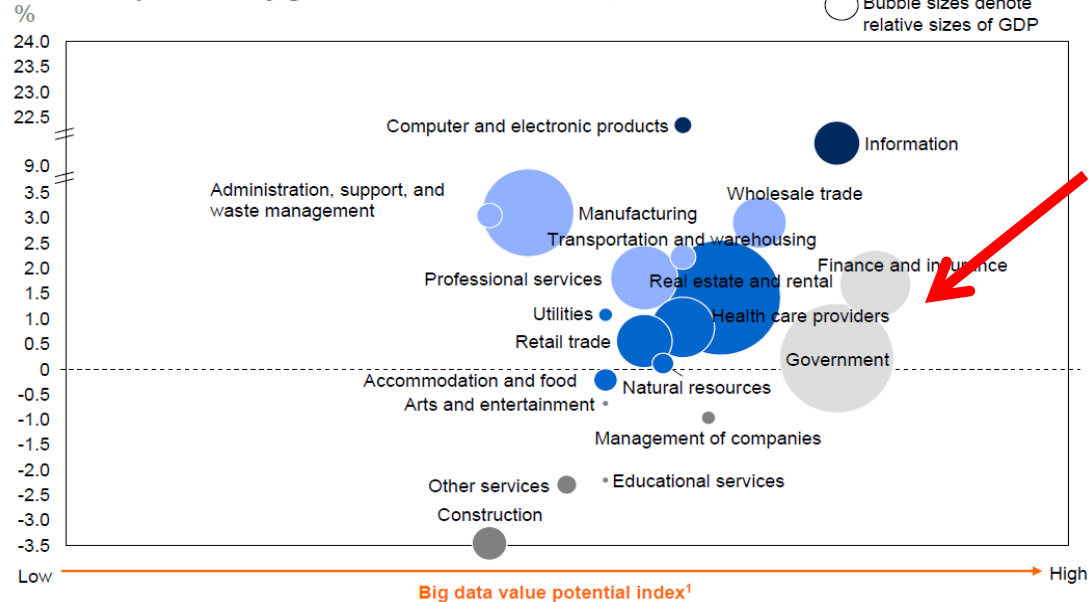
Each of us knows someone like M. Jourdain in the Middleclass Aristocrat (Bourgeois Gentleman) who earns our scorn for his smugness at the discovery that he has “spoken prose all of his life.”

McKinsey View on Big Data Effectiveness

Exhibit 2

Some sectors are positioned for greater gains from the use of big data

Historical productivity growth in the United States, 2000–08



1 See appendix for detailed definitions and metrics used for value potential index.
SOURCE: US Bureau of Labor Statistics; McKinsey Global Institute analysis

Two Broad Classes of Data

Class	Description	Example
Proprietary	Assembled through company operations. Generally only available to the company developing them.	Usage Based Insurance
Open	Assembled by governments or aggregators.	Government statistics for Income or Weather

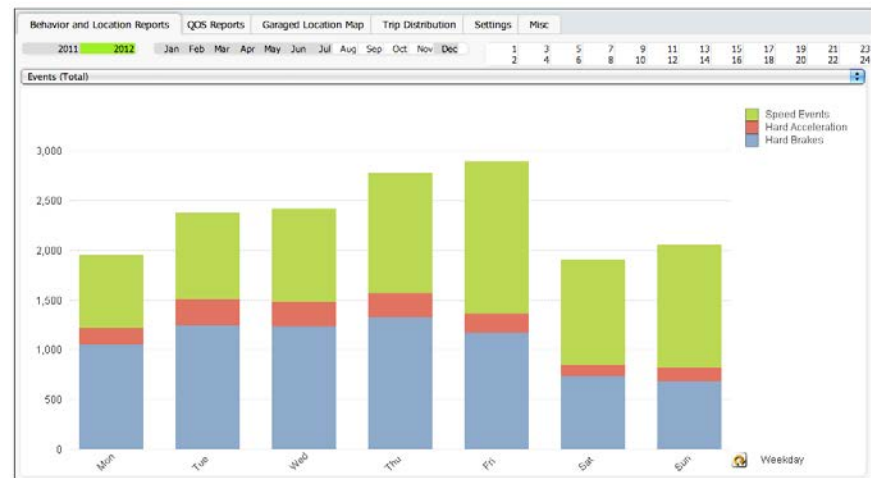
UBI Data Records

Once Per Second

- trip_id
- update_time
- latitude
- longitude
- altitude
- gps_speed
- obd_speed
- engine_speed
- event_code
- coolant_temp
- trip_odometer

Four Times Per Second

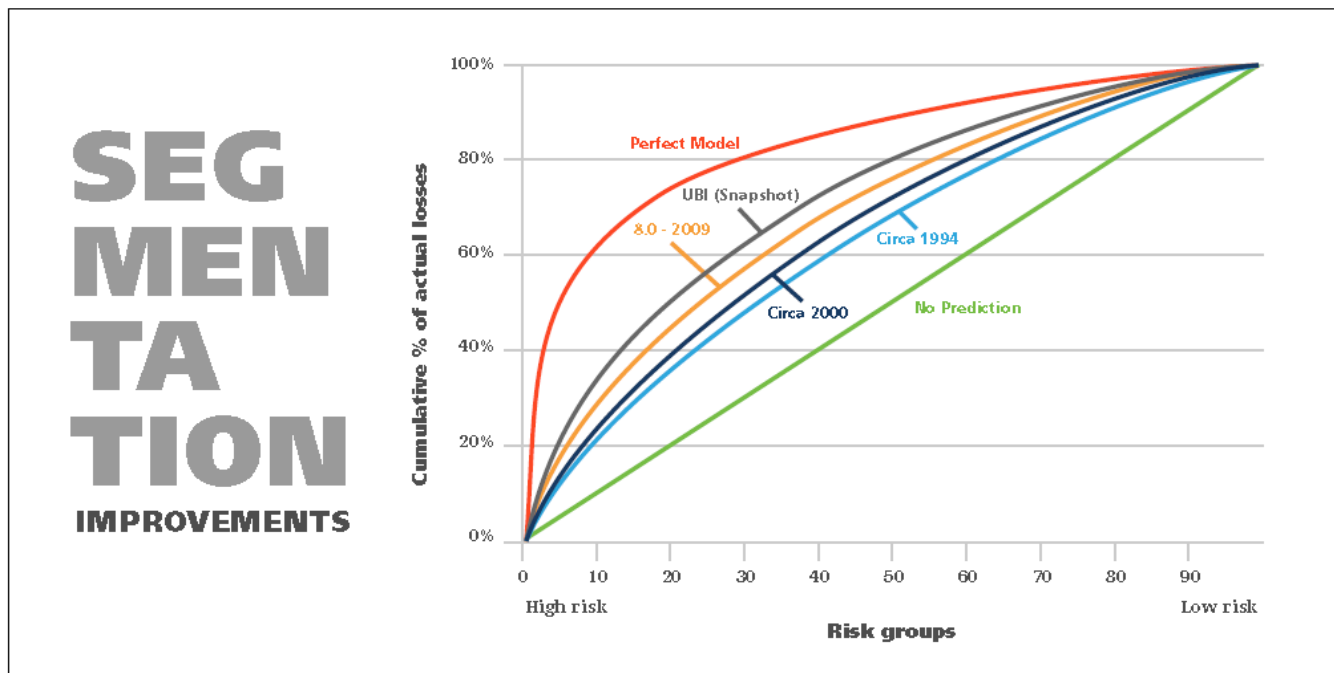
- accel_lat
- accel_lon
- accel_vert



Average vehicle develops 12 Meg per month

Significant Improvement is Possible

UBI Depends on Big Data for Insights



THE PROGRESSIVE CORPORATION INVESTOR RELATIONS MEETING

45

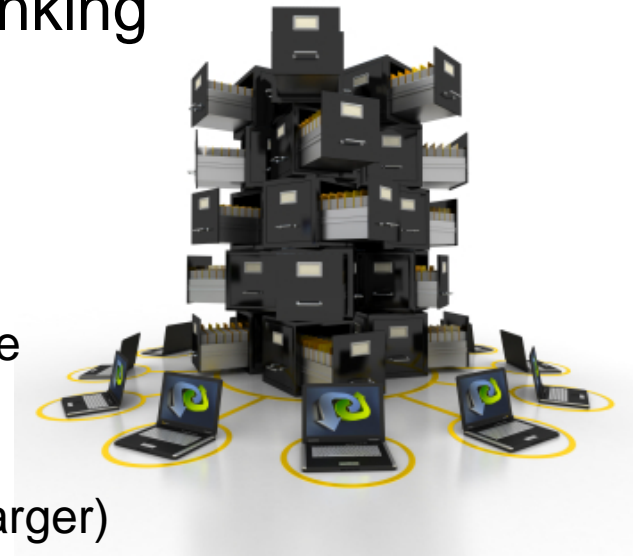
II. Trends Affecting Big Data

Cost to process and store data is shrinking

Process - Moore's Law

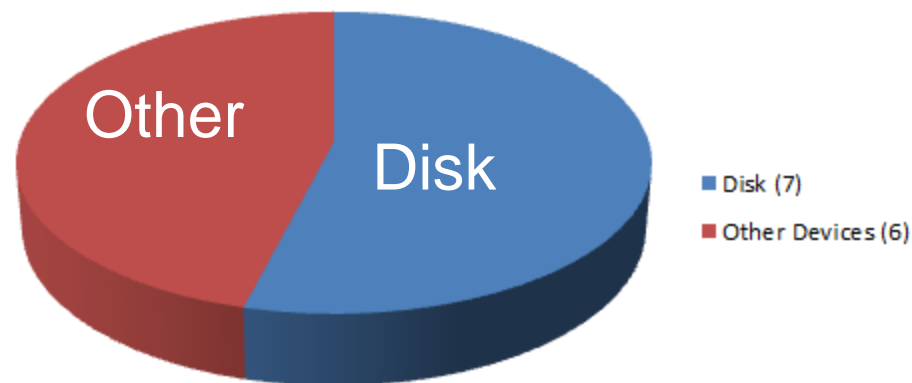
Storage - 2010

- ✓ 7 exabytes in disk storage
- ✓ 6 exabytes on PCs, notebooks and mobile devices
- ✓ Average company 200 terabytes
- ✓ Wal-Mart has 2.5 petabytes (12.5 times larger)



2010 World Data Storage Capabilities

Storage in Exabytes (10^{18})



Trends Affecting Big Data

Shrinking: Cost to process and store data

- Process - Moore's Law
- Storage - 2010



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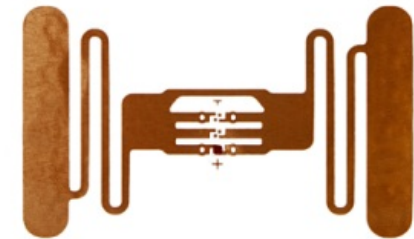
Growing: Data

- NewAge.com (Q4 2011) 1.2b social media users over the age of 15 are on for long periods every day
- 800 exabytes in 2009 (60 times storage)
- Annual growth rate of 45%



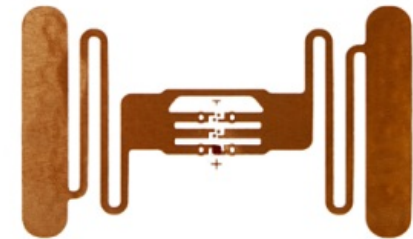
Data

- Growing array of sensors that connect machine-to-machine create 30% more data each year
 - ✓ Satellite imagery
 - ✓ Telematics
 - ✓ Radio Frequency Identifiers (RFIDs)
 - ✓ Event Data Recorders (EDRs)
 - ✓ Electronic Health Records (EHRs)



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 - ✓ Satellite imagery
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 - ✓ Radio Frequency Identifiers (RFIDs)
 - ✓ Event Data Recorders (EDRs)
 - ✓ Electronic Health Records (EHRs)
- Not all digital – text, video, speech



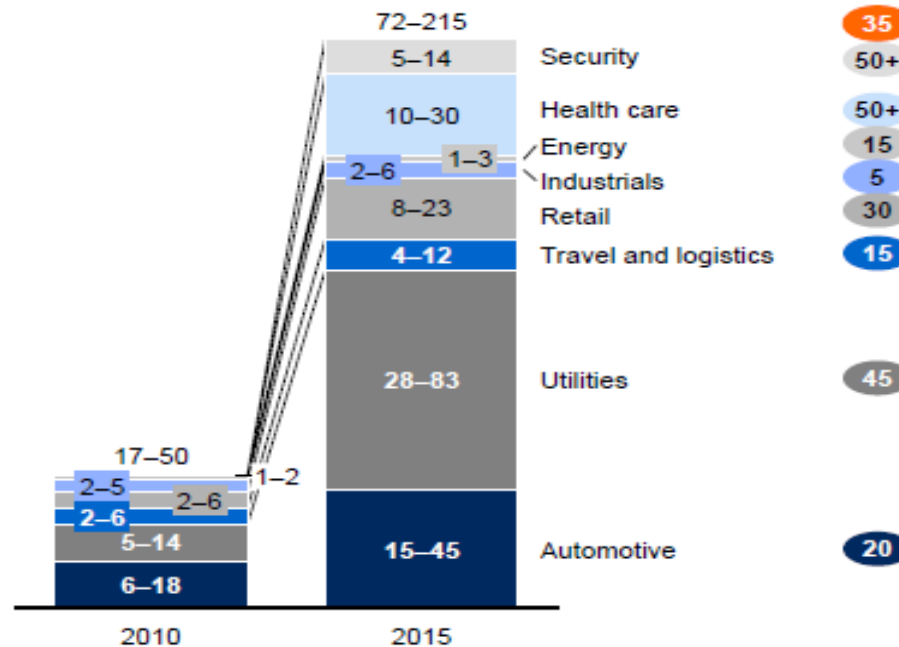
Machine-to-Machine Data

Exhibit 10

Data generated from the Internet of Things will grow exponentially as the number of connected nodes increases

Estimated number of connected nodes
Million

Compound annual
growth rate 2010–15, %



NOTE: Numbers may not sum due to rounding.

SOURCE: Analyst interviews; McKinsey Global Institute analysis

III. Effect on the Organization

Herbert Simon

Economist at Carnegie Mellon University



“A wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.”

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Data

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- Decisions to retain or discard should be periodically reexamined
- Technological and analytic capabilities necessary to access/analyze data
- Management processes to implement insights and assess their impact.



Challenges

- Senior Management support



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- Lead time for the collection of data. Process to identify what needs to be collected including data from 3rd parties



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Metadata – easy to access the data for an analysis



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- Senior Management support
- Lead time for the collection of data. Process to identify what needs to be collected including data from 3rd parties
- Data base organization.
Metadata – easy to access the data for an analysis
- Recruit and manage **analysts** with the necessary skills



IV. Where Big Data Differs

Big Data IT Requirements

- Large database storage capabilities
 - ✓ Big Table
 - ✓ Cassandra
 - ✓ Cloud Computing



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- Large database storage capabilities
 - ✓ Big Table
 - ✓ Cassandra
 - ✓ Cloud Computing
- Distributed processing strategies
 - ✓ Hadoop
 - ✓ Stream Processing



Management

- Set priorities for data and analysis

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Management

- Set priorities for data and analysis
- Supervise main actors
- Approve changes supported by analyses
- **Involvement is key**
 - ✓ Fast turnarounds and willingness to work with data
 - ✓ Recognize that views may change as additional data emerges
 - ✓ Slick is not always a positive attribute
 - ✓ Learning to Presentation ratio

Big Data Successes

March Ins Net News article

- Managing Sr. Management expectations
- Most successful project areas
 - ✓ Customer facing – e.g. CLTV or Media Mix
 - ✓ Internal process improvement – e.g. bad debt mitigation
 - ✓ Hybrid – e.g. Agent Scorecard
- Range of projects – quick wins & long-term bets.

Actuaries

- Identify the data elements to collect and reevaluate these decisions at regular intervals



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- Integrate Big Data into rate making and reserving
- Participate as technical experts on company cross-functional teams for process improvement
- **Help decision makers quantify their decisions. For example, the asset value of renewals**



V. Most Important Insights

Special Characteristics of Insurance: Customer Facing

- Legacy Book is most valuable asset

Value of Renewal Book

Combined Ratio of 94

20% New Business at 120 CR

80% Renewal at 88 CR



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U/W Asset Value (in Written Premium) of Renewals

80% of Premium is Renewal

12 point U/W Margin

2 Year Average Additional Life

- 19.2% of EP
- Each additional month of life adds .83%, e.g. 3 years 28.8%

V. Special Characteristics of Insurance: Process Improvement

- Legacy Book is most valuable asset
- Like all relationship businesses client retention and cross-selling is key

Need for Customer Lifetime Value

- Individual client relationships represent dramatically different values to the company. Value range is more than an order of magnitude from lowest to highest



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- Individual client relationships represent dramatically different values to the company. Value range is more than an order of magnitude from lowest to highest
- **Decompose renewal value and assign it at the individual customer relationship level**
 - ✓ PLE or Policy Life Expectancy
 - ✓ Include the value from all insurance relationships



Need for Customer Lifetime Value

- Individual client relationships represent dramatically different values to the company. Value range is more than an order of magnitude from lowest to highest
- Decompose renewal value and assign it at the individual customer relationship level
 - ✓ PLE or Policy Life Expectancy
 - ✓ Include the value from all insurance relationships
- **Critical element for the objective function on many projects**



Special Characteristics of Insurance

- Legacy Book is most valuable asset
- Like all relationship businesses client retention and cross-selling is key.
- Regulatory realities
 - Limit intervals between changes
 - More disclosure
 - Identical risks get the same rate, no AB experiments



V. Most Important Insights

Special Characteristics of Insurance: Process Improvement

- Many commentators agree that premium growth will continue to lag.
- The priority attached to expense control through process improvement will increase.
- Big data sets can provide insights that improve process efficiency.

VI. Big Data Looking Forward

- Numerous insurance applications
- Actuaries
 - Increase their impact
 - Skills and experience to play a leadership role in insurance
- Key Strategies:
 - Senior Management
 - Portfolio of Projects
 - Regulators



Ed Combs

Ed Combs is currently the principal at G. Edward Combs Consulting, LLC.

Ed has had over 30 years experience in the Personal Lines Insurance Industry. He has consulted for many of the major Property and Casualty insurers and has been an executive at both Progressive and 21st Century Insurance.

His certifications include:

CPCU - Chartered Property and Casualty Underwriter, and

ARM - Associate in Risk Management.

He is a former board member of the Insurance Institute for Highway Safety, the Highway Loss Data Institute and the Advocates for Highway and Auto Safety.

Ed's blog can be found at: <http://perspectives.combsconsults.com/>

How Many Radians?

- **A** is Back Up Drive at 1×10^{12}
- **B** is Total Storage at 1.3×10^{19}
- **A/B** is 7.69×10^{-8}
- 6.283 radians in the whole pie

The slice for Your Back Up Drive is about

5×10^{-8} radians