Information Economics, Big Data and the Art of the Possible with Analytics

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AGENDA

- The Economics of Information
- Big Data Challenges and Strategy
- The Art of the Possible with Analytics

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The Economics of Information

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Everyone agrees. Nobody agrees.

Information is one of our greatest corporate resources.

CEO

COO

Information is one of our greatest performance weapons.

Information is one of our greatest enterprise risks.

CFO

CIO

Information is one of our greatest pains in the asset.

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Where are information assets on the balance sheet?

	2010 US$m	2009 US$m
Noncurrent assets		
Goodwill	**3,412**	3,125
Other intangible assets	**1,233**	1,189
Property, plant, and equipment	**451**	479
Investments in associates	**243**	332
Deferred tax assets	**176**	13
Trade and other receivables	**8**	5
Available-for-sale financial assets	**33**	26
Other financial assets	**88**	61
Current assets		
Inventories	**3**	4
Trade and other receivables	**800**	738
Current tax assets	**4**	17
Other financial assets	**27**	21
Cash and cash equivalents	**175**	129
Assets classified as held for sale	**25**	-

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What is an asset?

Webster	A single item of ownership having exchange value or convertible into cash. Total resources of a person or business such as cash, notes, and goodwill.
American Institute of CPAs	Any economic resources (tangible/intangible) that can be owned or produce value. Assets have a positive economic value.
Financial Accounting Standards Board	A probable future economic benefit obtained or controlled by a particular entity as a result of past transactions or events.
International Accounting Standards Board	A resource controlled by the enterprise as a result of past events and from which future economic benefits are expected to flow to the enterprise.

An asset is more than just "something of value."

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Why even bother to think about and manage information as an asset?

- **Revenue**
- **Growth**
- **Expenses**
- **Risk**
- **Compliance**
- **Valuation**

Squeezing more value out of information

- Optimizing and eliminating business processes
- Improving business performance
- Trading information for goods and services
- Strengthening business relationships (partners, employees, customers, and suppliers)

Managing information effectively

- Optimizing availability versus quality
- Balancing accessibility versus security
- Improving information supply chain performance and integration
- Adhering to regulatory issues regarding information

An asset mindset about information leads to wringing more value from it

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A brief history of accounting innovation

Luca Pacioli
Father of Accounting

1953 - Arthur Andersen computerizes the payroll of a GE plant

1936-38 - SEC-chartered committee standardizes financial statements

1923 - General Motors' controller develops ROI and ROE calculations

1845 - William Deloitte founds the first of the Big-8 accounting firms in London

1772 - Darwin's grandfather, Josiah Wedgwood, invents cost accounting

1494 - A Venetian merchant codifies double-entry accounting methods

2200 BC - *The Code of Hammurabi*.
One of the earliest transaction legal codes

7th Century BC - Coins invented in Lydia

575 BC - Greek banks start to mint coins, accept deposits, make loans

7500 BC - The first accounting records in Jericho & Sumerian cities

1979 - Dan Briklin and Bob Frankston create VisiCalc for the Apple II

1990's - Rise of accounting packages and integrated financial systems, e.g., Peachtree, Quickbooks, Oracle, Peoplesoft, SAP

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Infonomics is the economic theory of information as new asset class, and the discipline of accounting for, managing and deploying information just as any other enterprise asset.

Principles of Infonomics

1. Information is an actual asset (if not a recognized asset class)
2. Information has both potential and realized value
3. Information's value can be quantified
4. Information should be accounted for as an asset (internally)
5. Information's realized value should be maximized
6. Information's value should be used to help budget IT and business initiatives
7. Information should be managed as an asset

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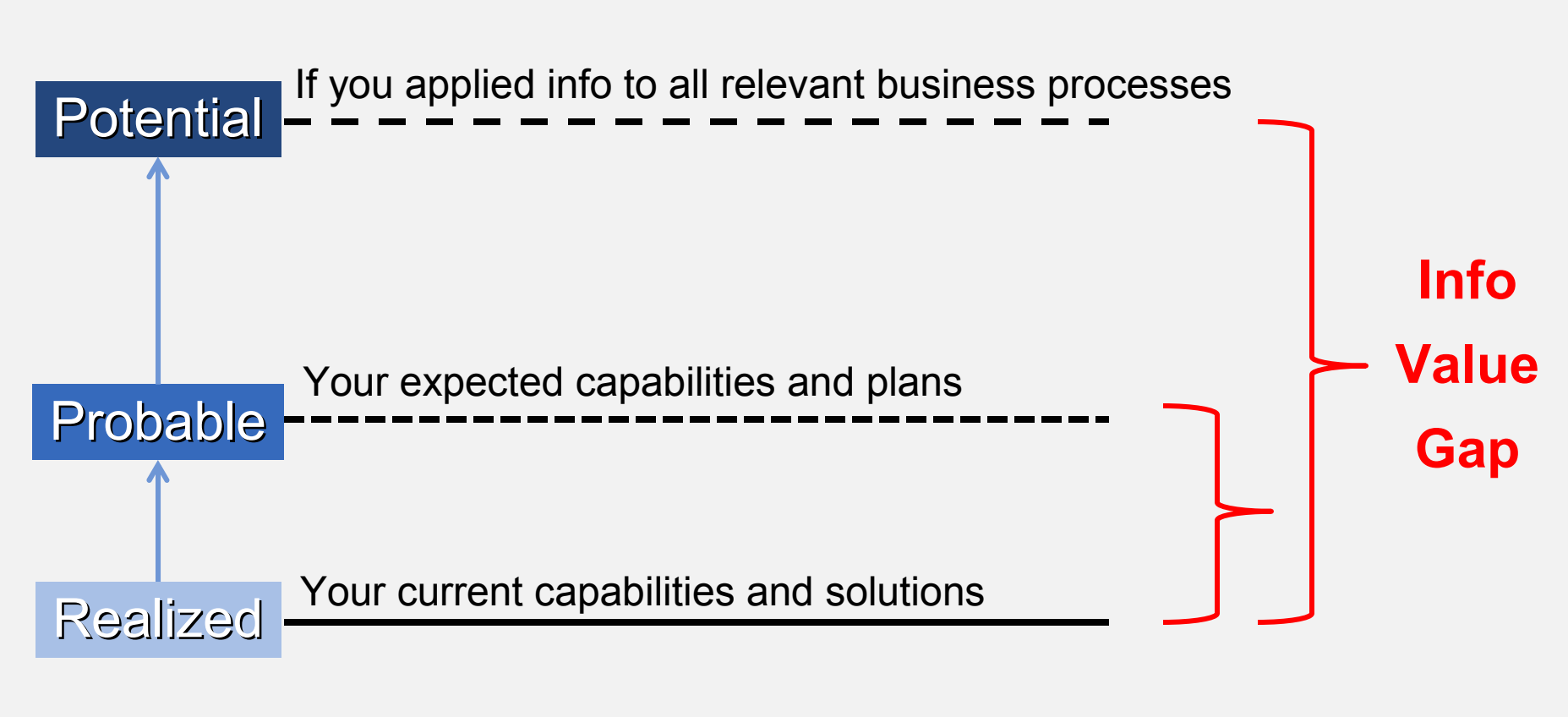
Three Degrees of Information Value



The availability of Big Data dramatically widens the gap between the actual and possible value for most organizations. Strategies and initiatives to close that gap are paramount.

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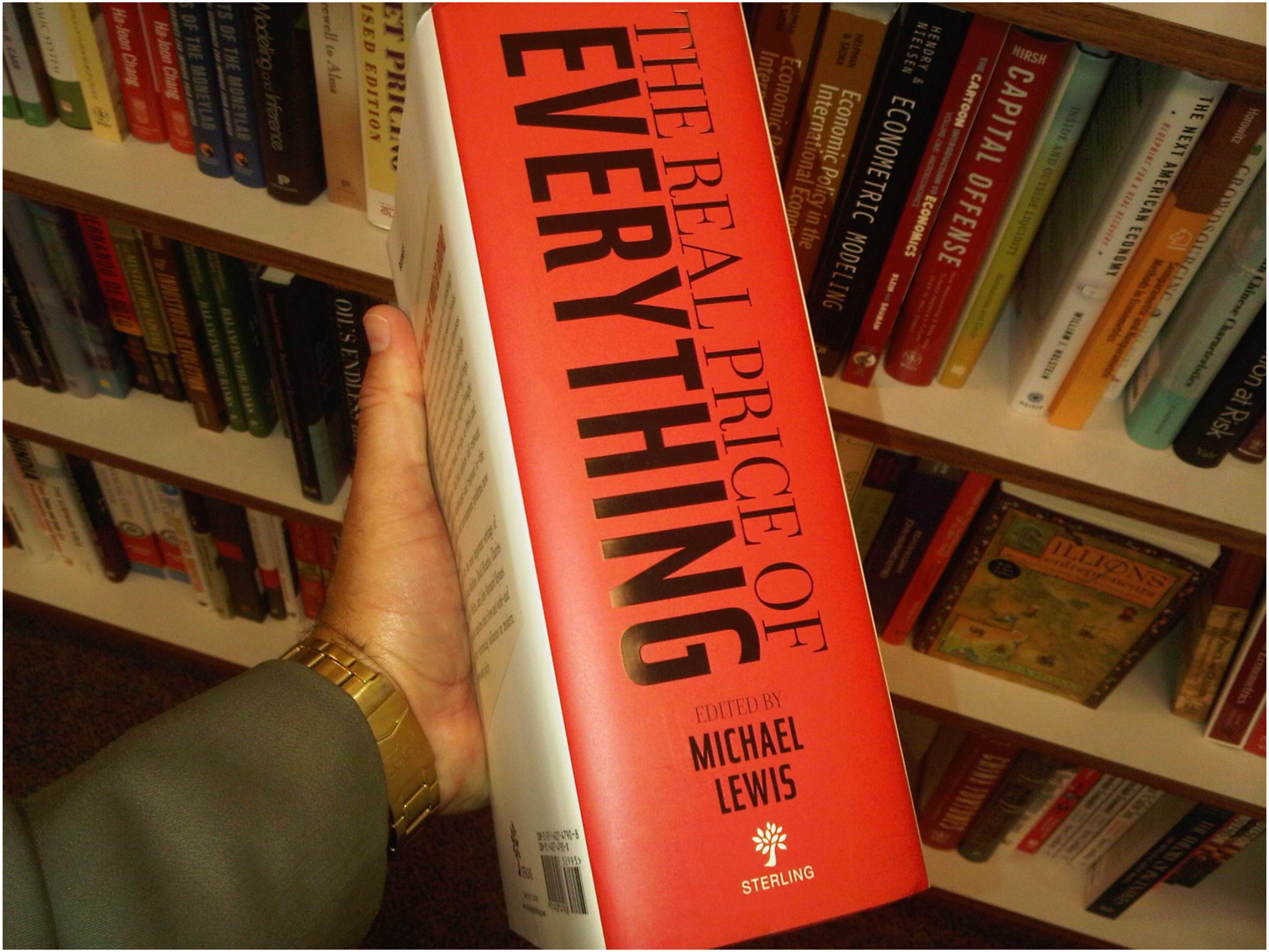
THE REAL PRICE OF
EVERYTHING
EDITED BY
MICHAEL
LEWIS
STERLING
CAPITAL OFFENSE
HIRSH
ECONOMETRIC MODELING
HENDRY & NIELSEN
THE NEXT AMERICAN ECONOMY
Ha-Joon Chang

A variety of information valuation models

NON-FINANCIAL MODELS

Intrinsic Value of Information (IVI): *How good and easy to use is the data versus how likely are others outside the organization to have it also?*

Business Value of Information (BVI): *How applicable to the business or a particular business process is it? How quickly can we get fresh data to the point of the business process?*

Performance Value of Information (PVI): *How much does having a unit of information incrementally contribute to moving closer toward all n KPI targets over a given period?*

FINANCIAL MODELS

Cost Value of Information (LVI): *What would it cost to replace the data, and what is the financial impact to the business if the data were lost over a given time period?*

Market Value of Information (MVI): *How much is a business partner (p) willing to pay for access to this information?*

Economic Value of Information (EVI): *The Performance Value of Information (PVI) for a revenue metric, less the cost of acquiring, administering, and applying the information.*

$$EVI = \sum_{0}^{t} (R_i - R_c) * T/t - (AcqExp + AdmExp + AppExp)$$

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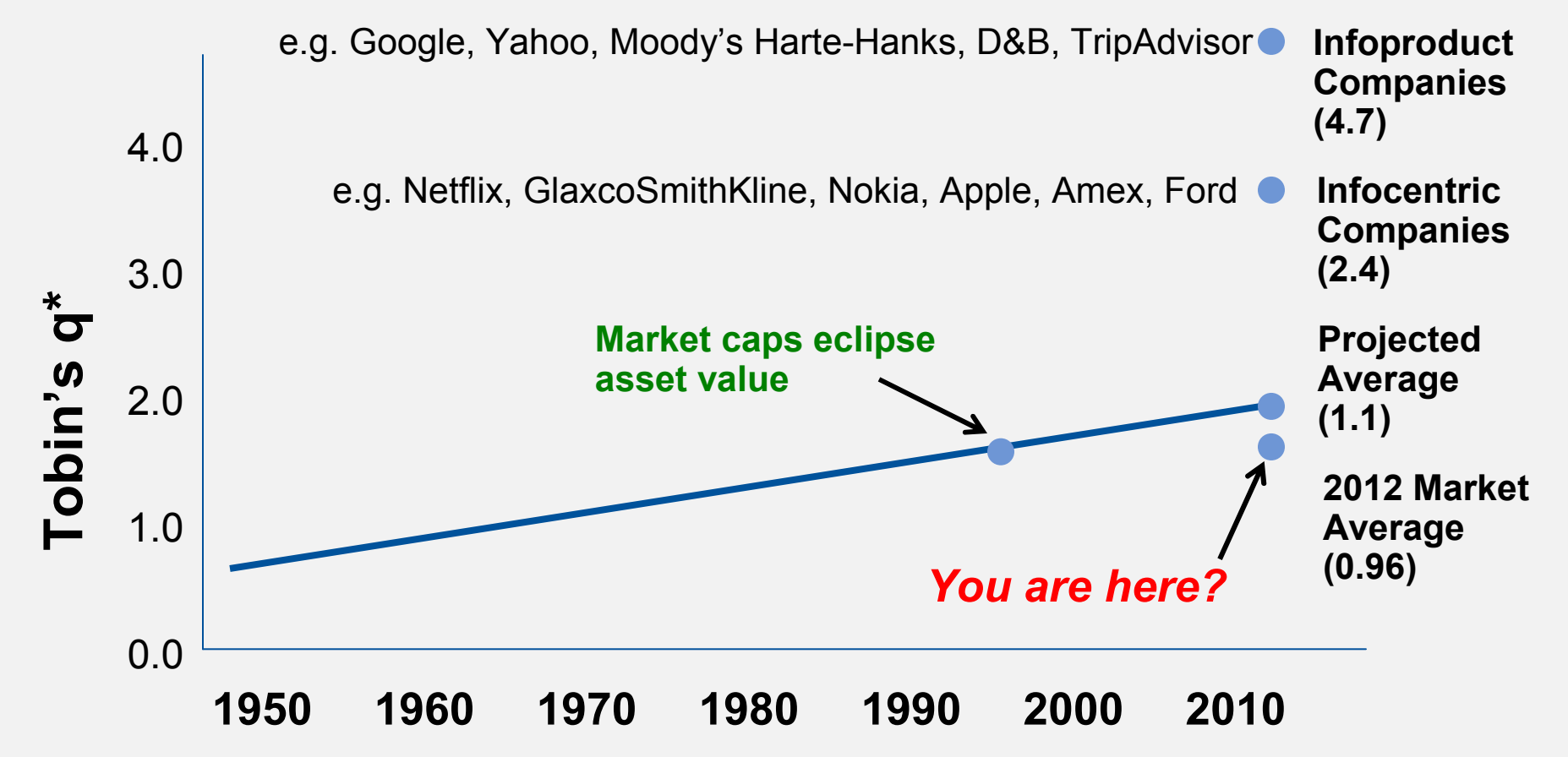
Infocentric Corporate Valuation Premiums



Financial markets see something in companies that are serious about information

*ratio of market value to tangible assets

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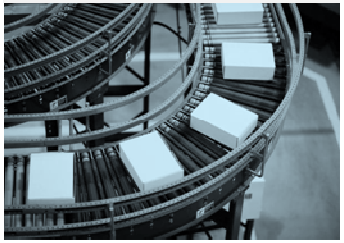
What we can borrow from traditional asset management practices?

Material



- Raw materials
- Inventory
- Finished goods
- Unfinished goods
- Storage
- Maintenance (planned & unplanned)
- Replacement
- Standardization
- Transportation
- Resource training
- Safe handling
- Security
- Disposal

Financial

- Accounting
- Investment
- Acquisition
- Leverage
- Credit
- Valuation
- Portfolio
- Factoring
- Liquidity
- Volatility

Workforce

- Recruiting
- Hiring
- Training
- Staffing
- Roles
- Teams
- Performance reviews
- Reduction in force
- Termination
- Outsourcing
- Temporary workers

Apply your org's expertise in asset management toward info asset mgt

Benefits of Infonomics

- Improving the management of information
- Creating a common language for IT, business leaders and CFO to communicate
- Becoming a more info-centric business (optimizing, eliminating, innovating)
- Justifying and proving benefits of IT initiatives
- Leveraging one of the enterprise's most underutilized resources
- Driving improved corporate market valuations

Big Data Challenges and Strategy

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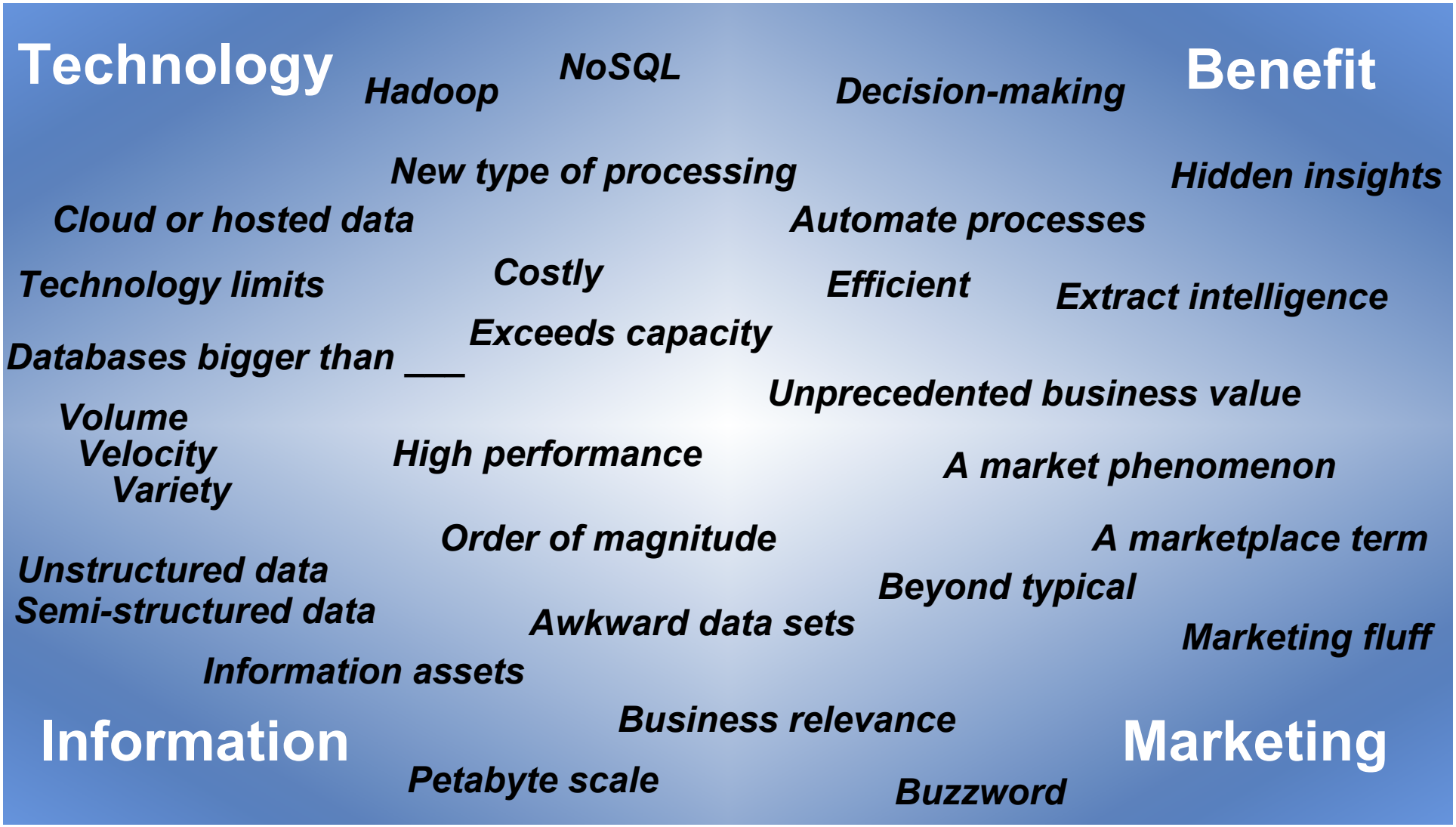
Big Data is #1
on the 2012 list of most ambiguous terms
-Global Language Monitor
most searched term among clients
-on Gartner.com

Big Drama in Defining Big Data



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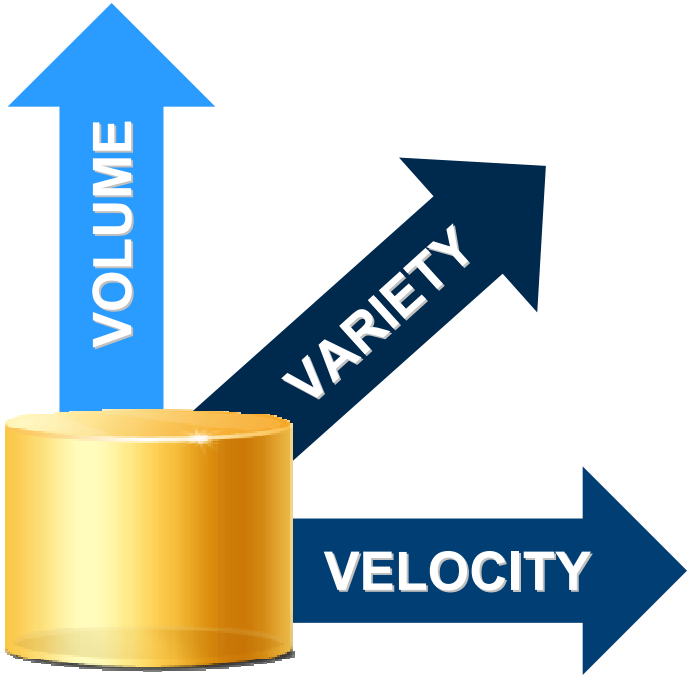
Big Data Characteristics

Growing quantity of data
e.g. social media, behavioral, video

Quickening speed of data
e.g. smart meters, process monitoring

Increase in types of data
e.g. app data, unstructured data



Gartner, Feb 2001

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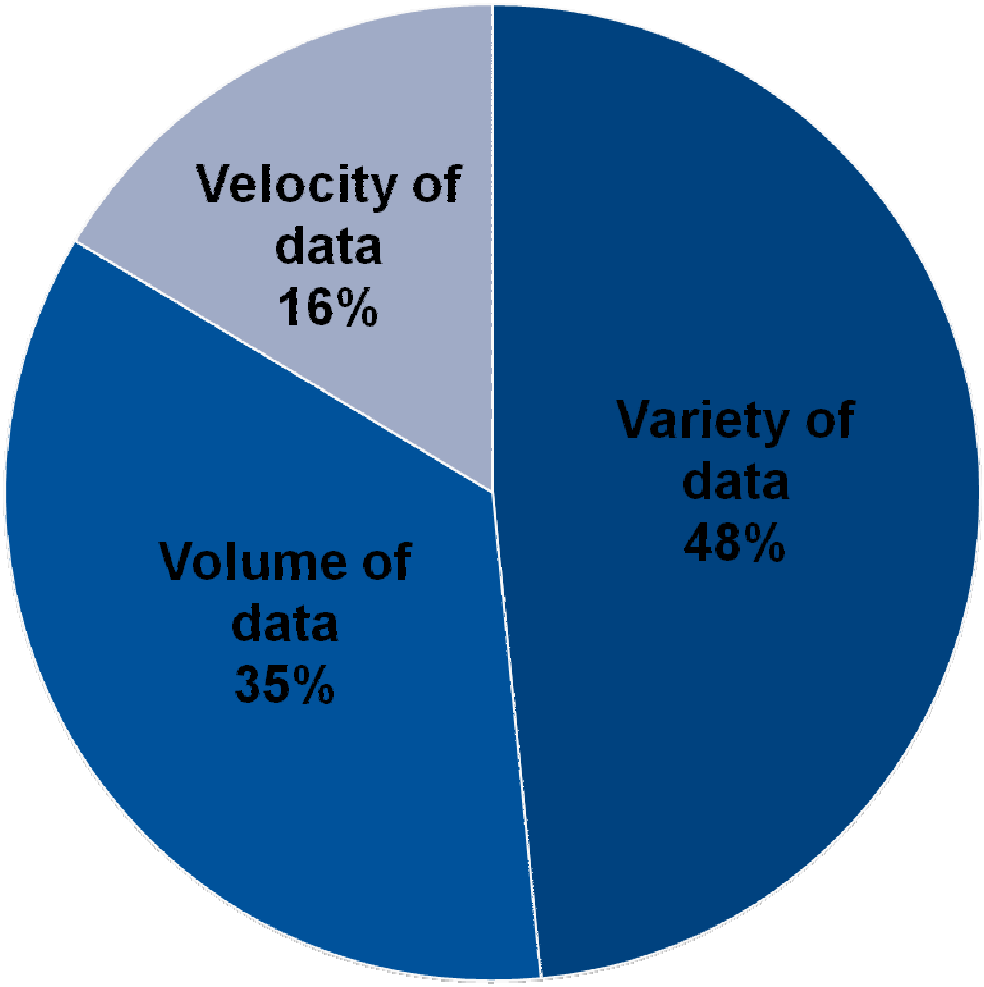
Which Big Data characteristic is the biggest issue for your organization?



Source: Getting Value from Big Data, Gartner Webinar, May 2012

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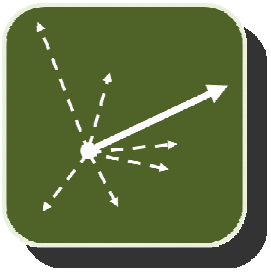
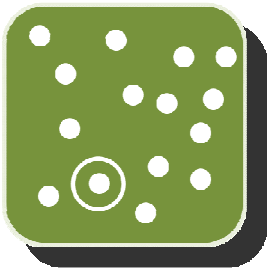
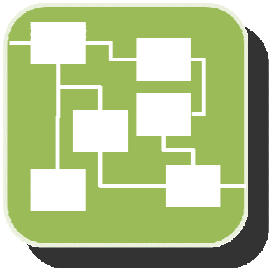
Big Data Opportunities



Making better informed decisions
e.g. strategies, recommendations



Discovering hidden insights
e.g. anomalies forensics, patterns, trends



Automating business processes
e.g. complex events, translation

Business Amplification

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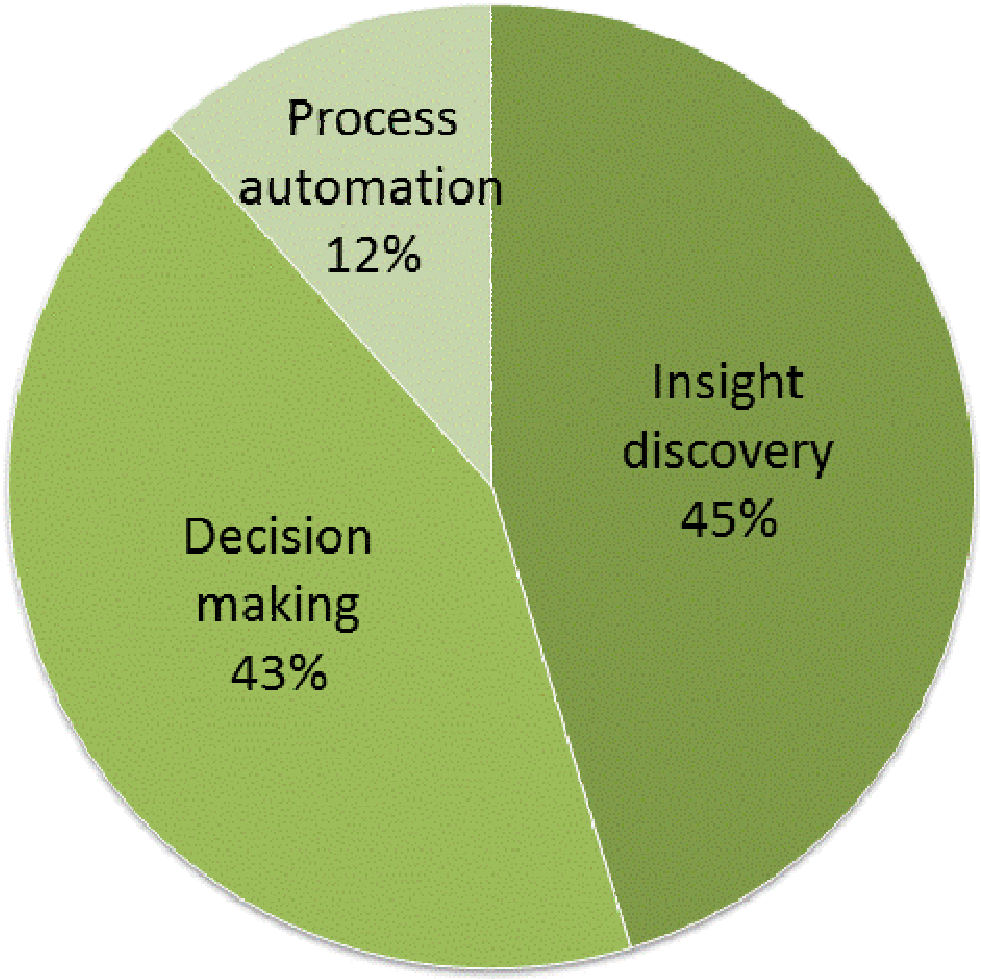
Which is the biggest opportunity for Big Data in your organization?



Source: Getting Value from Big Data, Gartner Webinar, May 2012

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Big Data is Centered on Challenges and Opportunities

VOLUME

VELOCITY

VARIETY

← Defined in 2001

Extended in 2012 →

DECISIONS

INSIGHTS

AUTOMATION

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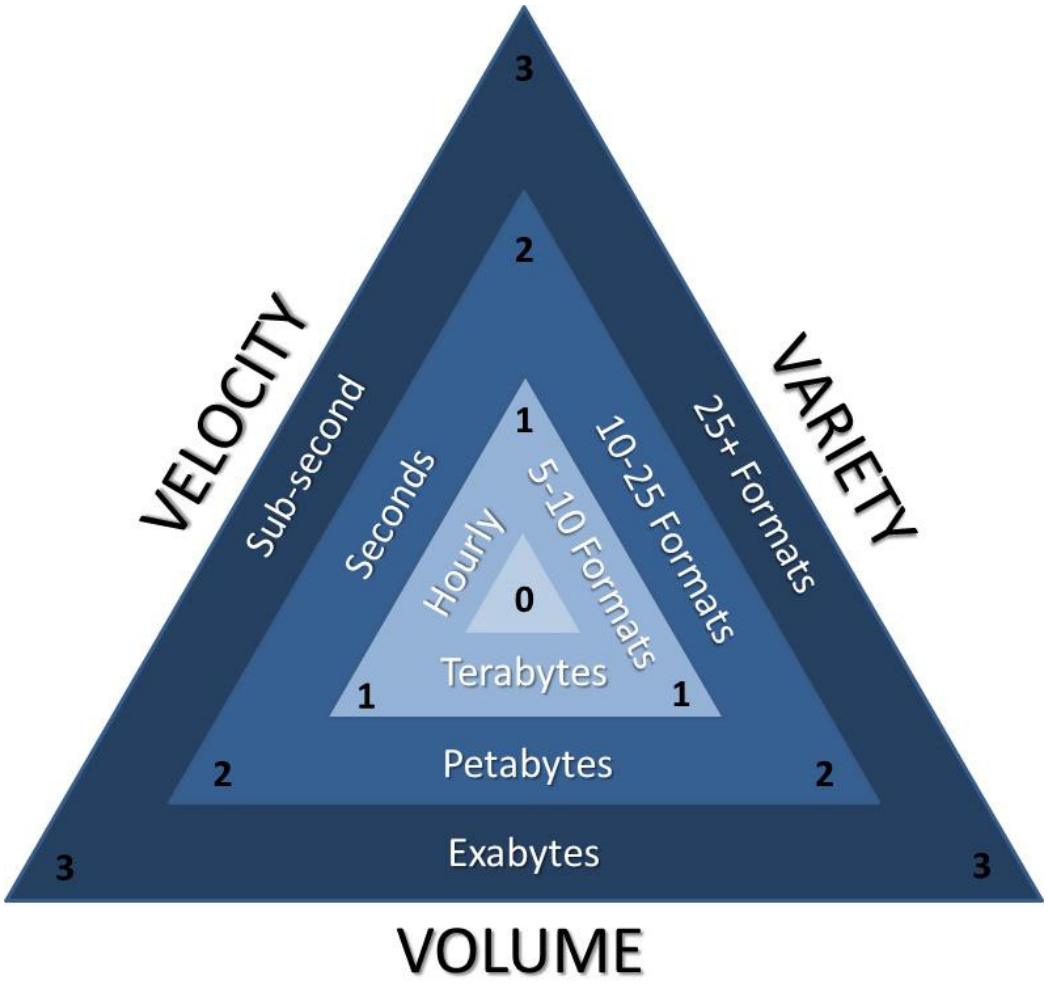
Big data are high volume, velocity and/or variety of information assets which require cost-effective, innovative forms of information processing to enable enhanced insight discovery, decision-making, and process optimization.

How Big is Big?

The Gartner Data Magnitude Index



Identify the scale of data you manage *and* process, for each dimension then sum them to determine your Data Magnitude Index (DMI).

Technology Class:

DMI 1-3: Prior generation

DMI 4-6: State of the art

DMI 7-9: Next generation

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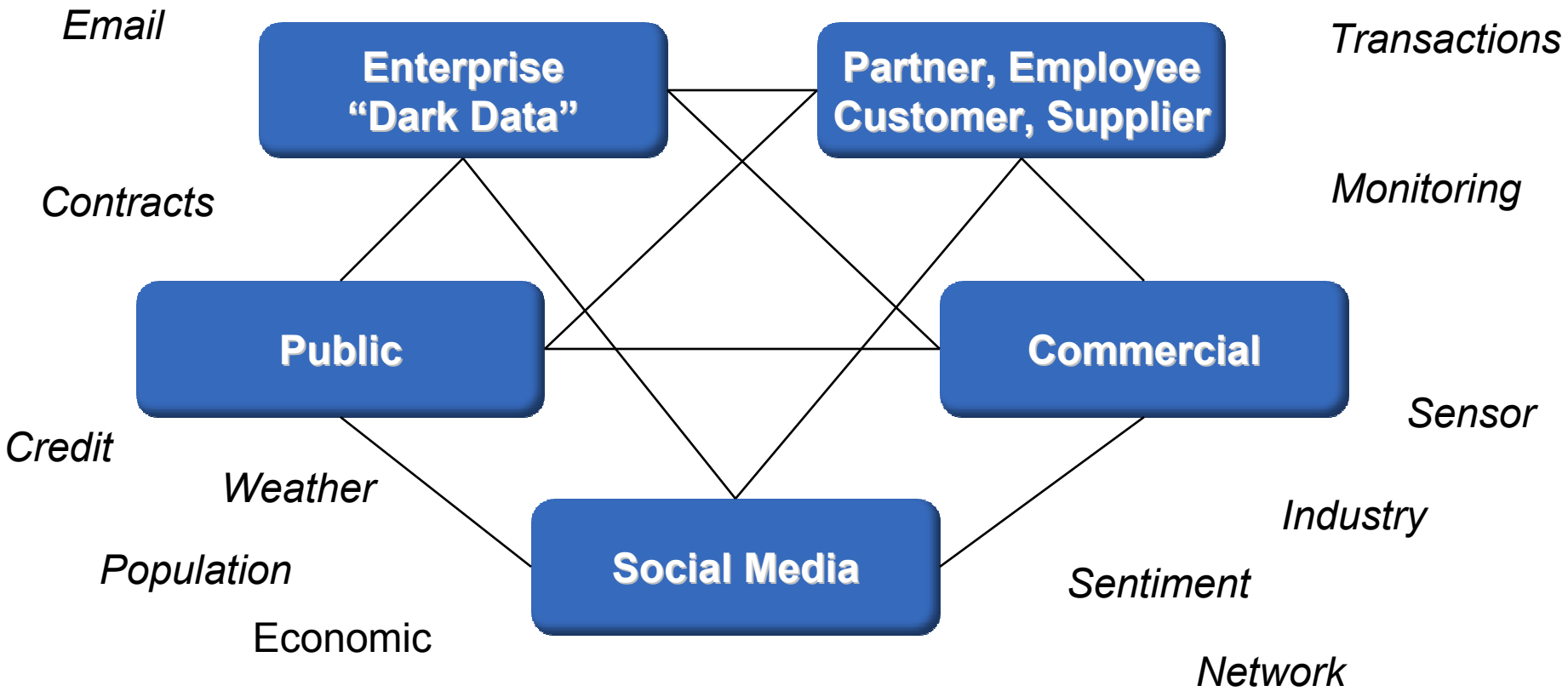
Where does Big Data come from?



Correlations and patterns from disparate, linked data sources yield the greatest insights and transformative opportunities

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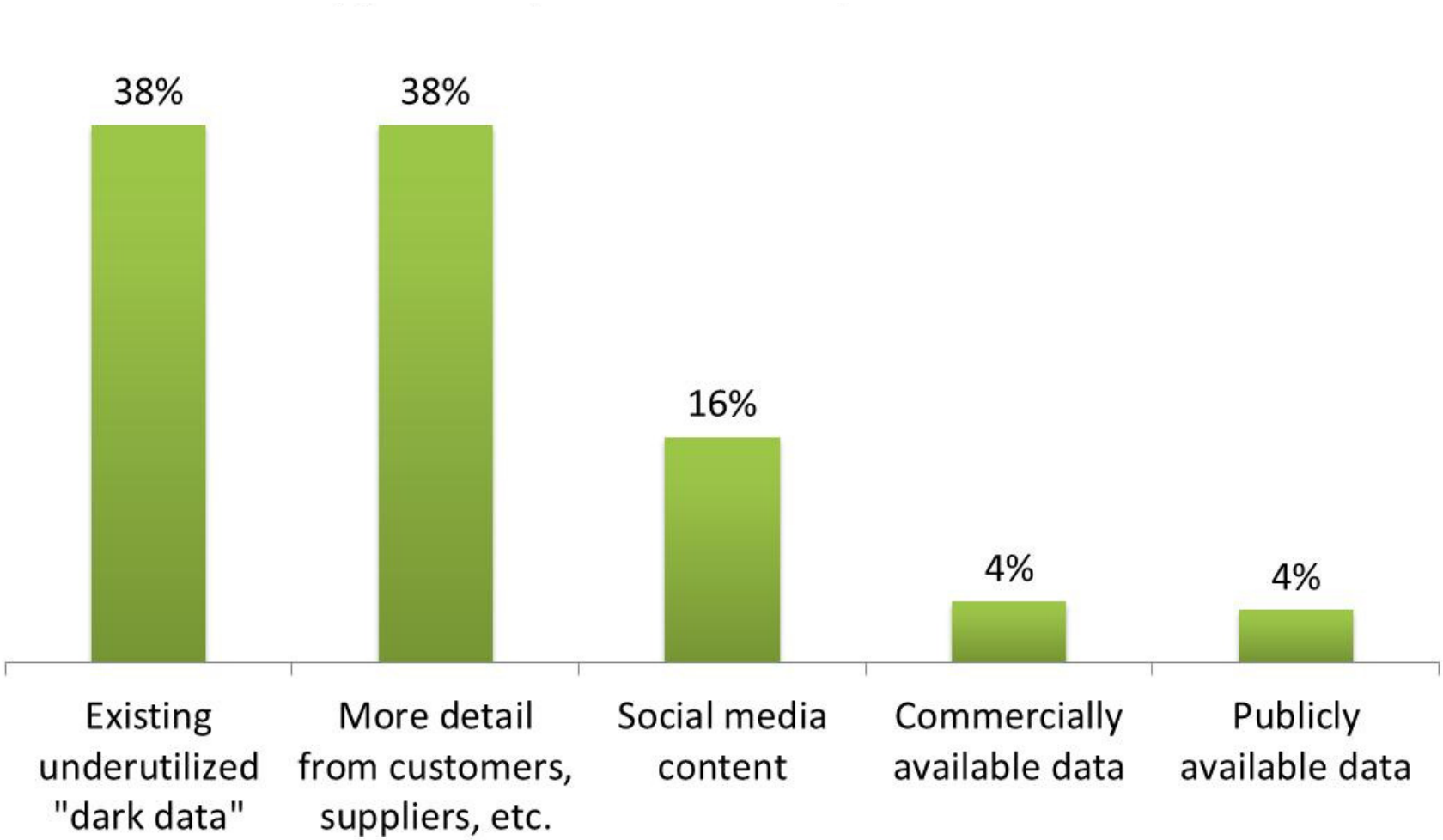
Which source of data represents the most immediate opportunity?



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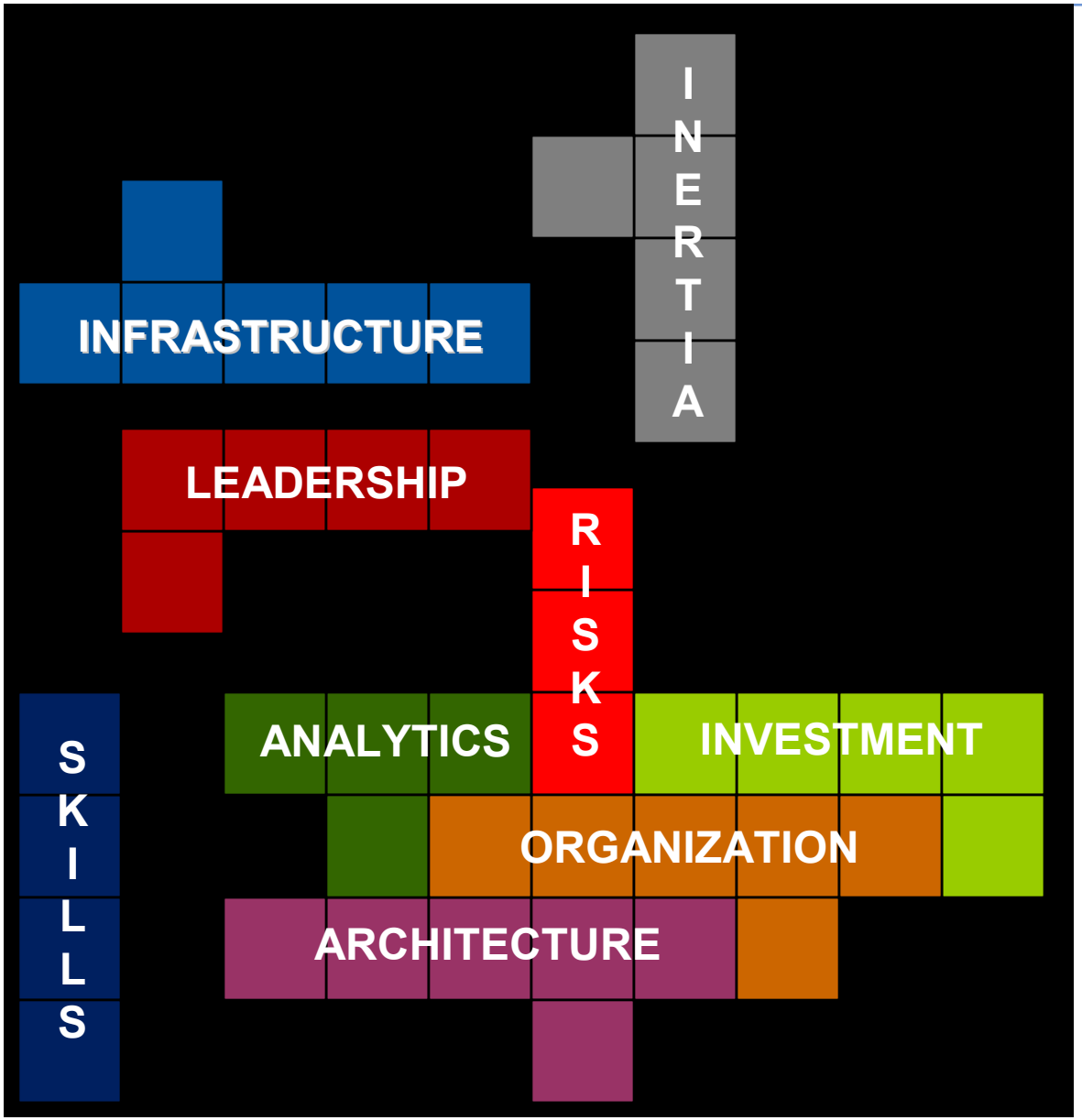
The Big Data Challenge: Putting Together the Pieces Quickly and Efficiently



Through 2015:

- 85% of Fortune 500 organizations will be unable to exploit big data for competitive advantage.
- Business analytics needs will drive 70% of investments in the expansion and modernization of information infrastructure.

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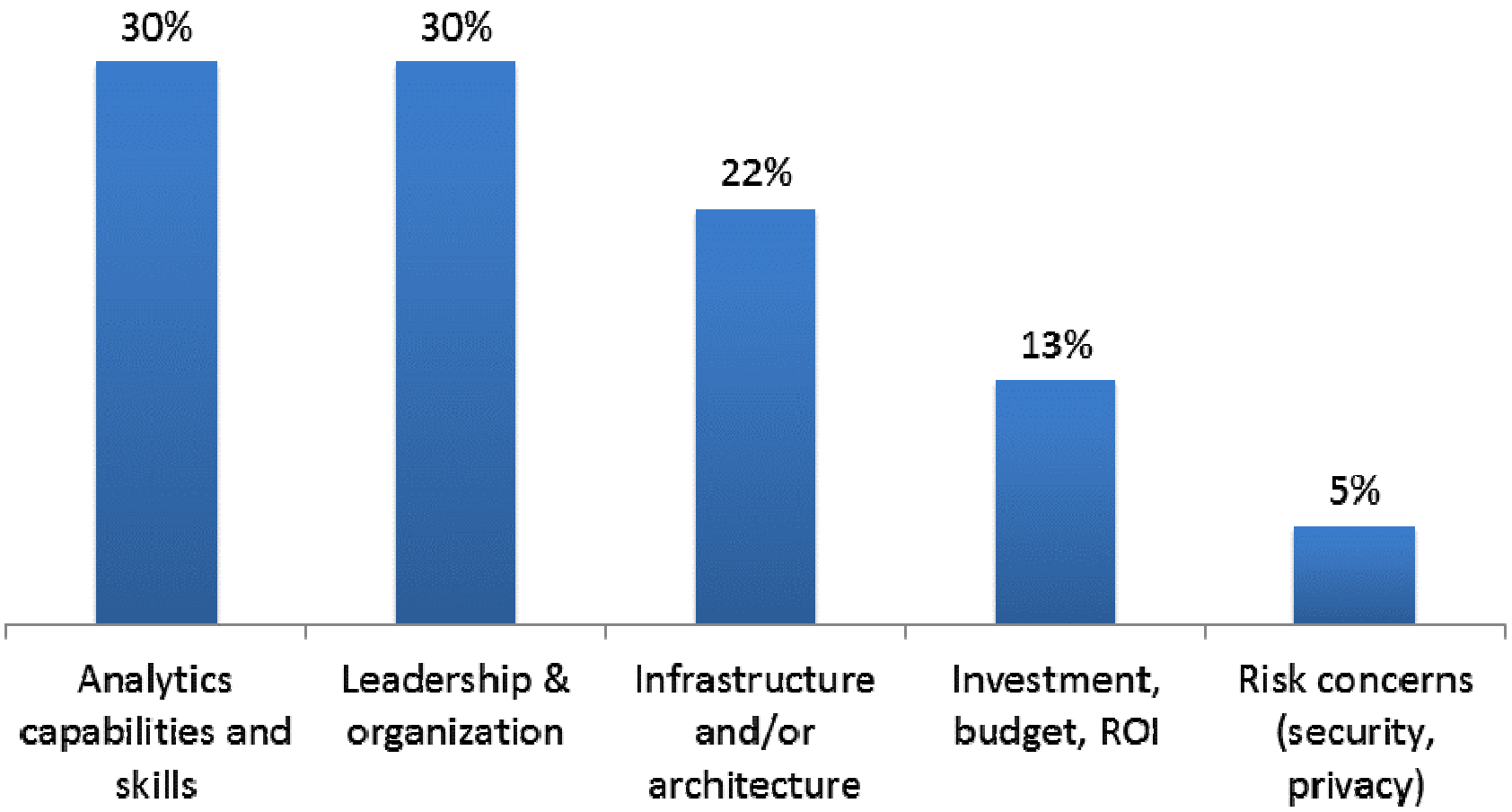
What is your organization's biggest inhibitor to benefiting from Big Data?



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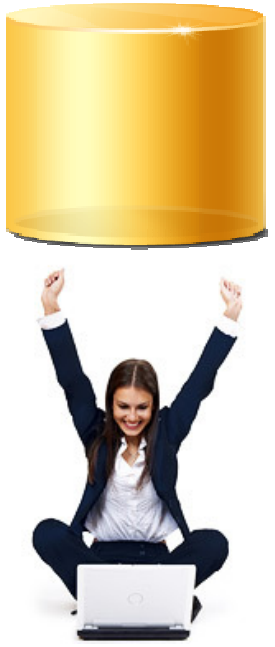
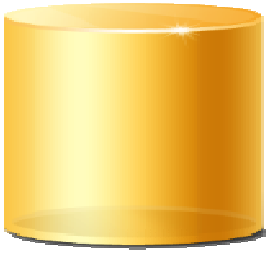
Big Data Strategy Essentials for IT

- Ensure infrastructure adequacy
- Consider alternate information architectures
- Anticipate and govern risks
- Expand your analytic capabilities
- Assemble necessary skills
- Alter IT organization structures



Big Data Strategy Essentials for Business

- Acknowledge how Big Data initiatives are unique
- Generate big ideas for Big Data
- Identify potentially valuable data sources
- Build business leadership belief in data
- Become even more pragmatic about investments



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The Art of the Possible

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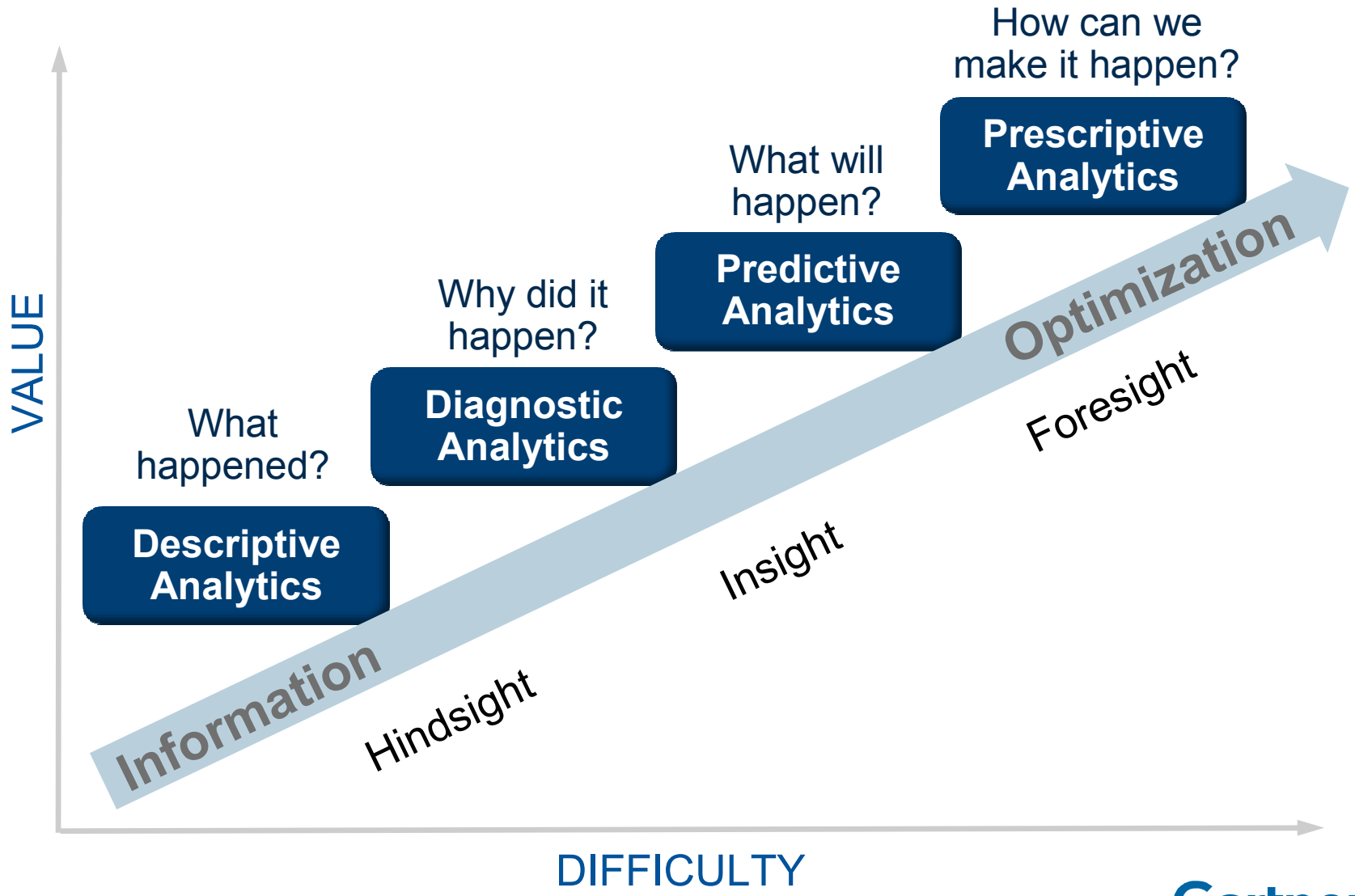
Gartner Analytic Ascendancy Model



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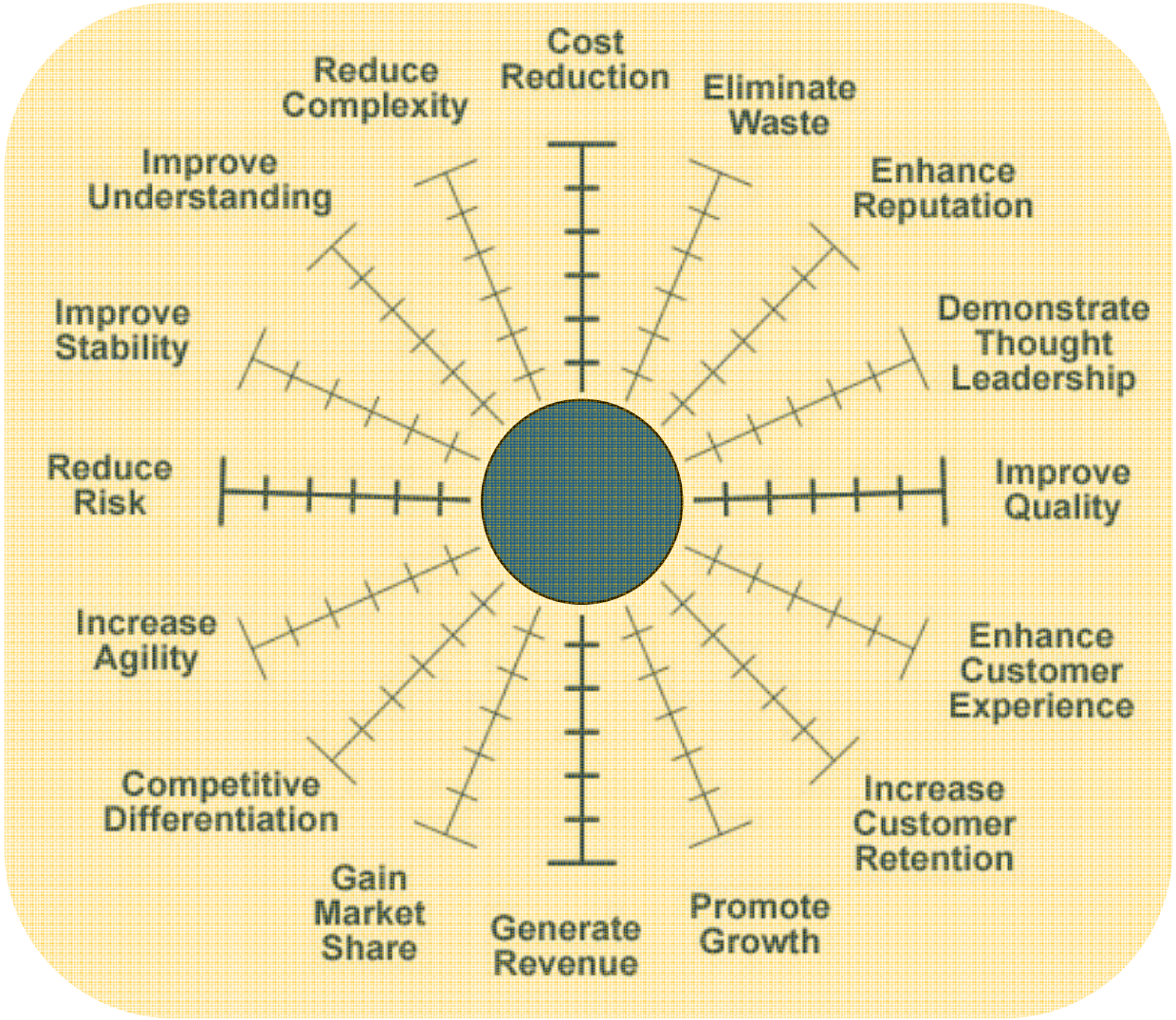
Targeting traditional business drivers



A focus on too many drivers can suboptimize overall business performance

A fixation only on traditional drivers can inhibit innovation and transformation

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Grapes of Math

- Opportunity
  - Advise vintners on Wine Spectator scores & competitions and how to improve winemaking
- Data & Analytics
  - Database of hundreds of thousands of wines including chemical analysis of 100+ chemical compounds
  - Proprietary method (pattern matching, machine learning) for sampling and analyzing grapes
- Results
  - Ability to predict Wine Spectator scores and simulate tasting notes
  - Winemakers improve wine scores, and optimize inventory, pricing and promotion

Enologix

How can you break years or centuries of tradition by collecting and analyzing data in new ways?

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Playing games with people's lives

- Opportunity
  - Improve heath care and reduce medical costs
- Data & Analytics
  - $5M open contest to predict which patients are most likely to be readmitted to a hospital in the next year, and for how many days
  - Over 10,000 participants and teams
- Result (TBD)
  - Identify advances in diagnoses, treatments, follow-up and release protocols

HERITAGE PROVIDER NETWORK

How can you "gamify" information and analytics to accelerate discoveries?

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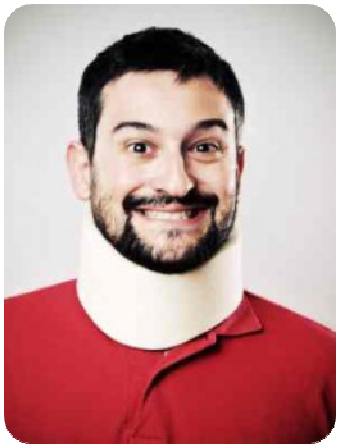
Sniffing and snuffing insurance fraud

- Opportunity
  - Save and make money by reducing fraudulent auto insurance claims
- Data & Analytics
  - Predictive analytics against years of historical claims and coverage data
  - Text mining adjuster reports for hidden clues, e.g. missing facts, inconsistencies, changed stories
- Results
  - Improved success rate in pursuing fraudulent claims from 50% to 88%; reduced fraudulent claim investigation time by 95%
  - Marketing to individuals with low propensity for fraud

INFINITY.



What "dark data" do you have just laying around that can transform business processes?

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Harvesting optimum product configurations

- Opportunity
  - High inventories, planning cycles, lead times and production costs for manufacturing agricultural equipment
- Data & Analytics
  - Manufacturing, sales, and inventory data
  - Thousands of configuration options of varying popularity and margin
  - Pattern analysis from to identify base configurations and realtime customer demand
- Results
  - Reduced product variety by 61% and slashed days of inventory by 81% while maintaining service levels

AGCO
Your Agriculture Company

How can you use advanced analytics to simplify your business for improved profitability and service?

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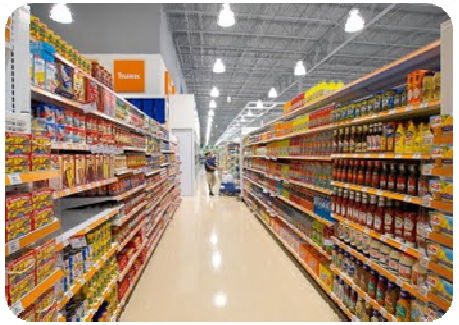
Stretching analytic performance to measure price elasticity

- Opportunity
  - Business lacking the ability to react to market conditions and new product launches
- Data & Analytics
  - 8.9B sales line items, 1.4B SKUs, 1.8B rows of inventory, 3200 stores
  - Entire solution moved from mainframe to Hadoop
  - Calculating price elasticity over 12.6B parameters
- Results
  - Price elasticity now measured weekly against all data instead of quarterly against a subset
  - $600K annual savings; 6000 lines of batch code reduced to 400 lines of PIG

SEARS HOLDINGS



How can embracing new technology help amplify the business?

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Smart Buildings on the Rise

- Opportunity
  - Reduce building operation costs; green building designation
- Data & Analytics
  - Monitor and analyze dozens of continuous data streams such as personnel locations, sunlight, room temperature, HVAC performance, elevator/stairwell usage, water & electricity usage
- Results (varies)
  - Automatically adjusting lighting & blinds, and air/water temperature; optimizing elevator patterns
  - Enhancing building security and safety, and employee comfort and productivity. Saving money and energy; reduced maintenance; improving future building designs

Johnson Controls

How can you enhance monitoring to drive a bevy of efficiency benefits?

Gartner

An infamous retail tale

- Opportunity
  - Target consumers with promotions based on their determined life situation
- Data & Analytics
  - Transaction receipts and other undisclosed information
  - Inference engine to predict future needs based on shopping and purchase pattern changes
- Result
  - Identified woman was pregnant; even estimated her due date
  - Woman was a pregnant teen; her father didn't know until coupons arrived
  - Coupons now sealed

Making the grade by setting a new curve

- Opportunity
  - Predict future financial performance, health, issues, risks better than industry standard methods
- Data & Analytics
  - Continuously crunch over 5 dozen publically-available factors to generate a hundred-point FHR (financial health scale) vs. subjective quarterly financial analyst ABC grades
- Result
  - Most financial analyst firms excited/blinded by MF Global hiring Jon Corzine, but RapidRatings saw its FHR score slide from 49 to 26, advising investors to run not hide

RapidRatings

How can you change the rules of the game with new measurements and new analyses?

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Does this data make my buns look good?

- Opportunity
  - Move from manual to automated inspection of burger bun production to ensure and improve quality
- Data & Analytics
  - Photo-analyze over 1000 buns-per-minute for color, shape and seed distribution
  - Continually adjust ovens and process automatically
- Result
  - Eliminate 1000s of pounds of wasted product per year; speed production; save energy; Reduce manual labor costs

Are you using all your "senses" to observe, measure and optimize business processes?

Steaking your reputation on it

- Opportunity
  - Improve reputation, brand and buzz by tapping social media
- Data & Analytics
  - Continually scanning twitterverse for mentions of their business
  - Integrating tweeters with their robust customer management system
- Results
  - Saw tweet from a top customer lamenting late flight—no time to dine at Morton's
  - Tuxedo-clad waiter waiting for him when he landed with a bag containing his favorite steak, prepared the way he normally likes it with all the fixin's

MORTON'S
THE STEAKHOUSE

How can you listen, analyze and respond in real-time?

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Listening to United Voices

- Opportunity
  - Evolving from reactive to proactive responses to global issues
  - Developing and guiding assistance programs
- Data & Analytics
  - Mining social networks to predict job losses, spending reductions, or disease outbreaks within a region
  - Natural language deciphering
- Result (TBD)
  - Early warning signals to guide assistance programs for preventing regions from slipping into poverty, epidemics, or war

United Nations

How can you tap social media to be proactive to emerging global issues?

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Projecting project success or failure

- Opportunity
  - 20 years of unused “dark data” (archived emails) incurring cost without benefit
  - Consulting project issues reported after the fact; no way to anticipate and address them
- Data & Analytics
  - Identify project communications (emails) from prior successful vs unsuccessful projects
  - Mine emails for communication and sentiment patterns (time-of-day, CC/BCC, length, content)
- Result (TBD)
  - Early warnings of scope, budget, technical, personnel issues → improved project success
  - Productized project indicator benchmarks

Global Systems Integrator

What “dark data” can you use to create and deploy patterns for early warning signals?

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Blowing Away Competitors with Big Data

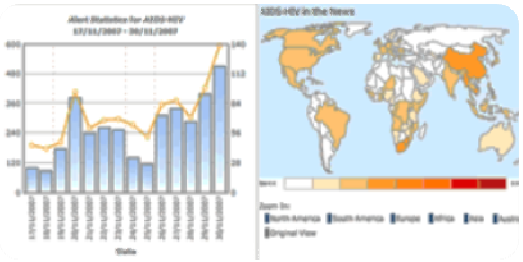
- Opportunity
  - Grow revenue through improved targeting and cross-selling yard care products
- Data & Analytics
  - Gartner recommended layering POS and warranty customer data with map data to identify customers that have large foliage coverage and large driveways
  - Identify new “DIY” customers to cross sell leaf & snow blowers or partner products
- Results (TBD)
  - Improve direct marketing campaign performance by focusing on customers with actual needs and specific behaviors; form higher-value partnerships, e.g. Scotts, Home Depot

Lawn Care Products Co.

What public data can you integrate to creatively target customers and partners?

Tomorrow's news, today

- Opportunity
  - Identify systemic, related or mounting health, geopolitical or financial issues
- Data & Analytics
  - Continually capture, translate, classify and analyze 40,000 local news reports in 43 languages from around the world
  - Custom charting, alerts, animated map visualization of categories or search terms
  - Predict and highlight emerging hot topics and trends
- Results
  - Enable politicians, insurers, investors, disease control institutions and global support groups to respond quicker to local or global issues



What data is out there to help you see the future?

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Yes, we know you want fries with that

- Opportunity
  - Optimize customer margin and revenue
- Data & Analytics
  - Continuously analyze video from drive-through lanes *and* on the street to identify customer "drive-by" behavior and situations
  - Outsource credit card data to analyze pre- and post-visit customer behavior (in aggregate)
- Results
  - Update order boards as needed to feature more expedient versus higher margin items based on anticipated customer behavior
  - Dynamically updated pricing???

Major Fast-Food Company

How can you dynamically optimize your offering mix based on real-time customer behavior?

A tale of retailing retail data

- Opportunity
  - Gain free strategic advice on promotions, stocking etc. from CPG partners
- Data & Analytics
  - Place billions of rows of POS, inventory, promotion, and other data into a cloud-based data store for partners to analyze in an common spreadsheet-like format
  - Data hosting and analytic processing provided by 1010data
- Results
  - CPG partners (e.g. P&G) now pay for access. As a result Dollar General has a self-funding enterprise data warehouse and was able to eliminate its complex, expensive RDBMS-based EDW.

How can you self-fund your analytic environment through sharing and monetizing it via partners?

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Future, Summary and Recommendations

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Keeping eyes wide open to the future of information

- Information banking
- Generally accepted information accounting principles (GAIAP)
- Information & algorithmic product lines
- Data science pools, executive companions and outsourcing
- Inter-enterprise data federation
- Intelligent linking and tagging
- Syndicated behavioral and emotional profiles

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Your Action Plan

- ✓ Start valuing, managing and deploying information as an *actual* corporate asset
- ✓ Understand that Big Data isn't just about the size of data. Also recognize and address the challenges of data velocity and variety.
- ✓ Put in place strategies and mechanisms to address all the non-technical challenges of Big Data as well
- ✓ Identify under-utilized "dark data" opportunities including available public, commercial, social media and partner data
- ✓ Beg, borrow and steal analytics and Big Data ideas from other industries

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Information Economics, Big Data and the Art of the Possible with Analytics

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