Business Intelligence Trends
商業智慧趨勢

商業智慧導入與趨勢
(Business Intelligence Implementation and Trends)

1012BIT08
MIS MBA
Mon 6, 7 (13:10-15:00) Q407

Min-Yuh Day
戴敏育
Assistant Professor
專任助理教授
Dept. of Information Management, Tamkang University
淡江大學 資訊管理學系

http://mail. tku.edu.tw/myday/
2013-05-27

1

課程大綱 (Syllabus)

週次 日期　　　　內容（Subject/Topics）

1　102/02/18　商業智慧趨勢課程介紹
　　　　　　　(Course Orientation for Business Intelligence Trends)

2　102/02/25　管理決策支援系統與商業智慧
　　　　　　　(Management Decision Support System and Business Intelligence)

3　102/03/04　企業績效管理 (Business Performance Management)

4　102/03/11　資料倉儲 (Data Warehousing)

5　102/03/18　商業智慧的資料探勘 (Data Mining for Business Intelligence)

6　102/03/25　商業智慧的資料探勘 (Data Mining for Business Intelligence)

7　102/04/01　教學行政觀摩日 (Off-campus study)

8　102/04/08　個案分析一 (SAS EM 分群分析)：Banking Segmentation
　　　　　　　(Cluster Analysis – KMeans using SAS EM)

9　102/04/15　個案分析二 (SAS EM 關連分析)：Web Site Usage Associations
　　　　　　　(Association Analysis using SAS EM)

課程大綱 (Syllabus)

週次 日期　　　內容（Subject/Topics）

10　102/04/22　期中報告 (Midterm Presentation)

11　102/04/29　個案分析三 (SAS EM 決策樹、模型評估)：
　　　　　　　 Enrollment Management Case Study
　　　　　　　 (Decision Tree, Model Evaluation using SAS EM)

12　102/05/06　個案分析四 (SAS EM 迴歸分析、類神經網路)：
　　　　　　　 Credit Risk Case Study
　　　　　　　 (Regression Analysis, Artificial Neural Network using SAS EM)

13　102/05/13　文字探勘與網路探勘 (Text and Web Mining)

14　102/05/20　意見探勘與情感分析 (Opinion Mining and Sentiment Analysis)

15　102/05/27　商業智慧導入與趨勢
　　　　　　　 (Business Intelligence Implementation and Trends)

16　102/06/03　商業智慧導入與趨勢
　　　　　　　 (Business Intelligence Implementation and Trends)

17　102/06/10　期末報告1 (Term Project Presentation 1)

18　102/06/17　期末報告2 (Term Project Presentation 2)
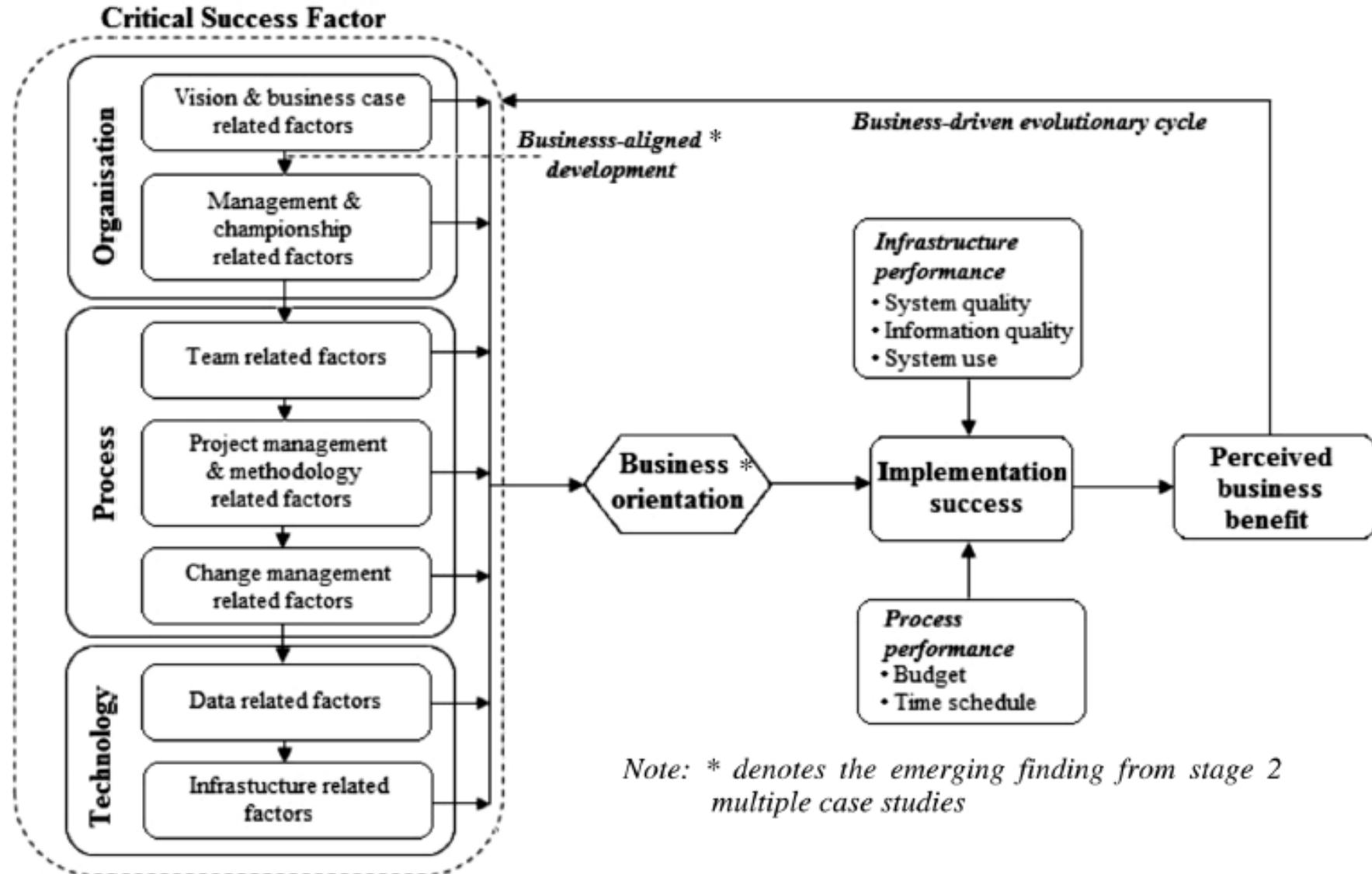
Outline

- Business Intelligence Implementation

- Business Intelligence Trends

- Big Data, Big Analytics:
  Emerging Business Intelligence and Analytic Trends for Today's Businesses

Business Intelligence Implementation

Business Intelligence Implementation
CSFs Framework for Implementation of BI Systems

Critical Success Factor

Organisation
- Vision & business case related factors
- Management & championship related factors

Process
- Team related factors
- Project management & methodology related factors
- Change management related factors

Technology
- Data related factors
- Infrastucture related factors

Businesss-aligned development

Business-driven evolutionary cycle

Infrastructure performance
- System quality
- Information quality
- System use

Business orientation *

Implementation success

Perceived business benefit

Process performance
- Budget
- Time schedule

*Note: * denotes the emerging finding from stage 2 multiple case studies*

Yeoh, W., & Koronios, A. (2010). Critical success factors for business intelligence systems. Journal of computer information systems, 50(3), 23.

Critical Success Factors of Business Intelligence Implementation

- Organizational dimension
  - Committed management support and sponsorship
  - Clear vision and well-established business case
- Process dimension
  - Business-centric championship and balanced team composition
  - Business-driven and iterative development approach
  - User-oriented change management.
- Technological dimension
  - Business-driven, scalable and flexible technical framework
  - Sustainable data quality and integrity

Yeoh, W., & Koronios, A. (2010). Critical success factors for business intelligence systems. Journal of computer information systems, 50(3), 23.

Business Intelligence Trends

Business Intelligence Trends

1. Agile Information Management (IM)
2. Cloud Business Intelligence (BI)
3. Mobile Business Intelligence (BI)
4. Analytics
5. Big Data

Business Intelligence Trends: Computing and Service

- Cloud Computing and Service

- Mobile Computing and Service

- Social Computing and Service

Business Intelligence and Analytics

- Business Intelligence 2.0 (BI 2.0)
  - Web Intelligence
  - Web Analytics
  - Web 2.0
  - Social Networking and Microblogging sites
- Data Trends
  - Big Data
- Platform Technology Trends
  - Cloud computing platform

Business Intelligence and Analytics: Research Directions

1. Big Data Analytics

   – Data analytics using Hadoop / MapReduce framework

2. Text Analytics

   – From Information Extraction to Question Answering

   – From Sentiment Analysis to Opinion Mining

3. Network Analysis

   – Link mining

   – Community Detection

   – Social Recommendation

Big Data, Big Analytics:

Emerging Business Intelligence and Analytic Trends for Today's Businesses

Big Data:

The Management Revolution

Source: McAfee, A., & Brynjolfsson, E. (2012). Big data: the management revolution.*Harvard business review.*
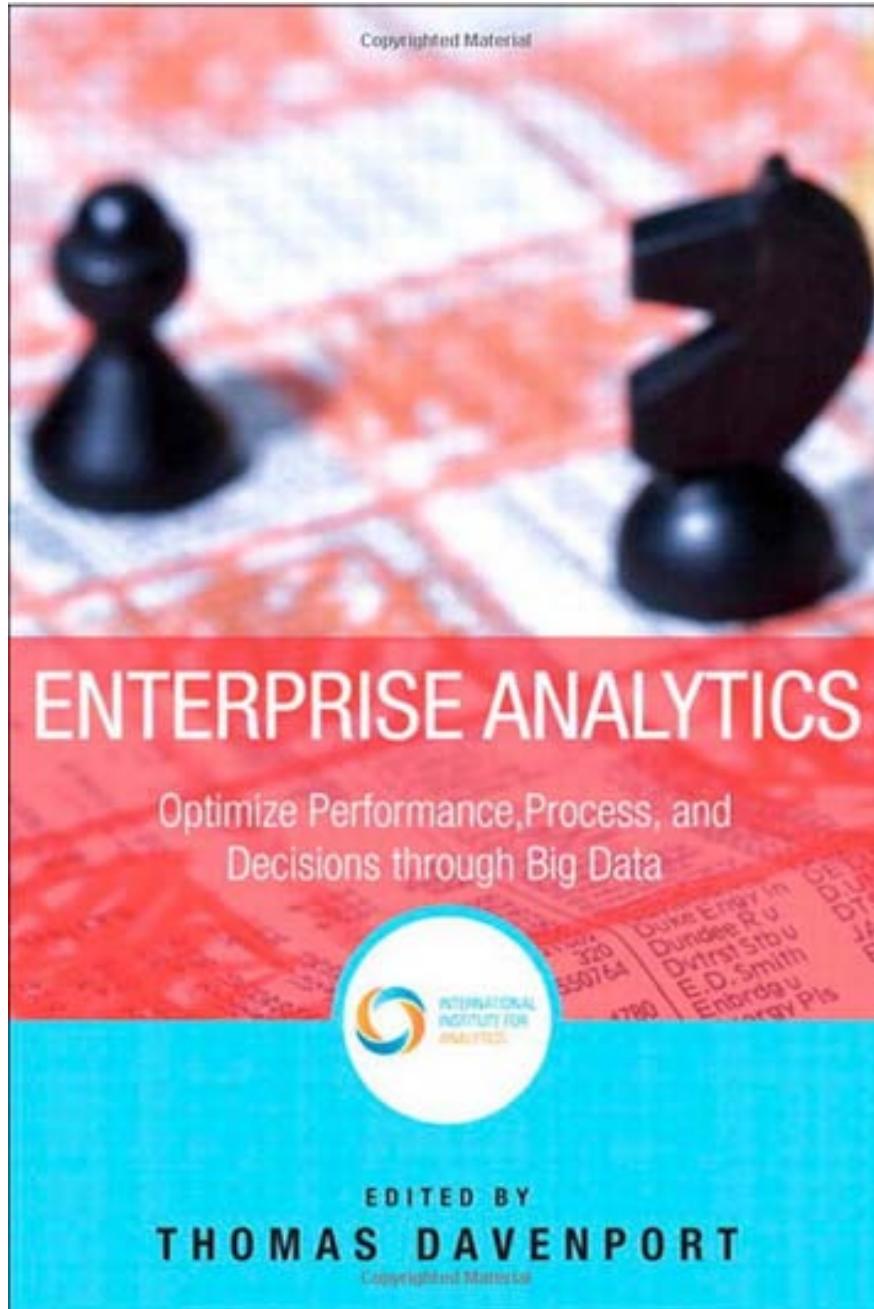
Harvard Business Review

SPOTLIGHT ON BIG DATA

Big Data: The Management Revolution

Exploiting vast new flows of information can radically improve your company's performance. But first you'll have to change your decision-making culture.
by Andrew McAfee and Erik Brynjolfsson
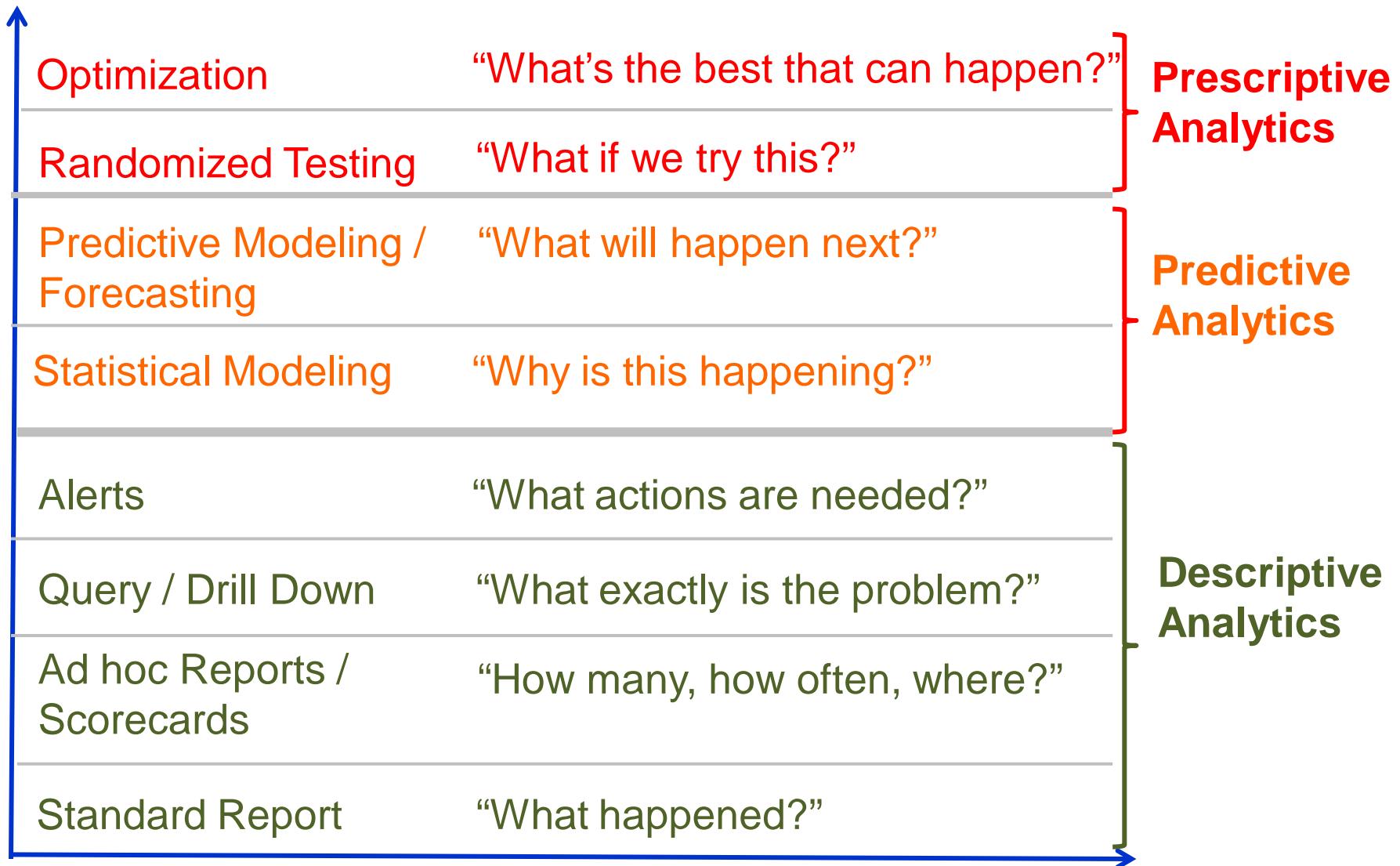
Business Intelligence and Enterprise Analytics

- Predictive analytics

- Data mining

- Business analytics

- Web analytics

- Big-data analytics

Three Types of Business Analytics

- Prescriptive Analytics

- Predictive Analytics

- Descriptive Analytics

Three Types of Business Analytics

Optimization	"What's the best that can happen?"	**Prescriptive Analytics**
Randomized Testing	"What if we try this?"	
Predictive Modeling / Forecasting	"What will happen next?"	**Predictive Analytics**
Statistical Modeling	"Why is this happening?"	
Alerts	"What actions are needed?"	**Descriptive Analytics**
Query / Drill Down	"What exactly is the problem?"	
Ad hoc Reports / Scorecards	"How many, how often, where?"	
Standard Report	"What happened?"	

Big-Data Analysis

- **Too Big,
  too Unstructured,
  too many different source**
  to be manageable through traditional databases

The Rise of "Big Data"
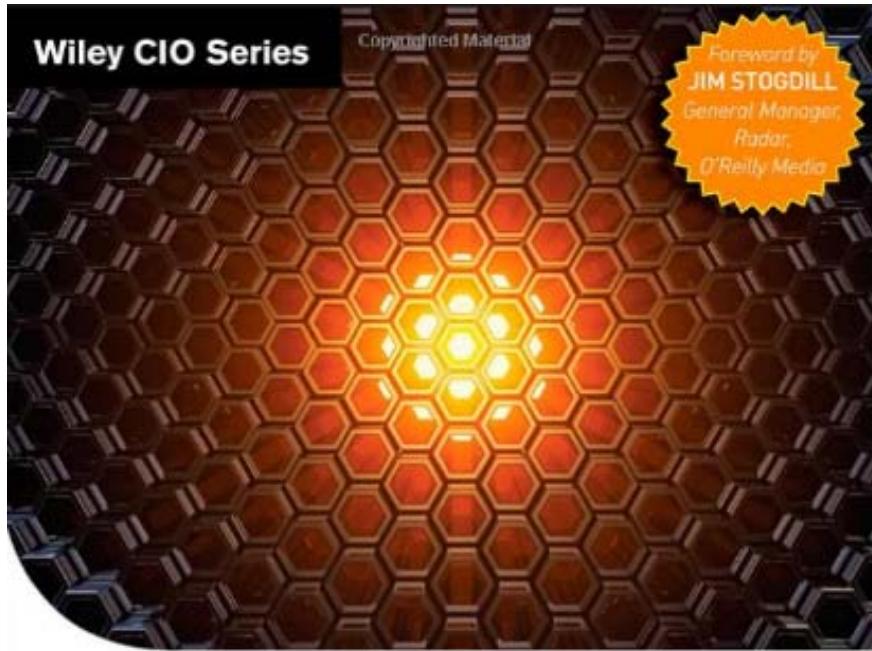
- "Too Big" means databases or data flows in **petabytes (1,000 terabytes**)
  - Google processes about 24 petabytes of data per day
- "Too unstructured" means that the data isn't easily put into the traditional rows and columns of conventional databases

Examples of Big Data

- Online information
  - Clickstream data from Web and social media content
    - Tweets
    - Blogs
    - Wall postings
- Video data
  - Retail and crime/intelligence environments
  - Rendering of video entertainment
- Voice data
  - call centers and intelligence intervention
- Life sciences
  - Genomic and proteomic data from biological research and medicine

Wiley CIO Series

Copyrighted Material

Foreword by
JIM STOGDILL
General Manager,
Radar,
O'Reilly Media

BIG DATA
BIG ANALYTICS

EMERGING BUSINESS INTELLIGENCE AND
ANALYTIC TRENDS FOR TODAY'S
BUSINESSES

Michael Minelli • Michele Chambers • Ambiga Dhiraj

Copyrighted Material

Big Data, Big Analytics:

Emerging Business Intelligence and Analytic Trends for Today's Businesses

- What Big Data is and why it's important

- Industry examples (Financial Services, Healthcare, etc.)

- Big Data and the New School of Marketing

- Fraud, risk, and Big Data

- Big Data technology

- Old versus new approaches

- Open source technology for Big Data analytics

- The Cloud and Big Data

Big Data, Big Analytics:
**Emerging Business Intelligence and Analytic Trends
for Today's Businesses**

- Predictive analytics

- Crowdsourcing analytics

- Computing platforms, limitations, and emerging technologies

- Consumption of analytics

- Data visualization as a way to take immediate action

- Moving from beyond the tools to analytic applications

- Creating a culture that nurtures decision science talent

- A thorough summary of ethical and privacy issues

What is **BIG Data**?

Volume

Large amount of data
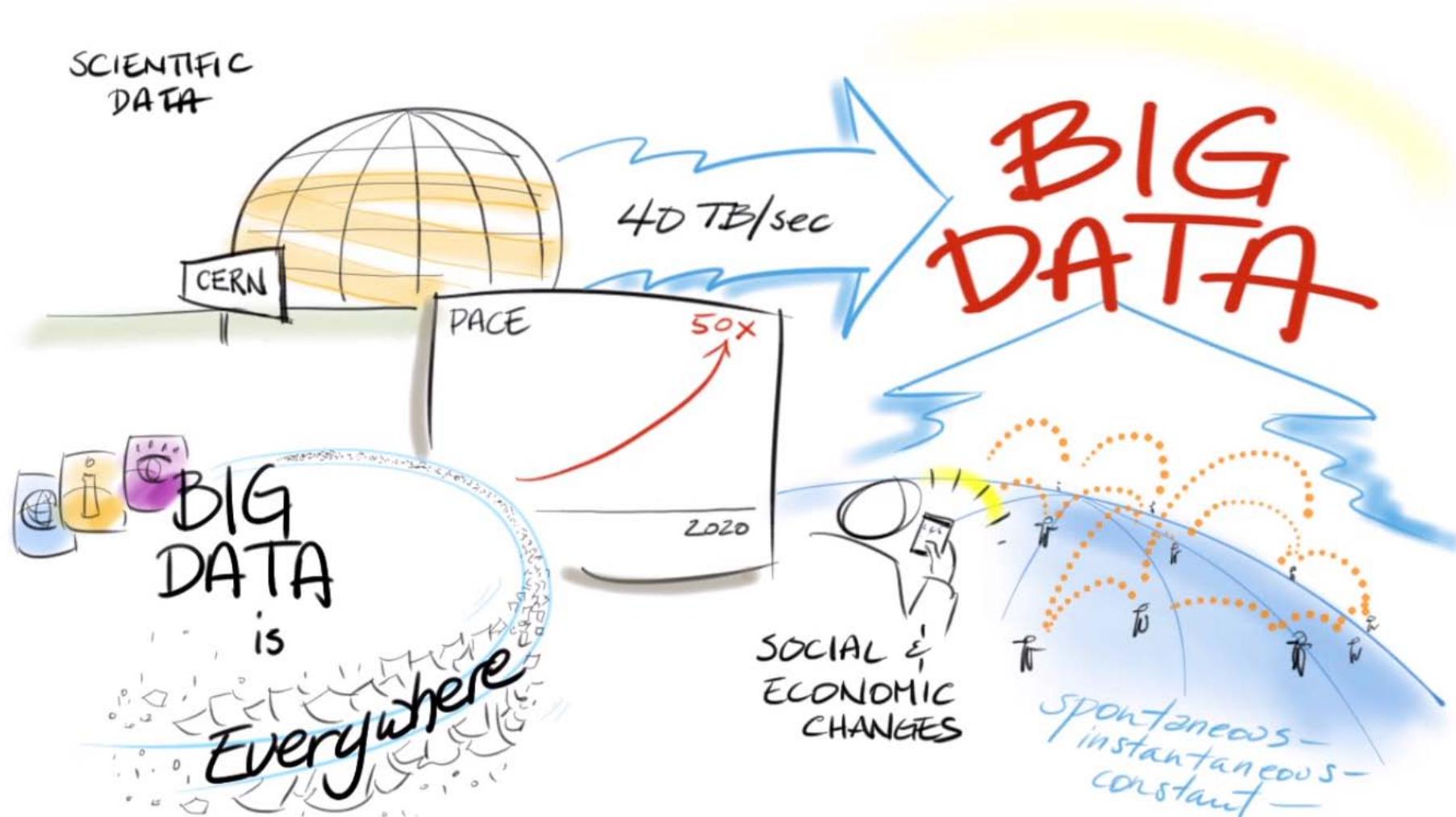
Velocity

Needs to be analyzed **quickly**
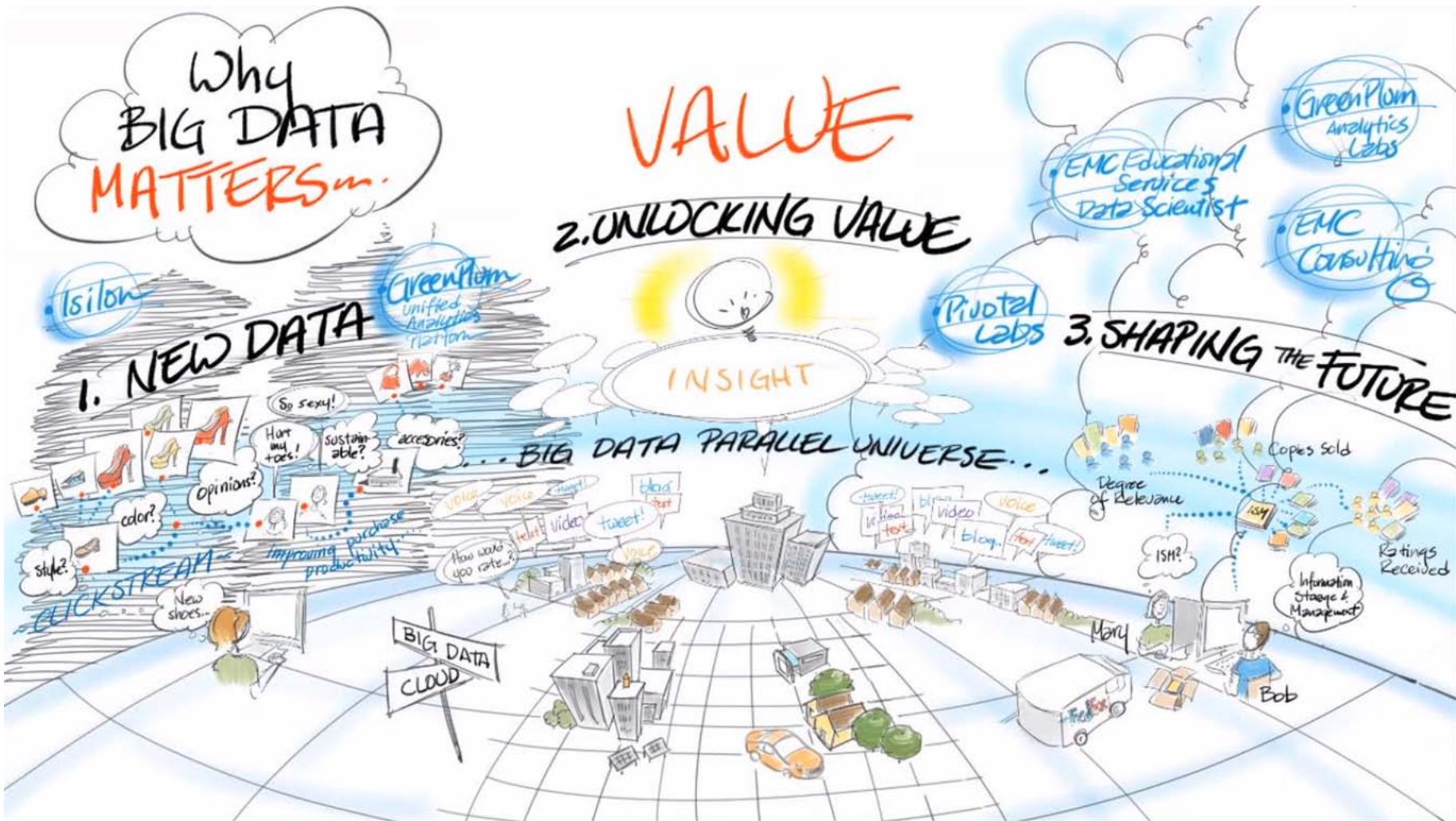
Variety

Different types of structured and unstructured data

Big Ideas: How Big is Big Data?

Big Ideas: Why **Big Data** Matters

# Key questions enterprises are asking about Big Data
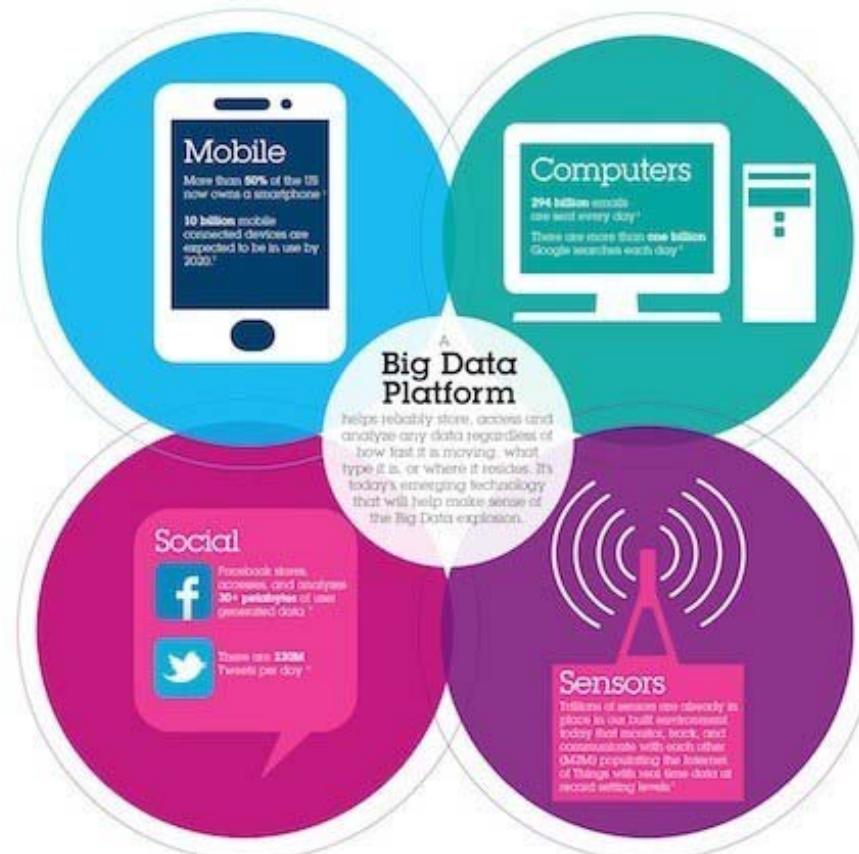
- How to store and protect big data?

- How to backup and restore big data?

- How to organize and catalog the data that you have backed up?

- How to keep costs low while ensuring that all the critical data is available when you need it?

Volumes of Data

- Facebook
  - **30 billion pieces of content** were added to Facebook this past month by 600 million plus users
- Youtube
  - **More than 2 billion videos** were watch on YouTube yesterday
- Twitter
  - **32 billion searches** were performed last month on Twitter

Big Data:
Making the World go Round

Big Data is growing and moving fast from a variety of sources; are you keeping up?
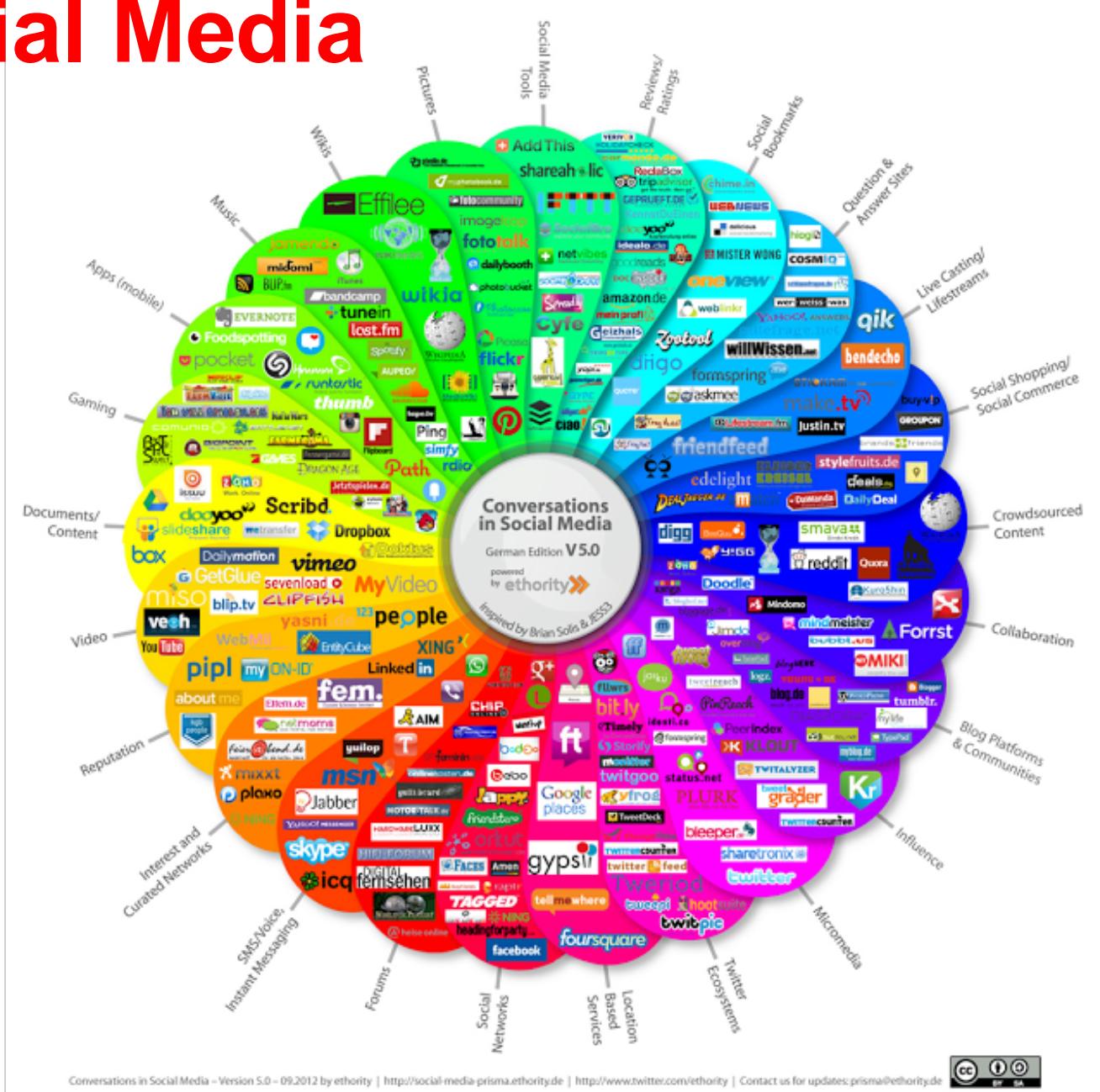
Social Media

Conversations in Social Media – Version 5.0 – 09.2012 by ethority | http://social-media-prisma.ethority.de | http://www.twitter.com/ethority | Contact us for updates: prisma@ethority.de

Source: http://2centsapiece.blogspot.tw/

Big Data Landscape

dave@vcdave.com

blogs.forbes.com/davefeinleib

Source: http://www.forbes.com/sites/davefeinleib/2012/06/19/the-big-data-landscape/

34

Big Data Landscape (Version 2.0)

Infrastructure

NoSQL Databases
10gen, DATASTAX, basho, Couchbase, CLOUDANT, HYPERTABLE, Neo4j, Amazon DynamoDB

NewSQL Databases
MarkLogic, paradigm4, memsql, SQLFire, DRAWNSCALE, VoltDB, nuoDB

Hadoop Related
cloudera, HADAPT, infochimps, Hortonworks, MAPR Technologies, HSTREAMING, Zettaset, MORTAR, IBM InfoSphere BigInsights, Microsoft, GREENPLUM A Division of EMC, amazon, Qubole, sqrrl

MPP Databases
VERTICA An HP Company, kognitio, ParAccel, GREENPLUM A Division of EMC, TERADATA, NETEZZA, InfiniDB, Microsoft SQL Server

Management / Monitoring
OUTER THOUGHT, oceansync, StackIQ

Cluster Services
LexisNexis, HPCC Systems, Acunu

Security
Stormpath, iMPERVA, TRACEVECTOR, codefortytwo software, DATAGUISE

Storage
Cleversafe, panasas, nimblestorage, AMPLIDATA, Compuverde

Crowdsourcing
CROWD COMPUTING SYSTEMS, CrowdFlower, amazon mechanicalturk Artificial Artificial Intelligence

Collection / Transport
aspera, nodeable

Analytics

Analytics Solutions
Palantir, platfora, PERVASIVE, Datameer, KARMASPHERE, DataHero, DIGITAL REASONING, dataspora, PRECOG

Statistical Computing
SKYTREE, p(k) Prior Knowledge, REVOLUTION ANALYTICS, MATLAB, SAS, SPSS

Sentiment Analysis
GENERAL SENTIMENT, crimson hexagon

Location / People / Events
RapLeaf, Fliptop, Recorded Future, PlaceIQ, RADIUS

Real-Time
CONTINUITY, ParStream, feedzai

Data Visualization
Quid, visual.ly, ACTUATE, Kitenga, centrifuge, metaLayer, Ayasdi, ClearStory, tableau, ISS, Quantum4D

Social Media
bit.ly, tracx, simple reach, bluefin, Dataminr

Analytics Services
THiNK BIG ANALYTICS, McKinsey&Company, Mu Sigma, accenture, OPERA

Big Data Search
elasticsearch, Autonomy

IT Analytics
splunk, sumologic

Crowdsourced Analytics
DataKind, kaggle

SMB Analytics
sumAll, RJMetrics, custora

Applications

Ad Optimization
DataXu, aggregate knowledge, m6d, MediaMath, aiMatch, bluekai, rocketfuel, thetradedesk, TURN, 33across

Publisher Tools
VISUAL revenue, Yieldex, yieldbot

Marketing
LATTICE ENGINES, Sailthru, RETENTION SCIENCE, bloomreach, CLICKFOX

Industry Applications
NEXT BIG SOUND, KNEWTON, zestcash, wonga, numberFire, MileSense, BILLGUARD, ClimateSolutions, Bloomberg

Application Service Providers
collective[i]

Data Sources

Data Marketplaces
factual, DataMarket, Windows Azure Marketplace

Data Sources
premise, DATASIFT, knoema, GNIP, infochimps

Personal Data
Withings, BASIS, JAWBONE, RunKeeper, Nike, fitbit

Cross Infrastructure / Analytics
SAP, sas, IBM, Google, ORACLE, Microsoft, vmware, amazon, 1010data, METAMARKETS, TERADATA, Autonomy, NetApp

Open Source Projects

Framework
hadoop MapReduce, HDFS

Query / Data Flow
HIVE

Data Access
mongoDB, Cassandra, SciDB, APACHE HBASE, CouchDB, Sqoop

Coordination / Workflow
ZooKeeper, talend, OOZIE

Real-Time
Storm

Statistical Tools
R, SciPy

Machine Learning
mahout

Cloud Deployment
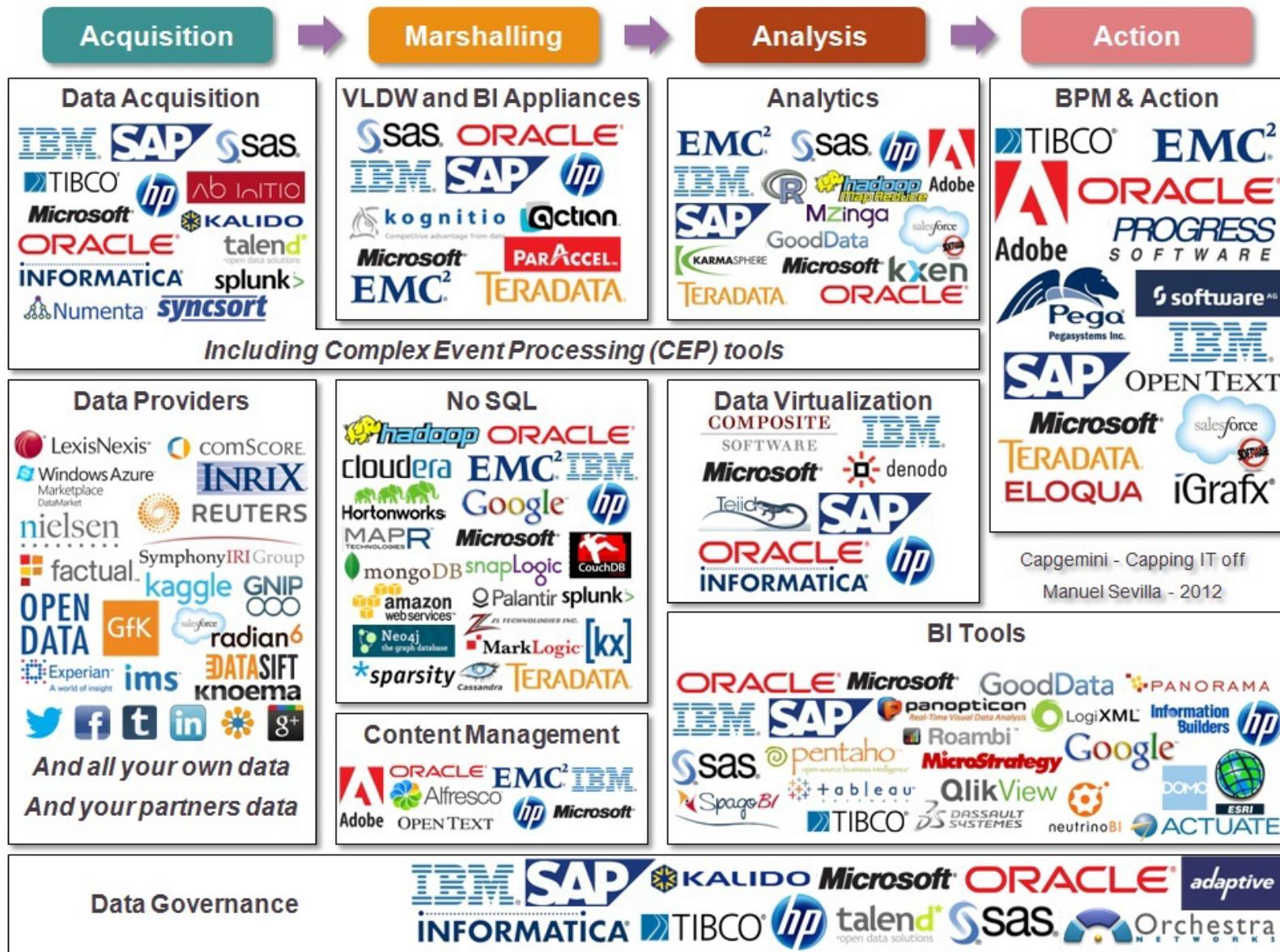
© Matt Turck (@mattturck) and ShivonZilis (@shivonz) Bloomberg Ventures

Source: http://mattturck.com/2012/10/15/a-chart-of-the-big-data-ecosystem-take-2/

35

Big Data Vendors and Technologies

Processing Big Data
Google

Source: http://whatsthebigdata.files.wordpress.com/2013/03/google_datacenter.jpg

Processing Big Data, Facebook

Data Scientist:

The Sexiest Job of the 21st Century

(Davenport & Patil, 2012)(HBR)

Source: Davenport, T. H., & Patil, D. J. (2012). Data Scientist. *Harvard business review*

Data Scientist:
The Sexiest Job of the 21st Century

Meet the people who can coax treasure out of messy, unstructured data.
by Thomas H. Davenport and D.J. Patil

When Jonathan Goldman arrived for work in June 2006 at LinkedIn, the business networking site, the place still felt like a start-up. The company had just under 8 million accounts, and the number was growing quickly as existing members invited their friends and colleagues to join. But users weren't seeking out connections with the people who were already on the site at the rate executives had expected. Something was apparently missing in the social experience. As one LinkedIn manager put it, "It was like arriving at a conference reception and realizing you don't know anyone. So you just stand in the corner sipping your drink—and you probably leave early."

Data Scientist
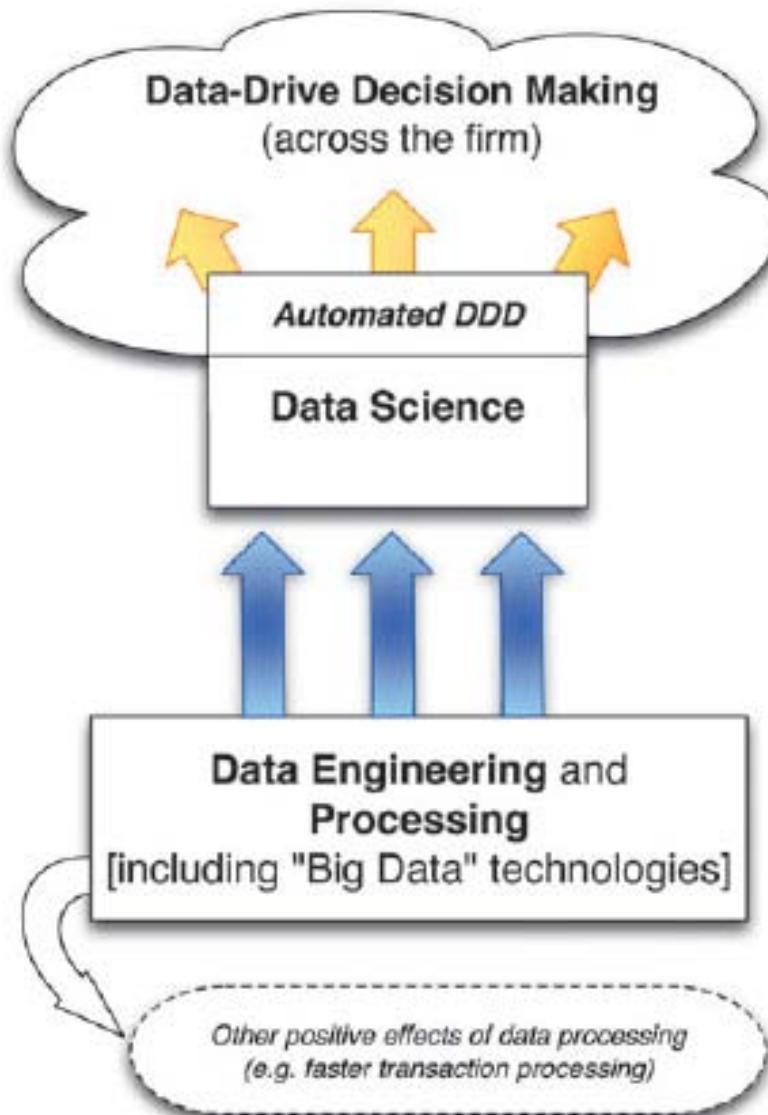
Profile of a Data Scientist

Quantitative · Curious & Creative · Communicative & Collaborative · Skeptical · Technical

41

Data Science

and its Relationship to

Big Data

and

Data-Driven Decision Making

Source: Provost, F., & Fawcett, T. (2013). Data Science and its Relationship to Big Data and Data-Driven Decision Making. *Big Data*, *1*(1), 51-59.

Data science in the organization

Source: Provost, F., & Fawcett, T. (2013). Data Science and its Relationship to Big Data and Data-Driven Decision Making. *Big Data*, *1*(1), 51-59.

Summary

- Business Intelligence Implementation

- Business Intelligence Trends

- Big Data, Big Analytics:
  Emerging Business Intelligence and Analytic Trends for Today's Businesses

References

- Yeoh, W., & Koronios, A. (2010). Critical success factors for business intelligence systems. Journal of computer information systems, 50(3), 23.

- Lim, E. P., Chen, H., & Chen, G. (2013). Business Intelligence and Analytics: Research Directions. *ACM Transactions on Management Information Systems (TMIS)*, *3*(4), 17

- McAfee, A., & Brynjolfsson, E. (2012). Big data: the management revolution. *Harvard business review*.

- Davenport, T. H., & Patil, D. J. (2012). Data Scientist. *Harvard business review*.

- Provost, F., & Fawcett, T. (2013). Data Science and its Relationship to Big Data and Data-Driven Decision Making. *Big Data*, *1*(1), 51-59.

- Thomas H. Davenport,
  Enterprise Analytics: Optimize Performance, Process, and Decisions Through Big Data, FT Press, 2012

- Michael Minelli, Michele Chambers, Ambiga Dhiraj,
  Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses,
  Wiley, 2013

- Viktor Mayer-Schonberger, Kenneth Cukier,
  Big Data: A Revolution That Will Transform How We Live, Work, and Think,
  Eamon Dolan/Houghton Mifflin Harcourt, 2013