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Business ᵘⁿIntelligence:

The Marriage of BI and Big Data

ACM Webinar

17 June 2014

Dr Barry Devlin

Founder & Principal
9sight Consulting

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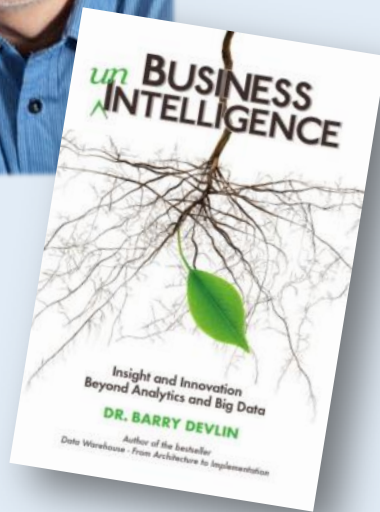- Podcasts with industry leaders/award winners

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- Use the Facebook widget in the bottom panel to share this presentation with friends and colleagues

- Use Twitter widget to Tweet your favorite quotes from today's presentation with hashtag #ACMWebinarBI

- Submit questions and comments via Twitter to @acmeducation – we're reading them!

Dr. Barry Devlin

**Founder and Principal
9sight Consulting, www.9sight.com**

*Dr. Barry Devlin is a founder of the data warehousing industry and among the foremost authorities worldwide on business intelligence (BI) and beyond. He is a widely respected consultant, lecturer and author of the seminal Data Warehouse—from Architecture to Implementation. His new book, **Business unIntelligence—Insight and Innovation Beyond Analytics and Big Data** (http://bit.ly/BunI-Technics) was published in October 2013.*

Barry has 30 years of experience in IT, previously with IBM, as an architect, consultant, manager and software evangelist.

As founder and principal of 9sight Consulting (www.9sight.com), Barry provides strategic consulting and thought-leadership to buyers and vendors of BI solutions. He is currently developing new architectural models for fully consistent business support—from informational to operational and collaborative work.

Email: barry@9sight.com
Twitter: @BarryDevlin

Based in Cape Town, South Africa, Barry's knowledge and expertise are in demand both locally and internationally.

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Opening question:

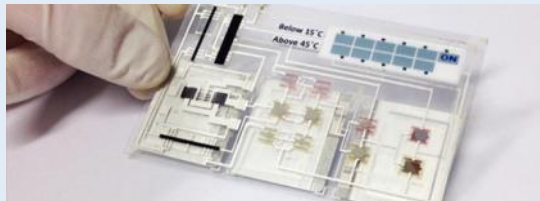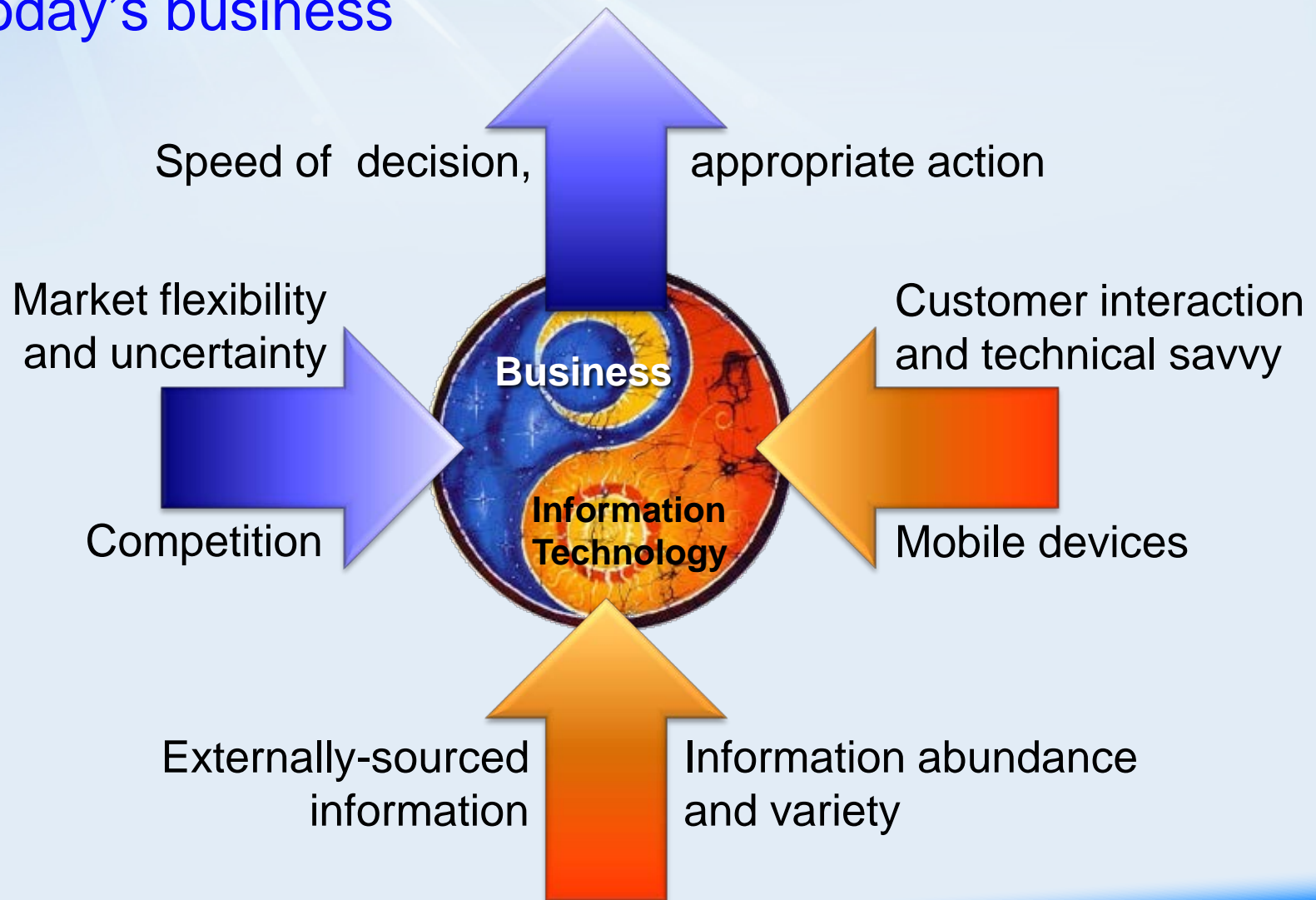So… what real difference does big data make for business?

Big data (and analytics) emerged for business with social media and web logs

- **Understanding and tracking sentiment**
  - What do you think? How do you react?
  - *Basic analytics and BI activity on a new data source*

- **Real-time insight into and influence on website activities**
  - Why did you abandon your cart?
  - What would you most likely buy on getting a cross-sell?
  - *Deep, real-time analytics and BI with operational integration*

The Internet of Things adds urgency for a new positioning of big data, analytics and BI

- **Extends existing processes**
  - Micro-management of supply chains and extension all the way to the consumer
    - *Sourcing and delivery*

- **Creates completely new business models**
  - Often depending on analytics
    - *Motor insurance → encouragement & prevention*
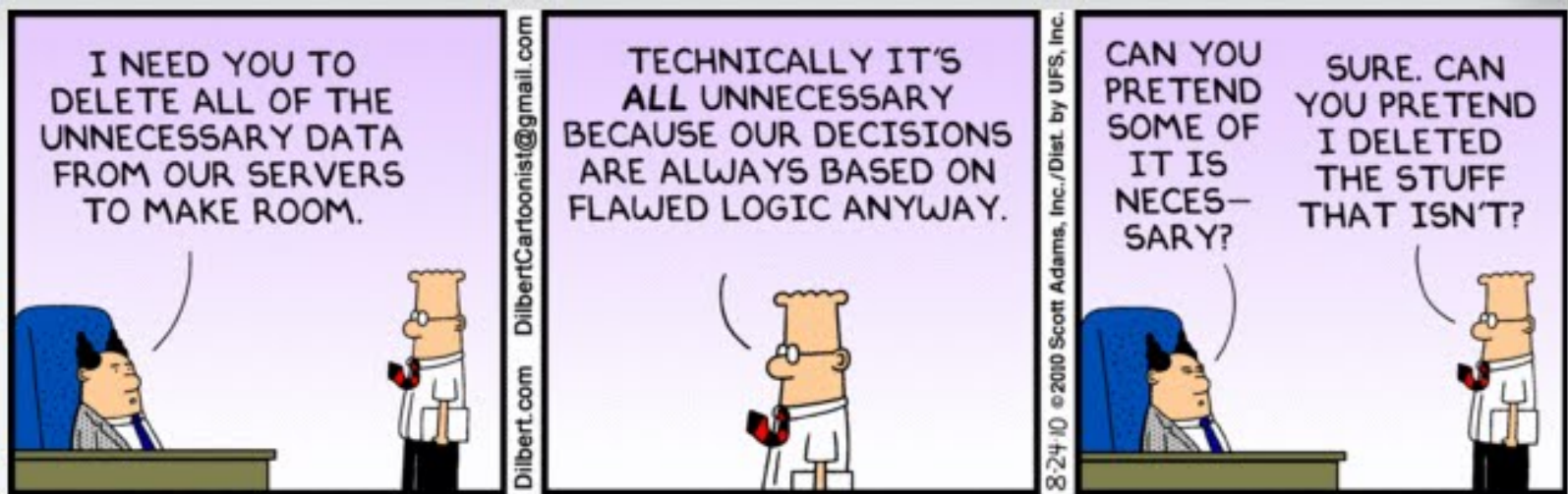   - *Hospital care → health monitoring*

The *biz-tech ecosystem* reflects the complexity of today's business

Speed of decision, appropriate action

Market flexibility and uncertainty

Customer interaction and technical savvy

Business

Information Technology

Competition

Mobile devices

Externally-sourced information

Information abundance and variety

But, let's remember traditional business data…

- Big data and IoT getting all the focus…

- Traditional business processes
  - Data created, managed and used in a structured and regulated way
  - *"Process-mediated data"*

  - The legal basis of business

- Big data and analytics
  - Data gathered from unreliable sources, often designed for unrelated purposes

- Business value of big data depends on linking it to traditional business processes
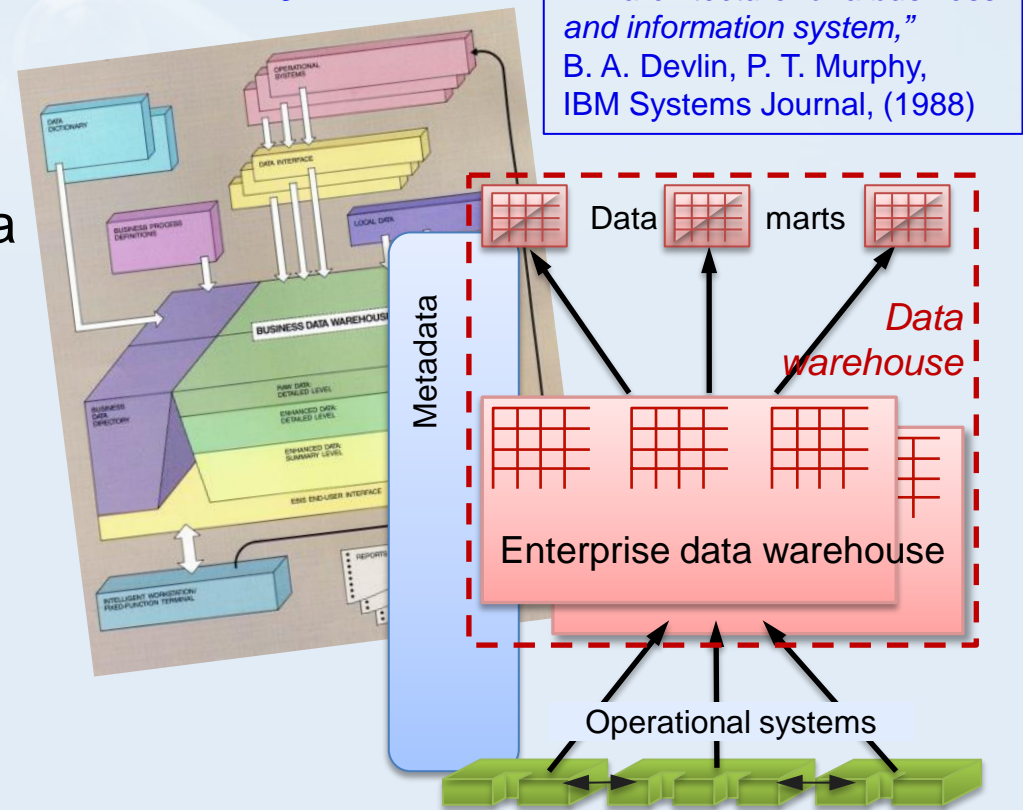
Central question:

How do we marry Big Data and BI for the biz-tech ecosystem?

Process-mediated data is the core of BI and layered Data Warehouse since the early '90s

- **Characteristics**
  - Tactical decision making based on reconciled data
  - Consistency and truth

  - Separation of operational and informational needs
  - Vertical and horizontal segmentation of data
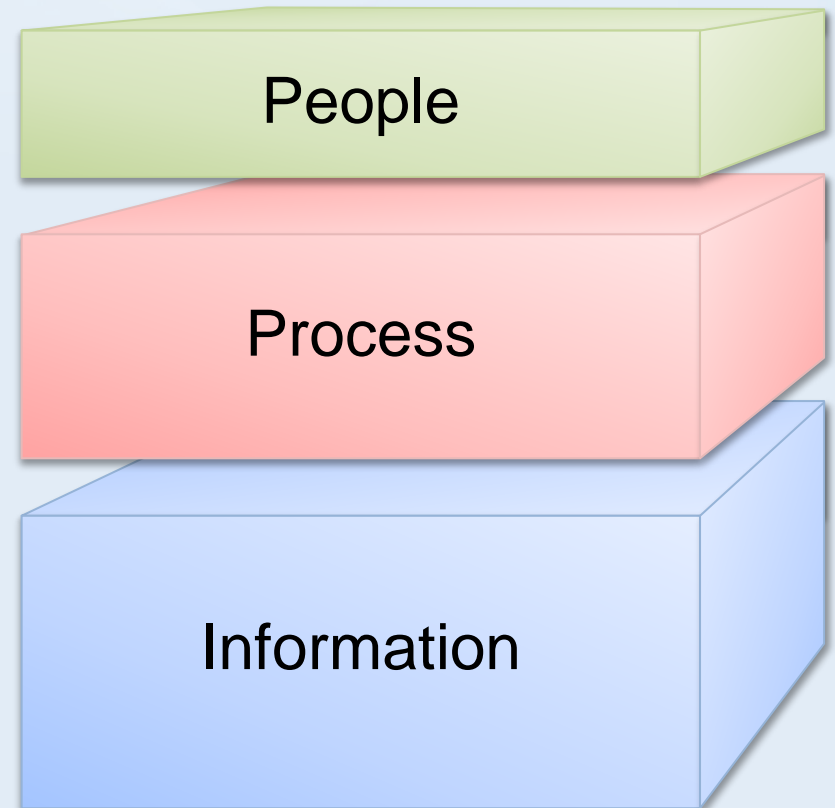 - Unidirectional data flow

- Note: key business needs and technology limitations of the '80s and '90s
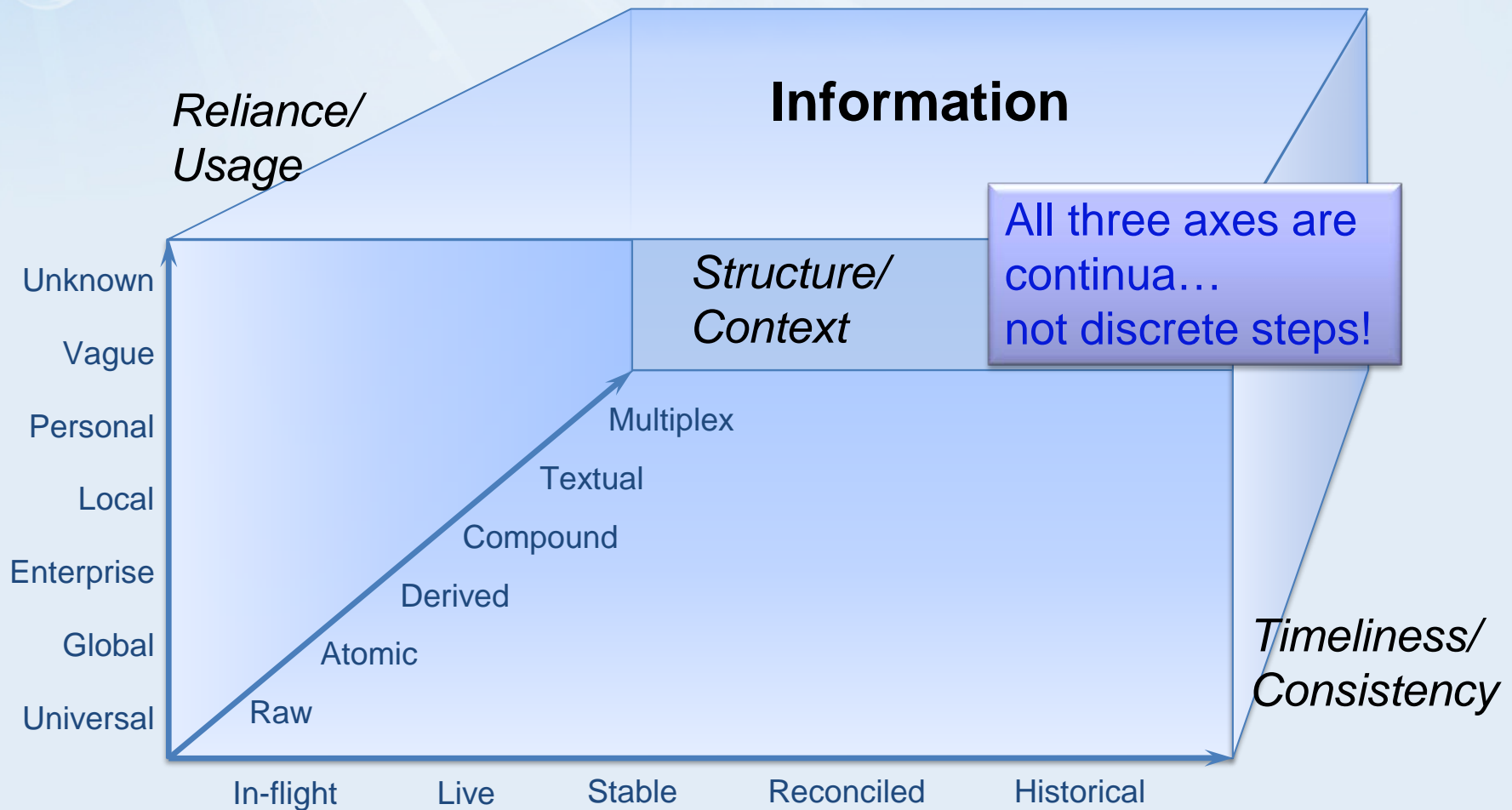
The IDEAL conceptual architecture consists of three logical "thinking spaces"

- Foundation for Business – IT cooperation

- Design the biz-tech ecosystem

- Characteristics
  - *Integrated*
  - *Distributed*
  - *Emergent*
  - *Adaptive*
  - *Latent*

- Also read as a story: *People process information*

People

Process

Information

Each space has three axes. The information space contains *all* information used by the business.

Information

Reliance/ Usage

Structure/ Context

All three axes are continua…
not discrete steps!

Unknown
Vague
Personal
Local
Enterprise
Global
Universal

Multiplex
Textual
Compound
Derived
Atomic
Raw

Timeliness/ Consistency

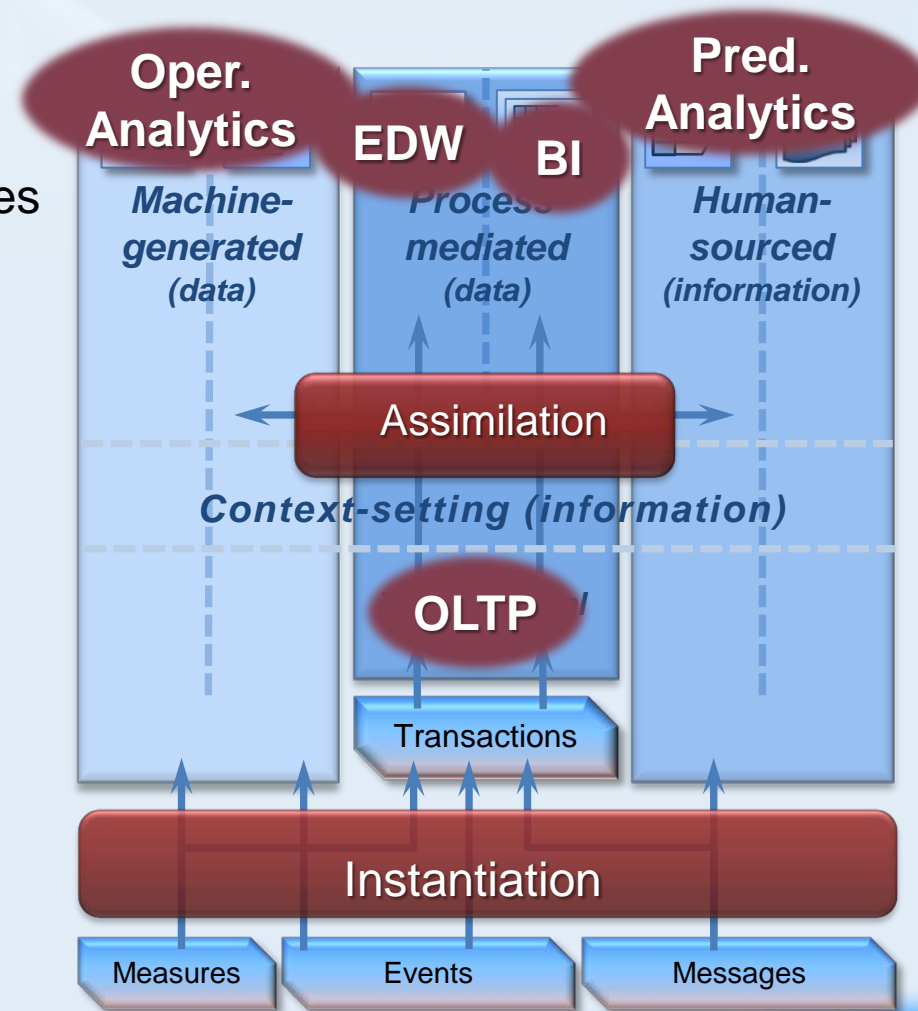In-flight   Live   Stable   Reconciled   Historical

The logical, REAL architecture: information pillars and supporting function.

- Single architecture for all types of data/information
  - Mix/match technology as needed
  - Relational, NoSQL, Hadoop, etc.

- Integration of sources and stores
  - Instantiation gathers measures, events, messages and transactions
  - Assimilation integrates stored info.
  - Reification virtualizes access

- Data flows as fast as needed and reconciled when necessary
  - No unnecessary storage or transformations
  - (Contrast layered data architecture)
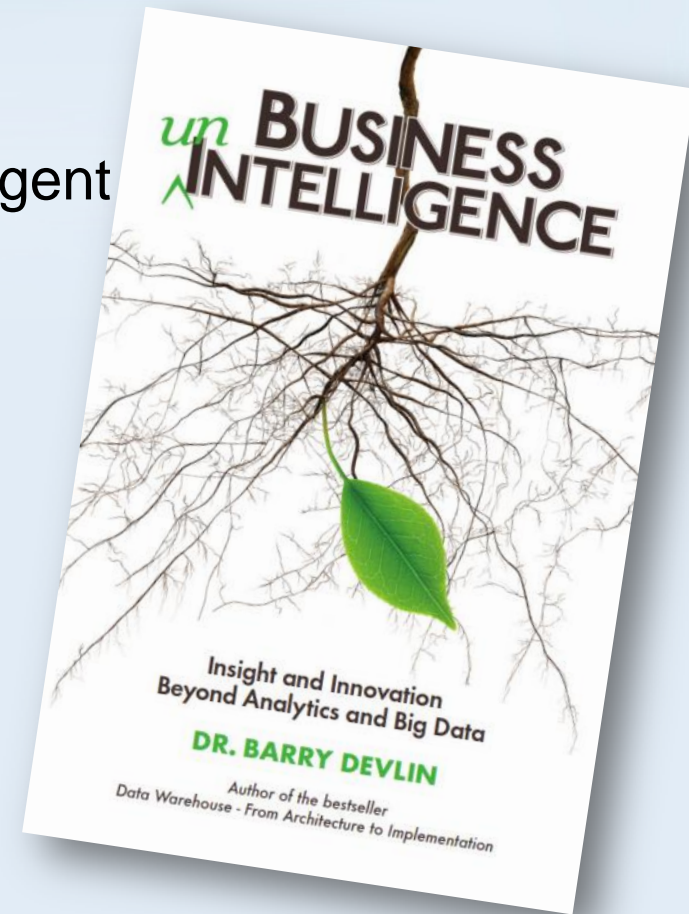

Reification

Machine-generated (data) *Process-mediated (data)* *Human-sourced (information)*

Assimilation

Context-setting (information)

Transactional (data)

Transactions

Instantiation

Measures   Events   Messages

Information pillars can be mapped to today's BI and analytics tools and environments.

- **Process-mediated** data
  - Traditional computing
  - Via data entry, cleansing processes
  - *Relational databases*

- **Machine-generated** data
  - Output of machines and sensors
  - The Internet of Things
  - *NoSQL, Streaming, (RDBMS)*

- **Human-sourced** information
  - Subjectively interpreted record of personal experiences
  - From Tweets to Videos
  - *Hadoop, Enterprise Content Management*

Oper. Analytics   **EDW**   **BI**   **Pred. Analytics**

Machine-generated (data)   *Process-mediated (data)*   *Human-sourced (information)*

Assimilation

Context-setting (information)

OLTP

Transactions

Instantiation

Measures   Events   Messages

From BI to Business unIntelligence

- Rationality of thought and far beyond it

- Logic of process, predefined and emergent

- Information, knowledge and meaning

- The confluence of
  - Reason and inspiration
  - Emotion and intention
  - Collaboration and competition
  - All that comprises the human and social milieu that is business

- Not business intelligence

- Business unIntelligence

- http://bit.ly/BunI-Technics : 25% discount with code "BIInsights25"

Closing question:

What are the dangers in the marriage of BI and big data?

The demise of metadata…
and the rise of meaning and context

- Metadata is two four-letter words!
  - Information (not data)
  - Describes all "stuff" (not just data)
  - Indistinguishable from "business information" by non-IT people (and some IT people)
  - Many (or most) metadata projects fail

What was the most expensive metadata error in history?

- The NSA popularize and repurpose metadata
  - "It's not (personal) information…so, we can collect it"
  - How ironic!

- We need to return to basic ground:
  - From business **meaning** to information collected and used
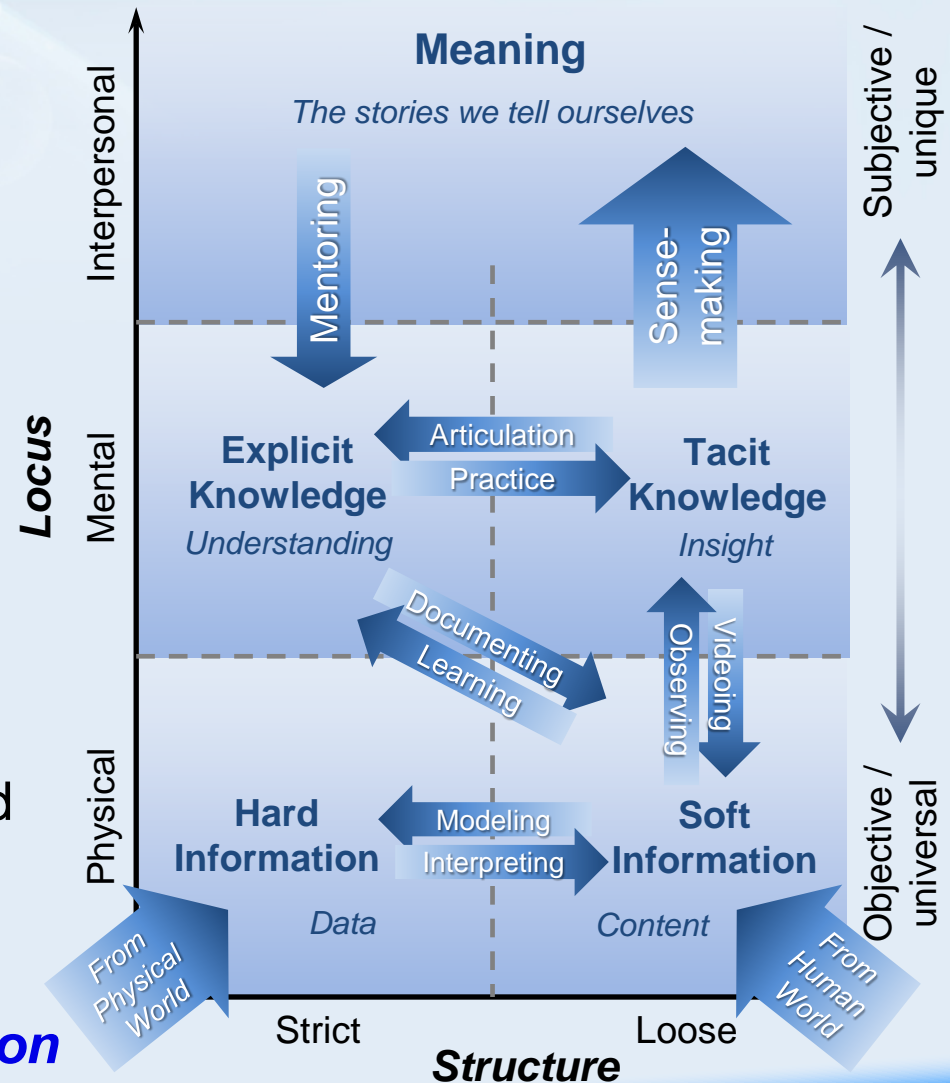 - From data stored to **context** understood

Introducing m³: The modern meaning model

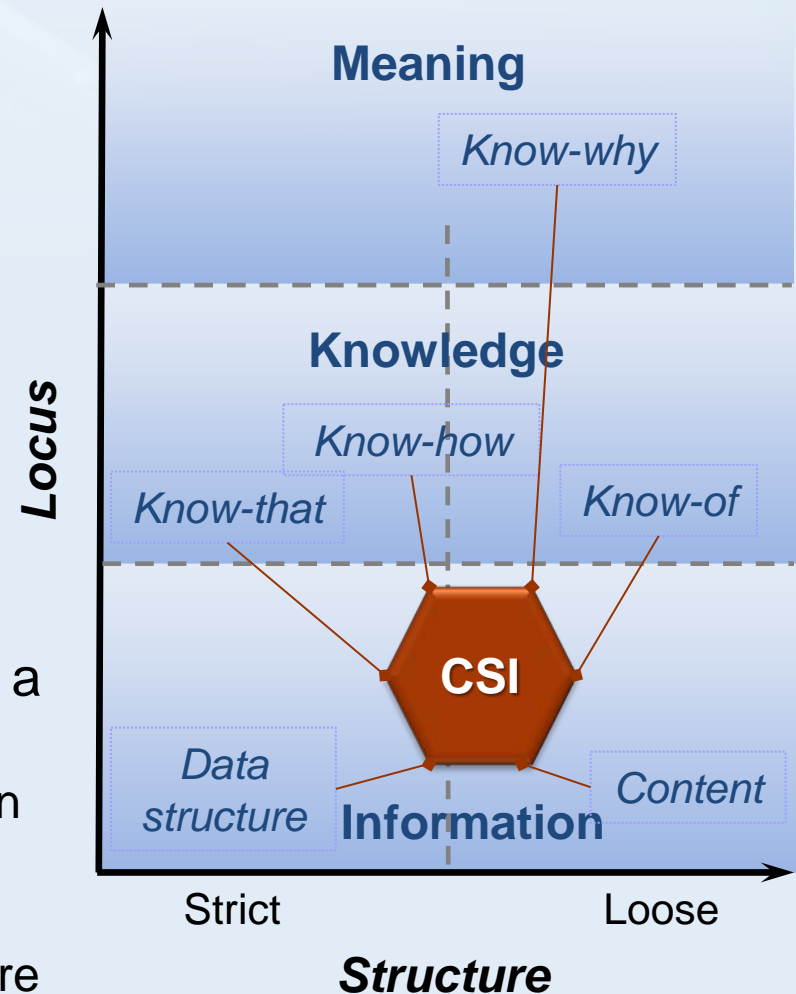- **Ackoff's DIKW pyramid is no longer viable**

- **Information precedes data**
  - Data is simply information optimized for computers
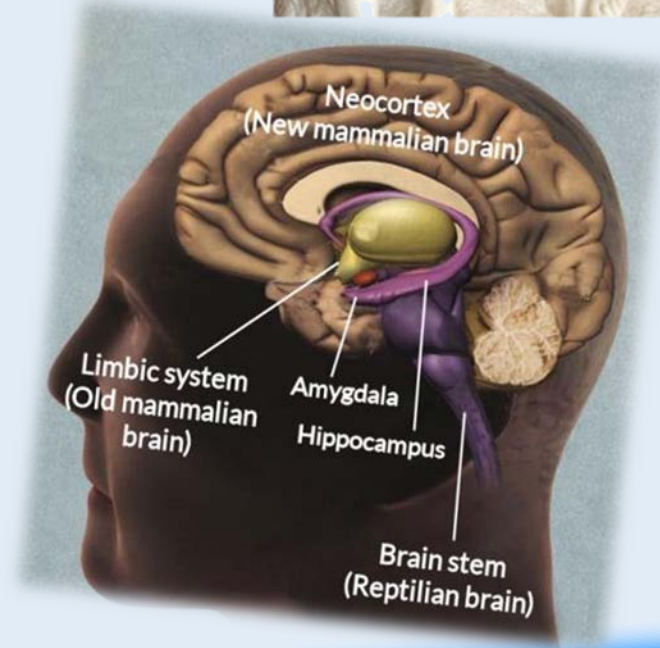 - The Web has fully devalued "facts"

  - ***People process information***

The m³ diagram contains the following labels:

- Vertical axis (left): **Locus** — Interpersonal, Mental, Physical
- Vertical axis (right): Subjective / unique — Objective / universal
- Horizontal axis: **Structure** — Strict, Loose

- **Meaning** — *The stories we tell ourselves*
- Mentoring, Sense-making
- **Explicit Knowledge** *Understanding* — Articulation / Practice — **Tacit Knowledge** *Insight*
- Documenting / Learning, Videoing / Observing
- **Hard Information** *Data* — Modeling / Interpreting — **Soft Information** *Content*
- From Physical World, From Human World

Context-setting information (CSI) reimages metadata

- **Describes (in physical form) what everything is and does**

- **Provides the background to:**
  - Each piece of information / data
  - Every process component
  - All the people
  - That constitute the business

- **Every piece of information adds context to something else**

- **All information is context setting to a greater or lesser extent**
  - CSI collected with other information (no separate project)
  - CSI stored as part of the larger information resource (separate store only for technology performance)
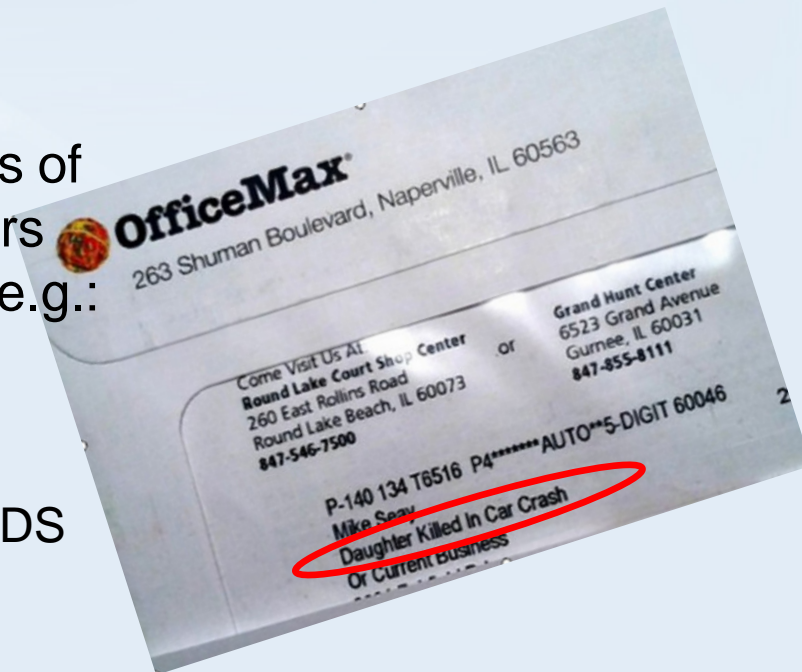
Meaning

Know-why

Knowledge

Know-how

Know-that *Know-of*

CSI

Data structure **Information** *Content*

Locus

Strict Loose

Structure

The human and social dimension: Gut-feel, intent and interaction

- Meaning is a personal/social interpretation based *(loosely)* on information and knowledge
  - Rationality is only one part
  - Emotional state plays an important role
  - Gut-feel can be more effective than rationality in decision making

- We are social animals
  - Business is a social enterprise

- Innovation is often team-based

- Intention drives understanding and action

Neocortex (New mammalian brain)
Limbic system (Old mammalian brain)
Amygdala
Hippocampus
Brain stem (Reptilian brain)

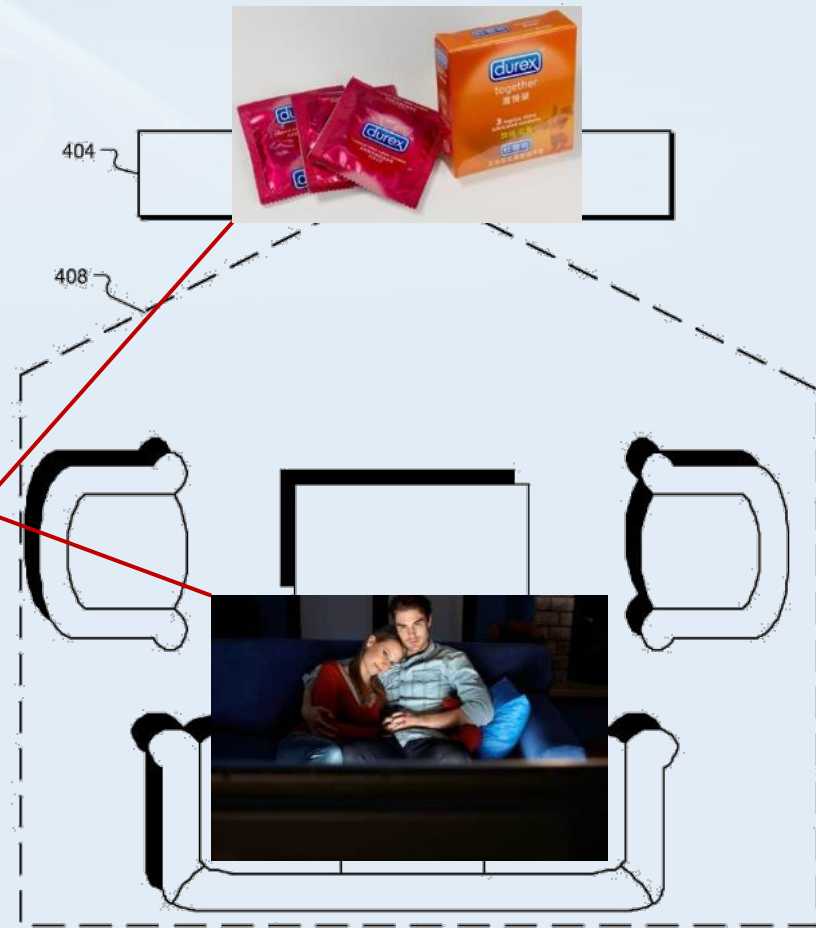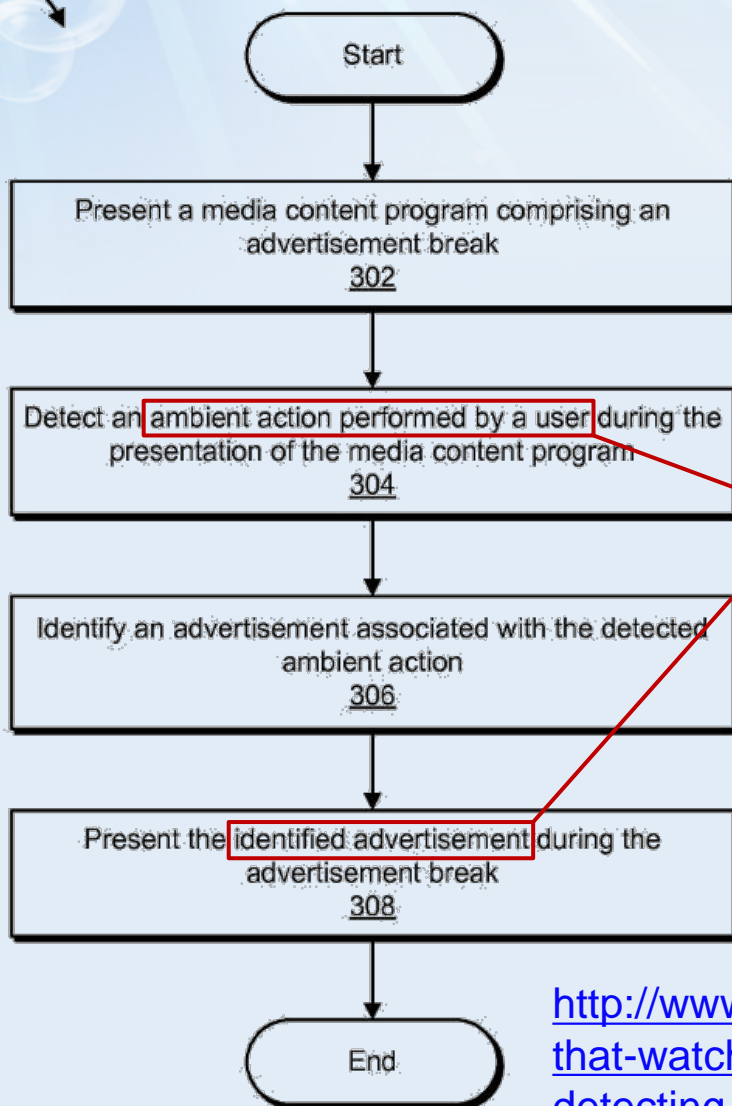# Analytics of human-sourced information drives serious privacy breaches

- Data brokers now gathering thousands of measurable attributes about consumers (people) and creating marketing lists, e.g.:
  - Police officers at home addresses
  - Rape sufferers
  - Domestic violence shelters
  - Genetic disease, dementia and HIV/AIDS sufferers
  - People with addictive behavior

- Scoring used to discriminate (target market)
  - *(Pam Dixon, Executive Director, World Privacy Forum, before US Senate Committee, Dec 2013)*
  - http://www.commerce.senate.gov/public/?a=Files.Serve&File_id=e290bd4e-66e4-42ad-94c5-fcd4f9987781

The Internet of Things is more invasive. First…invasion of the data snatchers

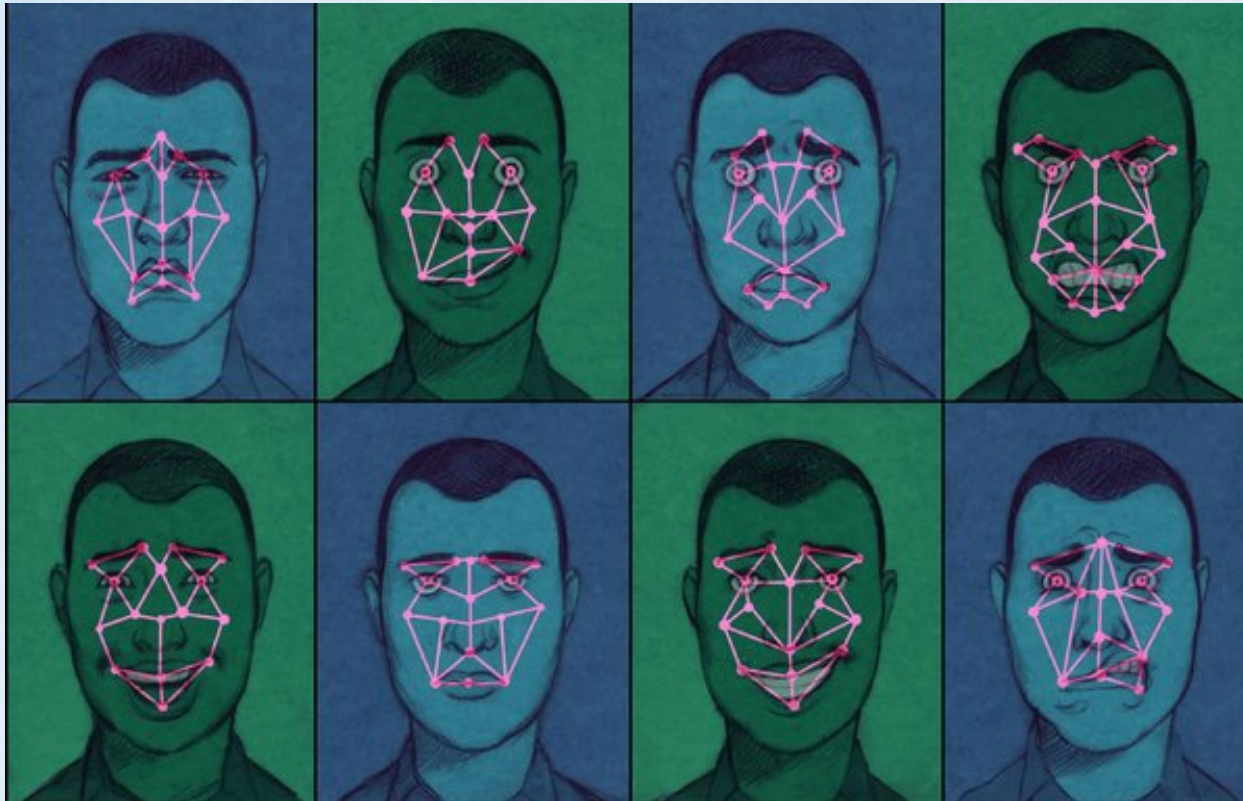http://doctorbeet.blogspot.co.uk/2013/11/lg-smart-tvs-logging-usb-filenames-and.html

Then…invasion of the information snatchers

Start

Present a media content program comprising an advertisement break
302

Detect an ambient action performed by a user during the presentation of the media content program
304

Identify an advertisement associated with the detected ambient action
306

Present the identified advertisement during the advertisement break
308

End

404

408

http://www.techdirt.com/articles/20121205/20395521250/dvr-that-watches-you-back-verizon-applies-ambient-action-detecting-device-patent.shtml

Finally…invasion of the thought snatchers

Koren Shadmi for The New York Times

When Algorithms Grow Accustomed to Your Face,
New York Times, November 30, 2013. By Anne Eisenberg,
http://www.nytimes.com/2013/12/01/technology/when-algorithms-grow-accustomed-to-your-face.html

Conclusions

1. **Big data extends BI (and operations)**
   - Faster, future and statistical
   - Driving the biz-tech ecosystem

2. **Business unIntelligence: a new model**
   - IDEAL and REAL architectures
   - Inclusive of **all** information and data

3. **Beware the death of democracy**
   - Erosion of privacy
   - End of anonymity

Thank you!

Questions?

Additional resources

- All articles and white papers available at: http://bit.ly/9sight_papers

- Blogs at: http://bit.ly/BD_Blog

- Follow me on Twitter: @BarryDevlin

Dr Barry Devlin

Founder & Principal
9sight Consulting

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- ACM Tech Pack on Business Intelligence and Data Management: http://techpack.acm.org/bi/.