Infonomics: The Economics of Information and Principles of Information Asset Management

ABSTRACT

Information increasingly is the stuff of our capitalistic cosmos that affects the orbits of so many enterprises. Just because data may be the dark matter that permeates the economy, that shouldn’t stop us from trying to formally measure it and manage it. Imagine any enterprise unable to account for its inventory of finished goods and materials. Yet, this is the unfortunate circumstance for organizations that traffic in or heavily leverage information. Established financial standards and econometric methods fail to enable quantifying this increasingly ubiquitous and admittedly amorphous class of asset. Until they do, or perhaps as a harbinger, this session will illustrate several methods enterprises can and should be using today to formally account for the value of their information assets.

BIOGRAPHY

Doug Laney
Eminence Lead, Deloitte Analytics Institute
Deloitte Consulting LLP

Doug currently heads thought leadership and marketing for the Deloitte Analytics Institute. Previously he launched and ran the enterprise analytics strategies research and advisory service for the IT analyst firm META Group (now part of Gartner). In this role he advised hundreds of organizations around the world, published over 100 articles and was a regular speaker at industry events on topics from information management to business intelligence. Doug is also considered one of the pioneers in the field of data warehousing, and is an analytic solution innovator. He led the development of the industry's first commercial data warehouse project methodology (still in use worldwide today), and developed ground-breaking methods for online, collaborative, self-service research and benchmarking. More recently, Doug has been asked to join the faculty of the Data Warehouse Institute and teaches a course on applying traditional asset management and valuation principles to information assets.
Infonomics: The economics of information and principles of information asset management

MIT Information Quality Industry Symposium

Doug Laney
Deloitte Analytics Institute
Deloitte Consulting LLP

About the Speaker

• Heads thought leadership, research and marketing with the Deloitte Analytics Institute—a function within Deloitte Consulting LLP to enhance the firm’s global business analytics go-to-market capabilities.

• Formed and led META Group’s (now part of Gartner) enterprise analytic strategies research and advisory practice. Authored 100+ articles and research pieces, and spoke now-and-again.

• Developed the data warehouse industry’s first commercial project methodology, ITERATIONS®, while leading Prism Solutions’ (now part of IBM) US and Asia-Pacific data warehouse consulting practice.

• Publishes primarily on Deloitte’s RealAnalytics LinkedIn group, @DeloitteBA on Twitter, and Deloitte’s Real Analytics site.

• Contact Doug at douglaney@deloitte.com
Who cares about information?

Information is one of our biggest business assets.

Information is one of our biggest business risks.

Information is one of our biggest competitive assets.

Information is one of our biggest problems.

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.
Where are information assets on the balance sheet?

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

So is information really an asset?

- It is not on the balance sheet.
- You can't account for it because it is so amorphous.
- It is not really consumable like other assets.

- It can have an exchange value.
- It can generate a positive economic value.
- Well, we could count/measure it, but how?
Beyond the balance sheet: Other kinds of assets

Stuff businesses manage

FINANCIAL  MATERIAL  HUMAN  INTEL PROP  INFORMATION

How do we manage these assets?

What we do to these assets

• Collect  • Prepare  • Combine  • Enrich
• Produce  • Inventory  • Locate  • Secure
• Organize  • Distribute  • Govern  • Monitor
How do we leverage these assets?

What we do with these assets

• Sell
• Spend
• Lend
• Trade
• Share
• Apply

The asset lifecycle

Asset Consumption
(value realization)

• Sell
• Spend
• Lend
• Trade
• Share
• Apply

Asset Management
(value augmentation)

• Collect
• Produce
• Prepare
• Combine
• Enrich
• Organize
• Inventory
• Distribute
• Locate
• Secure
• Govern
• Monitor

ENTERPRISE
ASSET
PORTFOLIO
The information supply chain

Application

How is information providing business benefit

Administration

What are we doing to add value to the information

Acquisition

Where are we getting information from

The information supply chain (cont.)

Application

Assess

Describe

Generate

Store

Rent

Deliver

Access

Alert

Trade

Sell

Inventory

Deduplicate

Integrate

Profile

Replicate

Organize

Update

Encrypt

Delete

Tag

Backup

Refresh

Transform

Observe

Transmit

Analyze

Lend

Tag

Index

Update

Transmit

Alert

Retrieve

Store

Sell

Describe

Deduplicate

Integrate

Replicate

Encrypt

Transform

Assess

Inventory

Profile

Delete

Observe

Access

Alert

Lend

Transmit

Analyze

Assess

Inventory

Profile

Encrypt

Transform

Delete

Observe

Access

Alert

Lend

Transmit

Analyze

Transmit

Alert

Retrieve

Store

Sell

Describe

Deduplicate

Integrate

Replicate

Encrypt

Transform

Assess

Inventory

Profile

Delete

Observe

Access

Alert

Lend

Transmit

Analyze


Why worry about information’s value?

Business reasons:

• Determining the relative effectiveness of various information assets on the business
• Determining what investments to make in information and information management solutions
• Improving company valuation premiums
• Including information as an asset in secured lending
• Reducing the risk of undesirable or illegal information exposure

Why worry about information’s value? (cont.)

Accounting reasons:

• Information is meets the definition of an asset
• Information has a probability of generating future value
• Information is distinct from financial and material assets
• Compliance with Financial Accounting Standards for measuring intangible assets
A brief history of accounting innovation

- 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

- 563 BC - Luca Pacioli: Father of Accounting
  Codifies double-entry accounting methods

- 1494 - A Venetian merchant codifies double-entry accounting methods

- 1953 - Arthur Andersen computerizes the payroll of a GE plant

- 1958-59 - SEC-chartered committee standardizes financial statements

- 1972 - Dan Brinklin 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

How to establish an asset’s economic value

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Information asset implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market approach</td>
<td>What the market will bear for selling this asset? Requires an active arm's-length marketplace and a salable asset.</td>
<td>Is there an active marketplace for given types of information assets? Perhaps so for publicly captured information or customer lists. Most of our information assets are not legally saleable.</td>
</tr>
<tr>
<td>Income approach</td>
<td>What income stream this asset will generate? Often requires an alternative for comparison.</td>
<td>How can any unit or portfolio of information be ascribed to a business function that generates an income stream if it is not directly sold?</td>
</tr>
<tr>
<td>Cost approach</td>
<td>What will it cost to replace this asset if lost? Requires that this asset can be replaced somehow.</td>
<td>What was (would be) the cost to generate, capture, or otherwise reacquire that information? This requires that all units of information are assumed to have a (probable) economic benefit.</td>
</tr>
</tbody>
</table>
Factors affecting an information asset’s utility and ultimately its economic value

<table>
<thead>
<tr>
<th>Objective factors</th>
<th>Subjective factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>Relevance</td>
</tr>
<tr>
<td>The data accurately represents reality or a verifiable source.</td>
<td>The data is applicable to one or more business processes or decisions.</td>
</tr>
<tr>
<td>Integrity</td>
<td>Usability</td>
</tr>
<tr>
<td>Appropriate links and relationships exist among data.</td>
<td>Business process(es) and/or individuals understand and are able to leverage this data.</td>
</tr>
<tr>
<td>Consistency</td>
<td>Believability</td>
</tr>
<tr>
<td>Each type of data has a single representation</td>
<td>Data is deemed credible by those using it.</td>
</tr>
<tr>
<td>Completeness</td>
<td>Clarity</td>
</tr>
<tr>
<td>Records are not missing fields. Data sets are not missing instances.</td>
<td>Data has a unique meaning and can be easily comprehended.</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Objectivity</td>
</tr>
<tr>
<td>Data is easily retrieved and/or integrated into business processes.</td>
<td>Data is unbiased and impartial and not depend on the judgment, interpretation, or evaluation of individuals.</td>
</tr>
<tr>
<td>Precision</td>
<td>Scarcity</td>
</tr>
<tr>
<td>Data is recorded with the precision required by the business.</td>
<td>Is the data proprietary, secret, and difficult to come by?</td>
</tr>
<tr>
<td>Timeliness</td>
<td></td>
</tr>
<tr>
<td>Data is updated with sufficient frequency to meet the business requirements.</td>
<td></td>
</tr>
</tbody>
</table>

Information asset valuation: What can be counted?

Information-related characteristics
- Quality features (completeness, accuracy, etc.)
- Relevance (its bearing on a process, uniqueness)
- Timeliness (accessibility, currency)

Information-related costs
- Cost to acquire it
- Cost to administer it
- Cost to apply it
- Revenue lost if we don’t have it

Information-related benefits
- Process/function performance gain
- Revenue/margin contribution
**Information asset valuation:**

Method 1: Intrinsic Value of Information

How good and easy to use is the data versus how likely are others outside the organization to have it also? This the presumptive value of information, enabling apples-to-oranges comparisons.

\[
IVI = \frac{\text{Accuracy} \times \text{Completeness} \times \text{Accessibility}}{\text{Uniquity}}
\]

**Variations**
- Include other objective or subjective measures
- Consider record and/or data set completeness
- Assume latency (timeliness) is a given

**Information asset valuation:**

Method 2: Business Value of Information (BVI)

The value of information to a business process: How good is the data? 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?

\[
BVI = \frac{\text{Accuracy} \times \text{Completeness} \times \text{Relevance}}{\text{Latency}}
\]

**Variations**
- Include other objective or subjective measures
- Weight information measures as appropriate
- Assume latency (timeliness) is a given
Information asset valuation: Method 3: Loss Value of Information (LVI)

The cost of not having information: What would it cost to replace the data, and what is the financial impact to the business if the data were lost over a time period (t)?

\[
LVI = \text{Acquisition Cost} + \sum_{3}^{t} \text{Lost Revenue}
\]

Variations
- Include cost of down-time for other assets until information is replaced or assets can be re-deployed
- Include a factor for making up revenue shortfall in other ways over time

Information asset valuation: Method 4: Performance Value of Information (PVI)

Value of information to business objectives, represented as key performance indicator (KPI) targets: How much does having a unit of information incrementally contribute to moving closer toward all n KPI targets over a given period?

\[
PVI = \sum_{1}^{n} (\delta KPI(i)_{n} - \delta KPI(C)_{n})
\]

Where:
- \(i\) = influenced
- \(C\) = control

Variations
- Compute financial KPIs to determine economic value of information
- Run what-if experiments instead
- Change data factors to see what happens
- Use historical results as a control group if other factors and constant
Information asset valuation:
Method 5: Economic Value of Information (EVI)

The bottom-line financial value for the information asset: The Performance Value of Information (PVI) for a revenue metric, less the cost of acquiring, administering, and applying the information.

\[ EVI = PVI - (\text{AcquisitionCost} + \text{AdministrationCost} + \text{ApplicationCost}) \]

Assumptions
• Consider that information acquisition, admin and application costs may be shared with other types of information
• Be sure to share costs across PVI time periods

Information asset valuation:
Method 6: Market Value of Information (MVI)

The income that can be generated by selling, renting or bartering with this information. How much is a business partner (p) willing to pay for access to this information?

\[ MVI - \sum_p \text{RevenuePrice} + \text{DiscountRate} \]

Variation
• Include a discount for the time-value of information
• Subtract the sales, preparation, packaging, and delivery costs to achieve a net value
Infonomics: Key Takeaways and Recommendations

- Idle information is an expense; leveraged information is an asset.
- Look to your own organization’s supply chain and material/financial/human asset management practices. Encourage adopting and adapting them for information asset management.
- Periodically benchmark your own information management capabilities along a continuum of characteristics. Set a course for improvement.

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