Creating Value with Big Data Analytics

Peter Verhoef, Edwin Kooge & Natasha Walk

14 September, 2016
Introduction: Edwin Kooge

Edwin Kooge (1968)

Passion for pragmatic high impact with Analytics

Marketing at the Rijksuniversiteit Groningen, 1986 – 1992

Working since 1992 in the field of Database Analysis, Customer/Marketing Intelligence

Co-founder of MIcompany, a Dutch Marketing Intelligence consultancy, (45 FTE’s, founded in 2006) and sold his share in 2013

Co-founder of MetrixLab Big Data Analytics since 2014.

Mission statement: helping our clients to integrate survey, social media & CRM data for value creation

Metrixlab Macromill
Een wereldwijde speler!

27 kantoren en meer dan 1.500 medewerkers!

US
San Francisco
Miami
Chicago
Cincinnati
Denver
Minneapolis
New York

EUROPE
Amsterdam
Hamburg
London
Madrid
Paris
Rotterdam

JAPAN
Tokyo
Kawasaki
Osaka
Nagoya
Sendai
Seoul

Mexico City
Sao Paulo
Hyderabad
Shanghai
Singapore
My journey through the decades……

1980 – 1995
Analyzing with zip-code and lifestyle data

1995 – 2000
Analyzing on internal transaction data and marketing-databases

2000– 2007
Marketing Intelligence to support marketing decisions

2007– 2013
Identifying growth opportunities for companies using analytics

2014 – …
Getting value from Big data by data integration and using analytics
Big Data Major Development for Business

Incremental annual GDP by 2020 ($ billion)

- Energy: 380-690
- Trade: 200-590
- Big data: 155-325
- Infrastructure: 270-320
- Talent: 165-265

(ADAPTED FROM: MCKINSEY GLOBAL INSTITUTE, 2013)
Big data just another management Fad

“Big Data is Bullshit”

Financieel Dagblad 7/10/2013

From time to time, you still come across someone with the opinion that Big Data is nothing more than a fad, which will be forgotten about soon enough.

You might not expect to hear this from me, but they're actually right. Well—half right, at least!

As I've written before, I'm not actually a fan of the term “Big Data”, which puts overemphasis on the importance of size. Anyone who's been reading my articles for a while will know that I'm firmly of the opinion that what you do with your data is far more important than how big it is.

And I am sure as more people realize this— as working with extremely large datasets increasingly becomes the norm, rather than something new and exciting—the term “Big Data” may indeed fall out of use.
BIG data is geen BIG bang!
Creating Value with Big Data Analytics offers a uniquely comprehensive and well-grounded examination of one of the most critically important topics in marketing today. With a strong customer focus, it provides rich, practical guidelines, frameworks and insights on how big data can truly create value for a firm.

Kevin Lane Keller, Tuck School of Business, Dartmouth College, USA

Creating Value with Big Data Analytics is a timely and thought-provoking book that should be on a must-read list of anyone interested in Big Data.
Sunil Gupta, Edward W. Carter Professor of Business, Harvard Business School, USA

This book goes beyond the hype, to provide a more thorough and realistic analysis of how Big Data can be deployed successfully in companies; successful in the sense of creating value both for the customer as well as the company, as well as what the pre-requisites are to do so. This book is not about the hype, nor about the analytics, it is about what really matters: how to create value. It is also illustrated with a broad range of inspiring company cases.

Hans Zijlstra, Customer Insight Director, Air France KLM

‘This is the next frontier in marketing. This comprehensive, yet eminently readable book by Verhoef, Kooge and Walk is an invaluable guide and a must-read for any marketer seriously interested in using Big Data to create firm value.’
Jan-Benedict E.M. Steenkamp, Massey Distinguished Professor of Marketing, Marketing Area Chair & Executive Director AiMark, Kenan-Flagler Business School, UNC-Chapel Hill

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Book Structure

1. Big data Challenges
   *Context, vision and structure*

2. Creating value with big data analytics
   *Understanding way of working to create value*

3. Data, data, everywhere
   *Understanding data types, storage & processing*

4. How big data are changing analytics
   *Analytical approaches and impact of it*

5. Building successful big data capabilities
   *Perspective on needed analytical competences*

6. Every business has (big) data, let’s use them
   *Case studies*

7. Concluding Thoughts and Key-Learnings

Key chapters

In Depth chapters

- 2.1 Value-to-customer metrics
- 2.2 Value-to-firm metrics
- 3.1 Data integration
- 3.2 Customer privacy and data security
- 4.1 Classic data analytics
- 4.2 Big data analytics
- 4.3 Creating impact with story-telling and visualization
What’s the typical business reaction on Big Data?

‘We have tons of data, but why is it taking so much time to create the right insights when we need them’

‘Why do we have to gather our crucial marketing insights from so many different departments within the organization?’

‘We are overloaded with reports and overviews, but they don’t give us input on how to improve our business performance’

‘Although I now understand what has happened, please tell me also how to act’
The necessary transition for value creation from Big Data

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Separate measurements</strong> on the effects of marketing investments and value KPI’s...</td>
<td>... integral measurement, explaining and forecasting of Market, Brand and Customer KPI’s to increase performance</td>
</tr>
<tr>
<td>Data &amp; insights delivered from stand-alone <em>silo’s</em> ...</td>
<td>... a centralized, <strong>integrated</strong> multi-source data environment</td>
</tr>
<tr>
<td>Analyzing <strong>averages</strong> of all customers</td>
<td>... <strong>de-averagen</strong> into target groups</td>
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<tr>
<td><strong>Static</strong> analyses</td>
<td>... monitoring and explaining developments <strong>through time</strong></td>
</tr>
<tr>
<td>Looking <strong>back</strong>...</td>
<td>... <strong>forecasting</strong></td>
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Merging data streams in a customer centric organization

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<tr>
<th>5 W’s</th>
<th>Survey data</th>
<th>Transaction &amp; behavioral data</th>
<th>Social data</th>
<th>Mobile data</th>
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<tr>
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<td></td>
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<td>What</td>
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<tr>
<td>Why</td>
<td></td>
<td></td>
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</tbody>
</table>

- **High added value**
- **Some added value**
- **Low added value**
The model for value creation with Big Data

- Flood of data
- Lack of integration
- Big Data capabilities not in place
- How to create and measure value?
Introduction Value to the Customer and Value to the Firm

<table>
<thead>
<tr>
<th>Target group</th>
<th>Value component</th>
<th>V2C en V2S result in V2F</th>
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<td>Shareholders</td>
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<td>Customers</td>
<td>Value To the Customer V2C</td>
<td>V2C</td>
</tr>
<tr>
<td>Society</td>
<td>Value To the Society V2S</td>
<td>V2S</td>
</tr>
</tbody>
</table>

V2C en V2S result in V2F
Value to the Customer versus Value to the Firm

- **Fatal Attraction**
  - High delivering & low extracting firm

- **Win/Win**
  - High delivering & high extracting firm

- **Doomed to Fail**
  - Low delivering & low extracting firm

- **Enjoy while it lasts**
  - Low delivering & high extracting firm
Different levels of Value to Customer and Value to Firm measurement

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<thead>
<tr>
<th></th>
<th>Value to Customer</th>
<th>Value to Firm</th>
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<tbody>
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<tr>
<td>Customer</td>
<td><img src="image" alt="Thumbs Up" /></td>
<td><img src="image" alt="Currency" /></td>
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</table>
## Examples of how to measure V2C and V2F

<table>
<thead>
<tr>
<th>Market/category</th>
<th>Value-to-Customer</th>
<th>Value-to-Firm</th>
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</thead>
<tbody>
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<td></td>
<td>🌐 🌐 🌐</td>
<td>📈 📈 📈</td>
</tr>
<tr>
<td><strong>Product aware</strong></td>
<td><em>Product awareness</em></td>
<td><em>Market volume/size</em></td>
</tr>
<tr>
<td><strong>Product att</strong></td>
<td><em>Product attractiveness</em></td>
<td><em>Market growth</em></td>
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<tr>
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<td><em>Product uniqueness</em></td>
<td><em>Number of competitors</em></td>
</tr>
<tr>
<td><strong>Brand aware</strong></td>
<td><strong>Brand/advert</strong></td>
<td><strong>Brand penetration</strong></td>
</tr>
<tr>
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<td><strong>Brand association</strong></td>
<td><strong>Brand sales</strong></td>
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<tr>
<td><strong>Brand consider</strong></td>
<td><strong>Brand consider</strong></td>
<td><strong>Brand/market share</strong></td>
</tr>
<tr>
<td><strong>Brand prefer</strong></td>
<td><strong>Brand preference</strong></td>
<td><strong>Brand repurchase</strong></td>
</tr>
<tr>
<td><strong>Brand link</strong></td>
<td><strong>Brand linking</strong></td>
<td><strong>Brand Equity</strong></td>
</tr>
<tr>
<td><strong>Brand like</strong></td>
<td><strong>Brand likes/comments</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Customer</strong></td>
<td><strong>Customer Satisfaction</strong></td>
<td><strong>Customer Lifetime Value</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Net Promotor Score (NPS)</strong></td>
<td>(and components)</td>
</tr>
<tr>
<td></td>
<td><strong>Customer Effort Score</strong></td>
<td><strong>Customer Engagement Value</strong></td>
</tr>
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<td></td>
<td><strong>Reviews: volume &amp; valence</strong></td>
<td><strong>Path to Purchase</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>Marketing ROI</strong></td>
</tr>
</tbody>
</table>

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### Data sources for measuring value at the market, brand and customer level

<table>
<thead>
<tr>
<th>Market/category</th>
<th>Value-to-Customer</th>
<th>Value-to-Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market</strong></td>
<td>Innovation research</td>
<td>Market sizing, descriptions &amp; monitoring</td>
</tr>
<tr>
<td><strong>Brand</strong></td>
<td>Brand tracking and Brand health studies, Social listening data</td>
<td>Sales data (like Nielsen or from CRM/ERP) brand equity research, Media spend etc.</td>
</tr>
<tr>
<td><strong>Customer</strong></td>
<td>Customer satisfaction, Loyalty, Customer care data</td>
<td>CRM/ERP, transactional data, customer contact data</td>
</tr>
</tbody>
</table>
3 V’s of Big Data

- Volume
- Velocity
- Variety
Data creation is exploding!

- Digital is driving the exploding growth of data creation.
- Mainly due to unstructured data from external and internal sources.
- Data storage is not keeping up.
- This will require a data strategy to assess the value of the data to be stored or not.
- Analytics will be crucial for this assessment.

Growth of data creation versus data storage (in Zettabytes)

Source: IDC iView ‘the digital universe decade, are you ready’ (2010)
Dimensions of data
Example of U.S. Government’s open data
Illustration of unstructured data versus structured data

Nowadays, big data is such a hype that firms are investing in big data solutions and organizational units to analyse these data and learn from it. We observed that firms are now for instance hiring big data scientists. This occurs in all sectors of the economy including telecom, (online) retailing, and financial services. Firms have a strong believe that analysing big data can lead to a competitive advantage and can create new business opportunities. However, at the same time experts are warning for too high expectations. Some thought leaders even consider big data as the next hype, which will mainly provide disappointing results. David Meer (2013) suggests that taking a historical perspective on prior data explosions shows specific patterns in the beliefs about the potential benefits. They specifically refer to the scanning revolution in the 80’s of the last century and the CRM revolution in the late 90’s of the last century as well (Verhoef & Langerak, 2002).

<table>
<thead>
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<th>Freq</th>
<th>Verb</th>
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<td>no</td>
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<td>no</td>
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Example of website visit data

<table>
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<tr>
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</tbody>
</table>

Count per state

![Map showing state counts](image-url)
Example of CRM data

<table>
<thead>
<tr>
<th>Customer id</th>
<th>Customer name</th>
<th>Type of products purchased (product ID)</th>
<th>Transaction channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>A. Johnson</td>
<td>80</td>
<td>Internet</td>
</tr>
<tr>
<td>2002</td>
<td>P. Van Hoof</td>
<td>07</td>
<td>Store</td>
</tr>
<tr>
<td>2004</td>
<td>George Hull</td>
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<td>3028</td>
<td>Ismael Buunk</td>
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<table>
<thead>
<tr>
<th>Product ID</th>
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<th>Most frequently used transaction channel</th>
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<tbody>
<tr>
<td>80</td>
<td>80,000</td>
<td>Catalog</td>
</tr>
<tr>
<td>07</td>
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<td>15</td>
<td>15,125</td>
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<tr>
<td>20</td>
<td>200,040</td>
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</table>
How to merge data streams?

- Integrating scattered & fragmented data

- Synchronizing the analytical perspective on segments & historical performance

- Linking all Value to Customer and Value to Firm metrics to the P&L
Building Analytical Competence

1. **People**
   to recruit, to develop and to maintain the right analytical talent

2. **Systems**
   platform & tools for an integrated data-ecosystem

3. **Process**
   creating a common business driven way of working & privacy/security proof

4. **Organization**
   taking the right place in the organization for the most impact
Data Scientist: “the sexiest job on Earth”
Hal Varian (Google)

“A data scientist is: a hybrid of hacker, analyst, communicator and trusted advisor, and is also be able to code and have intellectually curiosity.”

D.J. Patil (LinkedIn) & J. Hammerbacker (Facebook)

Anjul Bhambhri, VP of big data products at IBM, says:

“A data scientist is somebody who is inquisitive, who can stare at data and spot trends. It's almost like a Renaissance individual who really wants to learn and bring change to an organization.”
Multi disciplinary skills of the modern Big Data scientist

Analytical capabilities
- Excellent conceptual, analytical and numeric skills
- Statistical modelling & Experiment design
- Supervised learning: decision trees, logistic regression
- Unsupervised learning: clustering, dimensionality reduction

Data & Tools
- Curious about data and sources
- Computer science fundamentals
- Statistical computing package e.g. R, Matlab, SAS, IBM (SPSS)
- Database tools like SQL and NoSQL
- MapReduce/Hadoop concepts

Business sense
- Willingness to improve business performance
- Deep industry specific knowledge
- Organization sensitivity
- Leadership qualities
- Problem solver
- Engage with senior management

Communication & Visualization
- Translate data-driven insights into decisions and actions
- Define and support your key-message
- Story telling skills
- Consistency and structure
- Visual art design
Different profiles of the Big Data Scientist

The ‘consultant’

The ‘data-specialist’

The ‘data-analyst’

The ‘IT-professional’
How to create a top class Intelligence department?

- People
- Organization
- Systems
- Process
- Talent pool
- Develop career paths
- Create visibility on the labor market
- Make business cases
- Acquire sponsors
- Build own team
- Extern or in company
- Educate
- Hire experts
- Start on a project basis
- Qualify / Impact
- Independence / Durable
The vendor landscape of tools and systems is dramatically scattered!
Example of a Big Data infrastructure
Analytical roadmap: where analytics fits in the business cycle

- **Strategy and Vision**: 1 x every 3 years
- **Specification**: Annually
- **Execution**: Quarterly
- **Trends & Opportunities**: Continuously
- **Targets and drivers**: Continuously
- **Diagnosis**: Continuously
- **Opportunity Finding**: Continuously
- **Initiatives**: Continuously
- **Business steering**: Continuously
- **Key Figures**: Continuously
- **Analytical Insights & models**: Continuously

- **People**
- **Systems**
- **Process**
- **Organization**
There are four Analytical Strategies

<table>
<thead>
<tr>
<th>Framed problem</th>
<th>Pre-defined Data</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Problem solving</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Data modelling</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Collateral catch</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Data mining</td>
</tr>
</tbody>
</table>
We observe three specific challenges:

1. People
2. Systems
3. Process
4. Organization

- Centralization or decentralization of the analytical function
- Cooperation with other departments/functions
- Presence of a data-driven culture
Establish a data-driven culture

Top management support

Intelligence function that build bridges on C-level

Necessary space for employees to innovate and to find their solutions
Effect Analytics on Business Performance

Source: Germann et al. (2014)

All coefficients are greater than zero with a probability of more than .95
How Big Data is changing analytics?

Five Big Data Analytics Trends

1. From analyzing samples to analyzing to the full population
2. From significance to substantive and size effects
3. From ad-hoc data collection to continuous data collection
4. From ad hoc models to real time models
5. From single source to multi-source insights and models
# Overview of classic versus big data analytics

<table>
<thead>
<tr>
<th>Classics</th>
<th>Big Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reporting</td>
<td>• Web analytics</td>
</tr>
<tr>
<td>• Profiling</td>
<td>• Customer Journey analysis</td>
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<tr>
<td>• Migration analysis</td>
<td>• Attribution modelling</td>
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<tr>
<td>• Segmentation</td>
<td>• Dynamic targeting</td>
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<tr>
<td>• Trend analysis &amp; forecasting</td>
<td>• Big Data integrated models</td>
</tr>
<tr>
<td>• Product attribute analysis</td>
<td>• Social listening</td>
</tr>
<tr>
<td>• Predictive modeling</td>
<td>• Social Network analysis</td>
</tr>
</tbody>
</table>
The challenges of creating value with Big Data

Data Strategy & Merge data
Build multi-disciplinary teams
Use the right analytics
Focus on V2C and V2F
thank you