Big Data for Marketing:
When is Big Data the right choice?

Helping Chief Marketing Officers identify when to use Big Data
Introduction

Chief Marketing Officers (CMOs) without plans for Big Data may be putting themselves and their companies at a competitive disadvantage. Big Data is already being widely deployed to enhance marketing responsibilities, although the small number of widely-touted success stories might be masking a significant number of failed implementations. When correctly planned and implemented, however, Big Data can create significant value for CMOs and their organisations. In this paper, we focus on describing specific examples of how Big Data can support CMO responsibilities and developing frameworks for identifying Big Data opportunities.

What is Big Data?

Big Data refers to the ability to derive insights and make decisions using a newly available, expanded set of technology tools (e.g. Hadoop, Neo4j, Impala…) that store, process, and visualise data that is greater in volume, velocity, and variety than traditional business intelligence (BI) tools can handle.
Big Data is an important capability for CMOs

More than 90% of data in the world was produced in the last two years and several exabytes are now produced each day (more than 100 thousand times larger than the Library of Congress book collections). In response to this rapid growth of data, companies are quickly building capabilities to store and analyse data. In 2012, $28 billion of worldwide IT spending was devoted to Big Data and an additional $200 billion is expected to be spent on Big Data by 2016.

Marketing is one of the most enthusiastic adopters of Big Data. CMOs frequently identify Big Data as a top priority and nearly three-quarters of marketers plan to be leveraging Big Data analytics solutions within the next two years.

Since Marketing departments also tend to spend the most on Big Data, they could become the de-facto epicenter of Big Data in an organisation. Today, CMOs are planning to allocate significant portions of their budgets in the next five years to develop Big Data capabilities, with 40% of CMOs willing to spend up to half of their budget and another 45% willing to spend one-quarter. However, there is a significant risk the money will not be well spent. Buying IT and Big Data technologies is not a core capability of CMOs, but nearly one-third of technology-related marketing spend is purchased directly by the Marketing department. If CMOs are not careful with their approach, they may pick the wrong vendors or solutions.

The reason for such strong adoption of Big Data by CMOs is that many of their responsibilities align with Big Data capabilities (see Figure 2). As data generation continues to grow at unprecedented rates, particularly unstructured consumer data (e.g. Twitter feeds, comments on products) that is difficult to analyse with conventional tools, CMOs will continue to look to Big Data to provide actionable insights.

**Figure 1 - Use of Big Data by functionality area**

**Figure 2 - Core CMO responsibilities and Big Data use case examples**

<table>
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<th>Responsibility</th>
<th>Examples</th>
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<tr>
<td>Consumer targeting and segmentation</td>
<td>Williams-Sonoma</td>
<td>Developed revenue attribution and targeting techniques to more efficiently target customer. The 8% of direct emails with Big Data generated content resulted in 15% of sales</td>
<td>Consolidates millions of consumer behavior characteristics to target individual consumers</td>
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<td>New product development</td>
<td>BMW</td>
<td>BMW ConnectedDrive utilises predictive analysis to forecast consumer trends and demands to optimise design and capabilities</td>
<td>Allows heightened optimisation of a huge variety and volume of data reserves</td>
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<td>Advertisements</td>
<td>Google</td>
<td>Google leverages multi-source consumer data to target individuals with specific advertising campaigns</td>
<td>Tracks online consumer behavior to more accurately align adverts to individuals in real-time</td>
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<td>Pricing and promotions</td>
<td>Progressive</td>
<td>Usage-based driving monitors all aspects of a driver’s performance to determine accident risk and adjust insurance premiums accordingly, adjusting them up to 30%</td>
<td>Tracks high volume data in real time from multiple sources to provide individualised pricing</td>
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<td>Demand forecasting</td>
<td>Netflix</td>
<td>Predictive analysis forecasting consumer preferences and demand ensures which shows Netflix should add and should not air. 75% of total views are generated by recommendations</td>
<td>Connects consumer preferences, large data volume to future purchasing preferences</td>
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<td>Customer insights</td>
<td>GlaxoSmith Kline</td>
<td>Big Data insights more accurately monitor consumer usage patterns and reactions to ensure accurate and targeted product development</td>
<td>Provides immediate insights from unstructured consumer data, e.g. social media, to enhance products</td>
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Source:

1 IBM
2 Gartner
3 Teradata Data-Driven Marketing Survey 2013
4 Forbes
However, there are challenges to implementing Big Data solutions

Although Big Data is a top priority for CMOs, 70% of CMOs feel unprepared for it. There are, indeed, clear hurdles to implementing Big Data, and CMOs are likely to encounter three common challenges:

1. Lack of alignment on the objectives
   Without clear planning of objectives, companies may rush to implement ‘something’ with Big Data just to keep up with current trends. Often this approach will focus on the technical aspects of the solutions and fail to meet the needs of the business. Vendors can be just as eager to sell ‘something’ and may make promises about the flexibility and capabilities of their offerings to meet the yet unspecific business requirements of the company.

2. Confusion about when Big Data is truly required
   Existing enterprise IT tools are quite adept at solving many data analysis problems. Before investing in new Big Data capabilities, ensure your objectives cannot be achieved using existing capabilities.

3. Difficulties of technical implementation
   Data itself is often ‘dirty’ in the sense that it takes significant effort to prepare and standardise it before analyses can be performed. Clean data can also contain structural biases that could skew analysis results. Since very few CMOs are data scientists, significant effort may need to be invested into training and to integrate new tools into existing day-to-day workflows. On this matter, a positive trend is that there’s a clear industry move towards making Big Data compatible with existing BI interfaces, therefore bypassing the need to hire highly sought after data scientists. At the same time, a Big Data implementation should be holistic – appropriate training and tools are required not only for the department implementing Big Data, but also for everyone who stands to be influenced by the requirements and benefits it brings.

Many challenges can be avoided by using the proper approach for Big Data

The first step in any approach to Big Data is to define clear business objectives that focus on business value rather than being technical in nature. Objectives must be specific enough to identify concrete technology capabilities to implement, yet general enough to result in a manageable number of objectives.

Second, you must determine if Big Data is the right solution for achieving your business objectives or if existing technology can suffice.

Finally, your implementation should be planned using a holistic framework that includes both technology and business change elements.

Since objective setting is a different topic relevant to many strategy and IT efforts, we focus below on the second element of our approach, identifying when Big Data is the right solution. The third topic, implementation, is covered in a separate forthcoming whitepaper.

Identifying when Big Data is the solution

Each business objective can be assessed to determine whether Big Data tools are the right choice, or whether existing technical capabilities are sufficient. We propose assessing business objectives for Big Data suitability in two dimensions: decision-making characteristics and data characteristics. When we say Big Data is the ‘right choice’, we mean that traditional tools will be unable to perform adequately, due to limitations on storage technologies (speed of writing data, speed of reading data) or processing technologies (speed of analysis, database structure).

Decision making characteristics

Big Data enables decision making to occur at a speed and level of detail beyond the capabilities of previous generations of technology. To identify whether your decision-making process requires Big Data, consider the following two distinct, but often related characteristics of decision making.

Source

1 IBM Global CMO Study 2013
Frequency of decisions: As the speed and frequency of decision making increases, traditional tools struggle to keep up with the requirements.

- For example, online retailers may have only a few seconds to engage customers on their website before they click away. In that time, they must consider purchase history, browsing history, demographics, social networking comments, and more.

Number of outcomes: As the number of decision outcomes increases, the bigger the benefit of using Big Data.

- For example, Amazon needs to set prices for a large number of items (40+ million) while Microsoft needs to set prices of Windows 8 for only four versions. Amazon is more likely to need Big Data to make these decisions.

Once you have identified the characteristics of your decision-making process and the required output of your analysis, next look at the underlying data characteristics.

Data characteristics
The most generally accepted framework for describing Big Data focuses on the size and shape of the data along 3 dimensions.

1. Volume
The amount of data to be analysed is a key consideration in determining the need for Big Data, as standard database technologies may not be able to handle extremely large volumes. To support 350+ million items available, eBay needed to build out a massive Hadoop implementation of 50+ petabytes.

2. Velocity
The rate at which data is being generated, captured, and analysed will also determine the need for Big Data, and legacy hardware often fails to be able to meet these requirements. Marketing increasingly looks to draw value from social media data streams to improve customer relationship management, pricing, and new product development. However, sifting through social media requires being able to handle massive inflows of data, such as the 8 terabytes of data produced by Twitter every day.

3. Variety
Unstructured consumer data is growing with a 56% CAGR since 2005. Many traditional tools will work only with structured data, yet marketing efforts often need to leverage disparate data sources to create consumer profiles.
Once you have clarified the characteristics of your decision making and the underlying data, you can combine these considerations to help determine whether Big Data is necessary. The framework below may help with this assessment. The qualifications of ‘high’ and ‘low’ are deliberately subjective, and what is considered ‘high’ or ‘low’ is a moving target as technology continues to advance.

**Framework for identifying if Big Data is the solution**

![Framework Diagram]

### If your data has a high degree of Variety, you will likely need Big Data tools.

Traditional tools were created to analyse well-structured data with clear relationships between tables and databases. By many definitions, any tool that can perform analysis across server logs, geospatial data, social media, audio and video files, unstructured text, and more will be a Big Data tool.

### If your data has a high degree of Velocity, you will likely need Big Data tools.

Traditional relational databases were created to optimise ‘reading’ data from databases, so difficulties emerge when trying to massively scale ‘writing’ to a database. When velocity gets very high (e.g., hundreds of thousands of smartgrid meters), Big Data tools will likely be the only option.

### If your data has a high degree of Volume AND you need to make fast decisions with it, you will likely need Big Data tools.

Big Data tools are able to extract and analyse data from enormous datasets very quickly, which is particularly useful for rapidly changing data that can be analysed in memory. Traditional tools, on the other hand, may be unable to analyse data fast enough for real-time decision making.

### If your data has a high degree of Volume AND you need to perform many analyses on it, you will likely need Big Data tools.

Big Data tools are able to distribute complex processing jobs to a large number of nodes, reducing the computational complexity that would slow down the performance of traditional tools to an unacceptable level.

### Traditional tools, however, are still appropriate for many tasks.

If you only need to make a few decisions with a small set of structured data, traditional tools are likely sufficient. For the framework outcomes resulting in ‘Big Data potentially needed’, it is important to keep in mind that there is an overlapping area of capabilities where either tool may suffice. This is especially true in cases where the qualifications don’t fit neatly into ‘high’ or ‘low’. In these cases, the less clear benefits from Big Data will need to be weighed against the risk appetite for financial investment and the organisational effort required to implement Big Data.
Examples of applying the framework for identifying if Big Data is the solution

Amazon: Online retailer
Set prices for 40 million products every few minutes based on real time internet searches of online prices from competitors.

- High frequency?
- High number of outcomes?
- High velocity or variety?

Most appropriate tool
Big Data tools are needed.

Microsoft: Computer Software
Set prices for four versions of Windows 8 at time of release.

- High frequency?
- High number of outcomes?
- High velocity or variety?

Most appropriate tool
Traditional tools are sufficient.

Kroger: Grocer
Offer discounts on a large number of SKUs in a large number of geographies.

- High frequency?
- High number of outcomes?
- High velocity or variety?

Most appropriate tool
Big Data tools may be needed.

Kroger could use simple discounts (e.g. 10% on category X) or choose to apply varying levels of discounts based on complex demand forecasts.

Conclusion and next steps

In this whitepaper, we have discussed how Big Data will continue to be an area of growing importance for CMOs as responsibilities are increasingly impacted by Big Data capabilities. CMOs that make careful plans to avoid common challenges and properly identify when to use Big Data tools rather than traditional tools will obtain significant benefits in the years to come.

Gartner analysts predict that, through 2015, roughly 85% of Fortune 500 firms will be unable to exploit Big Data for business gains. Conversely, the remaining 15% of firms who aggressively pursue a Big Data strategy driven by business value creation will enjoy considerable competitive advantage in the coming years. The first step in the process is bringing executive stakeholders together to develop a vision for Big Data enabled decision making at your company and identifying the specific business challenges that Big Data can help you address. It is often useful to identify a strategic advisory firm with Big Data expertise and understanding of the holistic set of services (technical, people, processes) that are needed to both facilitate the business discussions and develop a Big Data program that suits the specific needs of your organisation.
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