IBM Global Business Services
Business Analytics and Optimization

Executive Report

IBM Institute for Business Value

In collaboration with *Saïd Business School at the University of Oxford*

Saïd Business School
UNIVERSITY OF OXFORD

Analytics: The real-world use of big data in consumer products

How innovative consumer products organizations extract value from uncertain data

Saïd Business School at the University of Oxford

The Saïd Business School is one of the leading business schools in the UK. The School is establishing a new model for business education by being deeply embedded in the University of Oxford, a world-class university and tackling some of the challenges the world is encountering. You may contact the authors or visit: *www.sbs.ox.ac.uk* for more information.

By John Hearn, Bob Debicki and Rebecca Shockley

"Big data" – which admittedly means many things to many people – is no longer confined to the realm of technology. Today, it is a business imperative and is providing solutions to long-standing business challenges for consumer products companies around the world. Consumer products companies are leveraging big data to transform their processes, their organizations and, soon, the entire industry.

Our newest global research study, "Analytics: The real-world use of big data," finds that executives are recognizing the opportunities associated with big data.[1] But despite what seems like unrelenting media attention, it can be hard to find in-depth information on what consumer products organizations are really doing and the business cases that, in turn, have lead to big data project funding. In this industry-specific paper, we will examine how consumer products industry respondents view big data – and to what extent they are currently using it to benefit their businesses. The IBM Institute for Business Value partnered with the Saïd Business School at the University of Oxford to conduct the 2012 Big Data @ Work Study, surveying 1,144 business and IT professionals in 95 countries, including 55 respondents from the consumer products industry, or about 5 percent of the global respondent pool.

Big data presents many promising and differentiating opportunities for consumer products companies. With extensive supply chains, often hundreds of unique brands and brand variations to manage, and millions of customers to serve, these companies rely on data and information to keep products moving from supply to store. Data about operations, products, suppliers, vendors, distributors, sales, inventory, merchandising, competitors, commodity markets and untold other dimensions form the basis for nearly every decision a merchandiser must make. Consumer products companies must ultimately appeal to fundamental customer wants and needs. While new sources of data like social media offer opportunities to uncover insights into consumer purchasing decisions and preferences, they also present new challenges associated with ingesting, managing and analyzing new types of data, such as free-form text, videos and geo-location coordinates. Companies also face the task of keeping up with the speed and granularity of data from existing sources as new technologies increase the capability to analyze it.

Moreover, consumers are expressing their opinions – both good and bad – in very public ways that often involve hundreds of personal contacts. So while the consumer products industry's structured data is significant in size and scope, it is the world of unstructured data that is emerging as an even larger and potentially more important source of customer, shopper and consumer insight. The question for consumer products companies is how to harvest and leverage this information to gain a competitive advantage as they map it to upgrade existing processes or create new applications.

We found that 58 percent of consumer products companies surveyed report the use of information (including big data) and analytics is creating a competitive advantage for their organizations, compared with 63 percent of cross-industry respondents. In the consumer products and distribution industry, the percentage of respondents reporting a competitive advantage rose from 39 percent in 2010 to 58 percent in 2012, a 49 percent increase in two years (see Figure 1).[2]

Further, the study found that consumer products companies are taking a business-driven and pragmatic approach to big data. The most effective big data strategies identify business requirements first and then leverage the existing infrastructure, data sources and analytics to support the business opportunity. These organizations extract new insights from existing and newly available internal sources of information, define a big data technology strategy and then incrementally extend the sources of data and infrastructures over time, generating wins along the way that serve as validation of the investments.

Realizing a competitive advantage
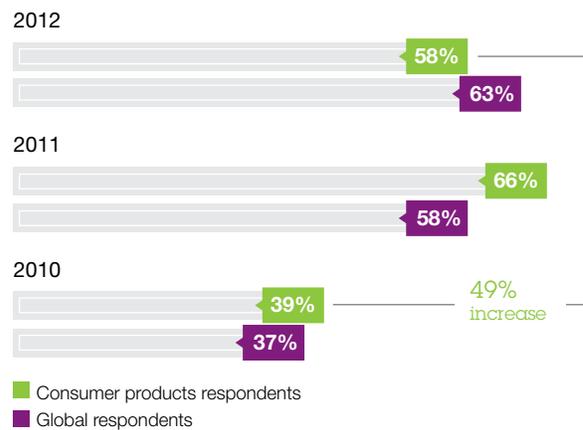
■ Consumer products respondents
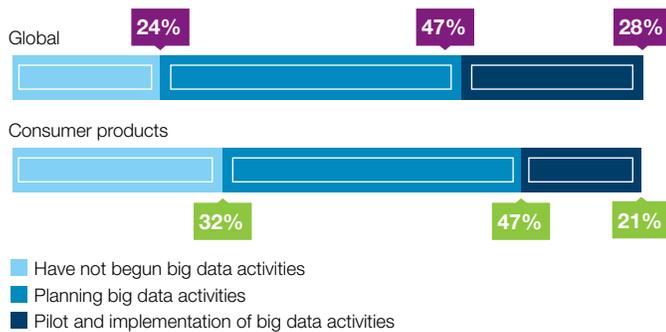■ Global respondents

Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 1: **More than half of consumer products companies are creating competitive advantage from analytics and information.**

Organizations are being practical about big data

Our Big Data @ Work survey confirms that most organizations are currently in the early stages of big data planning and development efforts. Consumer products companies are on par with the global pool of cross-industry counterparts (see Figure 2). While 32 percent of consumer products companies are focused on understanding the concepts (compared with 24 percent of global organizations), the majority are either defining a roadmap related to big data (47 percent) or already conducting big data pilots and implementations (21 percent).

Big data activities

- Have not begun big data activities
- Planning big data activities
- Pilot and implementation of big data activities

Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 2: **The majority of consumer products companies have either started developing a big data strategy or piloting and implementing big data projects.**
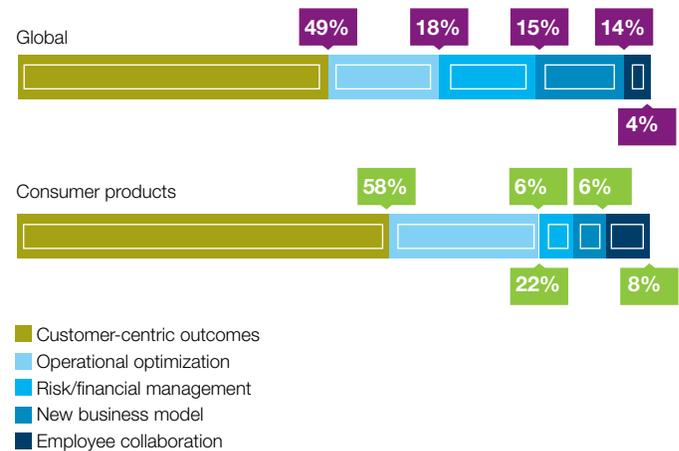
In our global study, we identified five key findings that reflect how organizations are beginning to embark on a journey into the next era of information management. For a more in-depth discussion of each of these findings based on the global pool of respondents, please refer to the full study, "Analytics: The real world use of big data."[3]

In this analysis, we will examine how consumer products-specific challenges are impacted by these five global findings and outline our top-level recommendations for targeting the needs of consumer products companies.

1. Insights about key constituents are driving big data initiatives

When asked to rank their top three objectives for big data, 58 percent of the consumer products industry respondents with active big data efforts identified objectives to understand and respond to customers (e.g., retailers, shoppers and consumers) better as their organization's top priority, a significant nine percentage points above the 49 percent of global respondents (see Figure 3). This is consistent with what we see in the marketplace, where consumer products companies are under pressure to transform from solely product-centric organizations to customer-, shopper- and consumer-centric organizations.

Big data objectives

- Customer-centric outcomes
- Operational optimization
- Risk/financial management
- New business model
- Employee collaboration

Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 3: **More than half of the big data efforts underway by consumer products companies are focused on achieving customer-centric outcomes.**

Today, the buyers and consumers of goods and products must be the central organizing principle around which data insights, operations, technology and systems revolve. By improving their ability to deliver the right product at the right price and manage their inventories to consumer demand signals, consumer products organizations are better positioned to deliver new high-demand products, quickly seizing market opportunities with more predictable cost. Not surprisingly, operational optimization was second among consumer products companies, with 22 percent of respondents identifying it as a top big data objective, reflecting the industry's reliance on excellence in supply chain operations to reduce out-of-stocks, address voids and increase inventory efficiency.

A global spirits company provides a good example of how customer analytics can drive product decisions. This company is analyzing social networking data to discover the most influential products and sites so that it can better understand and improve its footprint in the U.S market space. To expand in this large and highly diverse market, the company needed to know which brands were most popular, which were small and influential and how customers perceived certain brands. Specifically, it wanted to learn more about the whiskey market in the United States and to identify key influencers in the rum market to improve market share of its rum brands.

Employing a reputation analysis tool to analyze social networks, blogs and forums on the Internet, the company gathered in-depth knowledge it could use to target key influencers in the U.S. spirits market. Unstructured data analysis revealed a group of smaller whiskey brands previously unknown to the client that had a greater influence on the market than their size would have suggested. The company gained insights that traditional market research methods might have overlooked in less than 10 percent of the time.

2. Big data is dependent upon a scalable and extensible information foundation

The promise of achieving significant, measurable business value from big data can only be realized if organizations put into place an information foundation that supports the rapidly growing volume, variety and velocity of data. We asked consumer products industry respondents with current big data efforts to identify the current state of their big data infrastructures. Three-quarters (75 percent) report having integrated information, and two-thirds (67 percent) say they have scalable storage infrastructure. Consumer products companies are slightly ahead of their cross-industry peers in creating a strong foundation for accessing and analyzing big data.

But the weakness in consumer products companies' foundations appears to be low levels of security and governance, with only one-third (33 percent) reporting a strong implementation. The need for strong security and governance is exacerbated by the volume, variety and velocity of big data; all three increase the risks of malicious attacks or unauthorized use of data (much of the focus of data security), as well as the risk that improperly managed data is used to support key decisions – the provenance of data governance. Moreover, the need for business users to share data and direct big data activities also increases the need not just for IT governance, but business-driven governance. While security and governance have long been an inherent part of business intelligence, the added legal, ethical and regulatory considerations of big data introduce new risks and expand the potential for very public missteps, such as a company losing control of data or using it in questionable ways.
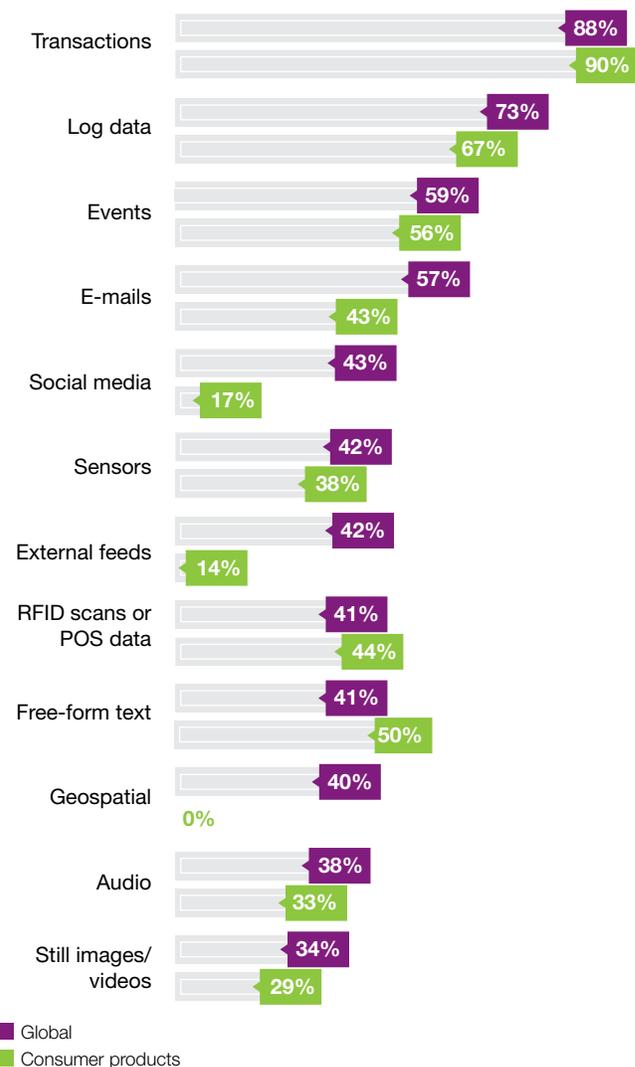
3. Initial big data efforts are focused on gaining insights from existing and new sources of internal data

Most early big data efforts are targeted at sourcing and analyzing internal data, and we find this is also true within consumer products companies. According to our survey, an overwhelming majority of consumer products respondents reported internal data as the primary source of big data within their organizations. This suggests that these companies are taking a realistic approach to adopting big data and also that there is tremendous untapped value still locked away in these internal systems.

Nine out of ten consumer products respondents with active big data efforts are analyzing transactions (90 percent), while 67 percent analyze log data (see Figure 4). This is machine-generated data produced to record the details of every operational transaction and automated function performed within a consumer products company's business or information systems – data that has outgrown the ability to be stored and analyzed by many traditional systems. As a result, in many companies this data has been collected for years but not analyzed.

Like many of their industry peers, consumer products companies are using these large sources of internal data from transactions, promotions and inventory to launch their big data efforts. A prominent global baked goods producer ran 18,000 promotional marketing events a year across 35,000 stores, generating a tsunami of data. However, the company's analytics systems couldn't keep up, making it impossible for management to ascertain the profitability of each promotion and identify which ones succeeded and which failed.

Big data sources

Source	Global	Consumer products
Transactions	88%	90%
Log data	73%	67%
Events	59%	56%
E-mails	57%	43%
Social media	43%	17%
Sensors	42%	38%
External feeds	42%	14%
RFID scans or POS data	41%	44%
Free-form text	41%	50%
Geospatial	40%	0%
Audio	38%	33%
Still images/ videos	34%	29%

■ Global
■ Consumer products

Figure 4: **Most consumer products companies are primarily focusing initial big data efforts on internal sources of data.**

To address this problem, the company implemented a sophisticated analytics solution that captures and analyzes trillions of product and trade promotion variables to help calculate profitability and assess the effectiveness of its annual promotions. Now the company can identify with confidence which promotions failed and which succeeded, influencing future planning and budgeting decisions. With promotional budgets running between 15 to 20 percent of revenue by category, the company uses this new intelligence to act quickly to reduce wasted market dollars by ending unprofitable events earlier, thus reducing costs by US$100 million in the first six months.
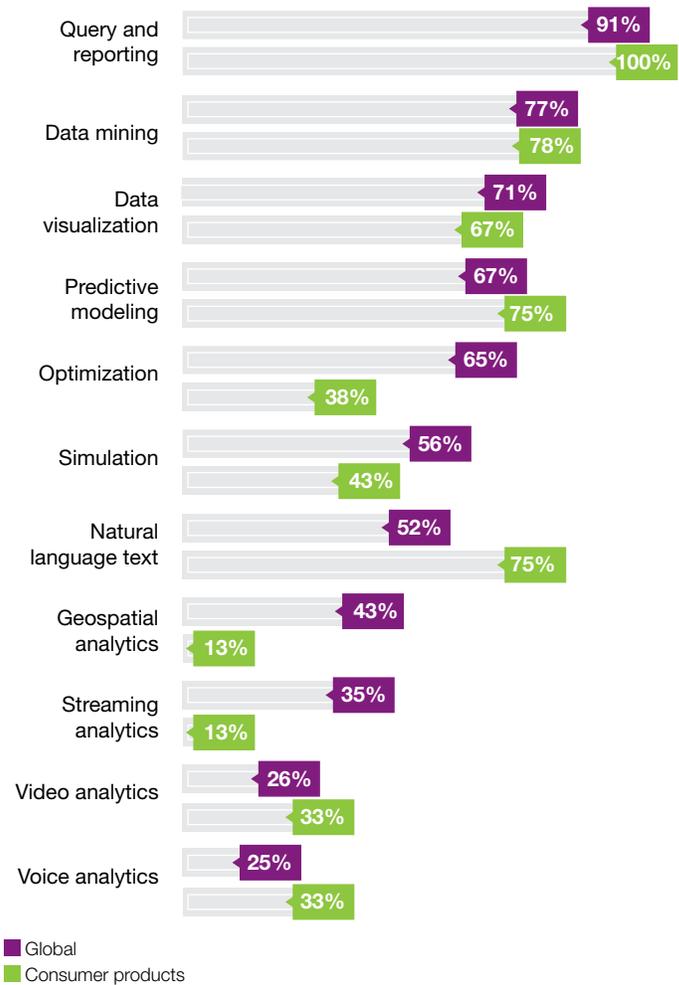
Unlike most of their peers in other industries, only 17 percent of consumer products companies are analyzing social media, compared to 43 percent of the cross-industry group. The consumer products industry also lags in analyzing geospatial data. These new sources of data represent an area for growth, particularly given the consumer and shopper insights available via social networks and the ability to now physically track inventory movement within supply chains.

4. Big data requires strong analytics capabilities

Big data itself does not create value until it is put to use to address important business challenges. This requires access to more and different kinds of data, as well as strong analytics capabilities that include both software tools and the requisite skills to use them.

Examining those consumer products companies engaged in big data activities reveals that they start with a strong core of analytics capabilities designed to address structured data, such as basic queries, data visualization, predictive modeling and data mining (see Figure 5). Consumer products companies led other industries in video and voice analytics (33 percent for both), suggesting greater enthusiasm for these emerging technologies. Also strong was the consumer products respondents' use of natural language analytics (75 percent).

Analytics capabilities

Capability	Global	Consumer products
Query and reporting	91%	100%
Data mining	77%	78%
Data visualization	71%	67%
Predictive modeling	67%	75%
Optimization	65%	38%
Simulation	56%	43%
Natural language text	52%	75%
Geospatial analytics	43%	13%
Streaming analytics	35%	13%
Video analytics	26%	33%
Voice analytics	25%	33%

■ Global
■ Consumer products

Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 5: **Most consumer products companies start with a strong core of analytics capabilities designed to address structured data.**

One waste management company in Italy used its predictive skills to monitor its compliance with strict environmental regulations. It had previously struggled with an information system that lacked an integrated company-wide view, leaving it unable to accurately predict the most efficient ways to store or dispose of waste. Now, executives have full access to all company data in a single place. This system integration helped increase efficiency, reduced reporting errors by 38 percent and sped analysis by 99 percent. Operations can now monitor truck routes using GPS tracking, find an exact skill set match for a production shift, and perform proactive maintenance on equipment and troubleshooting issues before they happen. With more accurate data on waste disposal and operating practices, the company is now in a better position to comply with government regulations with the added bonus of achieving significant cost savings by proactively maintaining assets and streamlining production.

5. The current pattern of big data adoption highlights consumer products companies' hesitation, but confirms interest too

To better understand the big data landscape, we asked respondents to describe the level of big data activities in their organizations today. The results suggest four main stages of big data adoption and progression along a continuum that we have identified as Educate, Explore, Engage and Execute (see Figure 6). For a deeper understanding of each adoption stage, please refer to the global version of this study.[4]

- **Educate:** Building a base of knowledge (32 percent of consumer products respondents)
- **Explore:** Defining the business case and roadmap (47 percent of consumer products respondents)
- **Engage:** Embracing big data (15 percent of consumer products respondents)
- **Execute:** Implementing big data at scale (6 percent of consumer products respondents)

Big data adoption

Educate	Explore	Engage	Execute
Focused on knowledge gathering and market observations	Developing strategy and roadmap based on business needs and challenges	Piloting big data initiatives to validate value and requirements	Deployed two or more big data initiatives, and continuing to apply advanced analytics
Global 24%	Global 47%	Global 22%	Global 6%
Consumer products 32%	Consumer products 47%	Consumer products 15%	Consumer products 6%

Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 6: **Almost half of consumer products companies are in the "Explore" stage of big data adoption, which entails defining the business case and roadmap.**

Unlike other industries where the CIO is an early proponent of big data initiatives, consumer products companies report that the CEO and functional leadership (e.g., marketing, sales and finance) first champion the initiative and only bring the CIO in upon execution. The roles of the executives are reversed throughout the adoption cycle as compared to other industries. This is likely due to the strength of brand management organizations that have long held authority within consumer products companies.

At each adoption stage, the most significant obstacle to big efforts reported by consumer products firms is the need and ability to articulate measurable business value. For executives to embrace the investment in time, money and human resources necessary, they must understand the potential or realized business value from big data strategies, pilots and implementations. As a result, organizations must be vigilant in articulating the value, forecasted based on detailed analysis when needed and tied to pilot results where possible.

Recommendations: Cultivating big data adoption

IBM analysis of our Big Data @ Work Study findings provided new insights into how consumer products companies at each stage are advancing their big data efforts. Driven by the need to solve business challenges, in light of both advancing technologies and the changing nature of data, consumer products companies are starting to look closer at big data's potential benefits. To extract more value from big data, we offer a broad set of recommendations tailored to consumer products organizations.

Commit initial efforts to customer-centric outcomes

It is imperative that organizations focus big data initiatives on areas that can provide the most value to the business. For most consumer products companies, this will mean beginning with customer analytics that help them better understand customer needs and anticipate future behaviors, which in turn enables them to provide better, more finely tailored products to customers and retailers. Consumer products organizations can use analytic insights to help generate enhanced products, improve brand performance, drive customer loyalty, adjust pricing and improve customer satisfaction.

To effectively cultivate meaningful relationships with their customers and distribution channels, consumer products companies must connect with them in ways their customers and distributors perceive as valuable. The value may come through preferred features and pricing and more timely, informed or relevant interactions; it may also come as organizations improve the underlying operations in ways that enhance the overall experience of those interactions.

Consumer products companies should identify the processes that most directly interact with customers – and then pick one and start. Even small improvements matter as they often provide the proof points that demonstrate the value of big data and the incentive to do more. Analytics fuel the insights from big data that are increasingly becoming essential to create the level of depth in relationships that customers expect.

Define big data strategy with a business-centric blueprint

A blueprint encompasses the vision, strategy and requirements for big data within an organization and is critical to establishing alignment between the needs of business users and the implementation roadmap of IT. A blueprint defines what business outcomes organizations want to achieve with big data to help ensure efficient acquisition and use of resources.

An effective blueprint defines the scope of big data within the organization by identifying the key business challenges involved, the sequence in which those challenges will be addressed and the business process requirements that define how big data will be used. It is the basis for understanding the needed data, tools and hardware, as well as relevant dependencies. The blueprint will help guide the organization in developing and implementing its big data solutions in ways that create sustainable business value.

Start with existing data to achieve near-term results

To achieve near-term results while building the momentum and expertise to sustain a big data program, it is critical that consumer products companies take a pragmatic approach. As our respondents confirmed, the most logical and cost-effective place to start looking for new insights is within the organization's existing data store, leveraging the skills and tools most often already available.

Looking internally first allows organizations to leverage their current data, software and skills and to deliver near-term business value. In addition, companies can gain important experience as they then consider extending existing capabilities to address more complex sources and types of data. While most organizations will need to make investments that allow them to handle either larger volumes of data or a greater variety of sources, this approach can help reduce investments and shorten the timeframes needed to extract the value trapped inside the untapped sources. It can help accelerate the speed to value and enable organizations to take advantage of information stored in existing repositories while infrastructure implementations are underway. Then, as new technologies become available, big data initiatives can be expanded to include greater volumes and variety of data

Build analytics capabilities based on business priorities

The unique priorities of each consumer products company should drive the organization's development of big data capabilities, especially given the tight margins and the industry-specific production and distribution challenges that most firms face today. The upside is that many big data efforts can concurrently help reduce costs and positively affect revenues, a duality that can bolster the business case and offset necessary investments.

For example, several consumer products companies are using data to better understand their true performance and return on investment of brand marketing campaigns. Others are using big data technologies to enable data integration across channels. This helps provide an improved and more consistent channel user experience and can lead to improved customer satisfaction and reduced costs.

Consumer products companies should focus on acquiring the specific skills needed within their organization, especially those that will increase their ability to analyze unstructured data and visually represent it to be more consumable to business executives.

Create a business case based on measurable outcomes

Developing a comprehensive and viable big data strategy and the subsequent roadmap requires a solid, quantifiable business case. Many organizations are taking a multi-phased approach to business case development and funding that spells out the anticipated value in successively more granular levels of detail. Initial forecasts are refined based on results from a proof of concept or pilot, while metrics are monitored to measure results once implementation is complete. Proof of value is often a key consideration in future funding cycles.

Deploy a stepped approach to realize the benefits

During both the proof of concept and deployment stage, business users should be actively engaged with a series of activities designed to realize value early in the process. This is an imperative as companies no longer have the luxury of waiting to launch a single "big bang" of benefits, but must instead ensure successive releases of smaller benefits-driven tactics that incrementally contribute to a more substantial payoff. Select a use case where a core team of cross-functional business users define target requirements toward solutions developed through collaboration and where quick-hit value is achieved.

Create the near–term/long-term big data platform:

Identify what existing assets meet the use case's information needs and add to them with open, scalable big data components. Make an initial investment on a short timetable to evaluate the results and enable educated decisions on where to go next.

Establish meaningful big data information governance

Success in the ongoing management and maintenance of the big data platform requires individuals who are motivated – with clearly defined objectives – to enable information as a corporate asset and who are accountable and deliver the creation and maintenance rules, processes and disciplines. It also requires individuals who have the authority to negotiate optimal outcomes and decide the path forward and who are dedicated to and measured on information quality success rather than governing information as their part-time job.

For example, it is imperative to identify who in the organization has authority and is motivated, accountable and dedicated to making sure the different types of customer, consumer and shopper groups are being managed, marketed to and exposed correctly across business systems. Information management requires dedicated business ownership. It is important to have the active involvement and sponsorship from one or more business executives throughout this process. Equally important to achieving long-term success is strong, ongoing business and IT collaboration.

Getting on track with the big data evolution

An important principle underlies each of these recommendations: Business and IT professionals must work together throughout the big data journey. The most effective big data solutions identify the business requirements first and then tailor the infrastructure, data sources, processes and skills to support that business opportunity.

To compete in a consumer-empowered economy, it is increasingly clear that consumer products companies must leverage their information assets to gain a comprehensive understanding of markets, customers, products, distribution channels, competitors, employees and more. Consumer products companies will realize value by effectively managing and analyzing the rapidly increasing volume, velocity and variety of new and existing data, and putting the right skills and tools in place to better understand their operations, customers, distributors and the marketplace as a whole.

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4   Ibid.

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