



MICROSOFT PRESENTS

FROM BIG DATA TO SMART DATA:

*Using data to drive
personalized brand experiences*

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ABSTRACT

This white paper looks at Big Data from the marketing perspective, running through the opportunities and risks of data-driven market targeting, analytics, quantitative performance metrics, visualization, and potential backlash.

IT'S NOT ABOUT THE SIZE OF THE DATA IT'S WHAT YOU DO WITH IT

NEARLY EVERYONE IN MARKETING TODAY SHOULD BE FAMILIAR WITH THE CONCEPT OF BIG DATA—THE VOLUMINOUS STREAM OF DIGITAL INFORMATION GENERATED AS A BYPRODUCT OF OUR TECH-DRIVEN, MOBILE, WIRELESS, HIGH-SPEED, NETWORKED WORLD. WHAT NEW MARKETING MODELS DOES IT CREATE, AND WHAT ARE THE CHALLENGES THAT REMAIN?

The promise of Big Data is tempting for marketers, who are scrambling to infuse their existing processes with data to improve message targeting, better track performance of marketing investments, and anticipate new opportunities through predictive analytics. As the apocryphal client once remarked, “I know I’m wasting half my ad budget, but I don’t know which half.” Now, perhaps, we might be able to know.

But is that really the right question? After all, the purpose of collecting and analyzing all this information is not simply to know, but to act.

The immediate goal of marketers is to use this information to create *personalized brand experiences*—whether through better ad targeting or better service delivery—but ultimately it will enable companies to deliver *personalized products* and *personalized pricing*. At its endpoint, Big Data will give marketers the tools to establish the mode and level of engagement necessary to attract and retain each individual customer at the lowest cost, and manage the ongoing relationship at optimum levels of profitability.

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The Hype and the Promise

In a July 2013 report, McKinsey Global Institute estimated that the application of Big Data practices could generate upward of \$30 billion in additional revenue in the retail sector alone through productivity gains, improved transparency, and more sophisticated targeting of marketing, ads, and offers. McKinsey further notes that “shifts in retailers’ market share and profit pools can total more than \$600 billion as the most effective companies capture consumer spending that would have gone to competitors.”¹

Those are high stakes and lots of companies are scrambling to make sure they are on the right side of that shift. But getting from here to there is, as always, the tricky part. We are still in the very earliest days of the Big Data era. Critical issues related to technology, policy, and privacy remain to be resolved. How can organizations bring together data from

disparate sources necessary to achieve this vision, and what role can marketing play in what is essentially an IT challenge? What can brands offer customers to make the exchange of data less “creepy” and more convenient? What changes may be required of marketing organizations and marketing professionals as data analysis becomes more central to the discipline?

In this paper, we have gathered research and insights from industry experts in marketing and IT, including corporate marketing and brand executives, agency leads, entrepreneurs working on data-oriented startups, academics, and hardware and software systems specialists. The goal is to facilitate conversation between business leaders and IT around the real challenges and real objectives of Big Data projects for marketing.

CLEARING THE HURDLES

BEFORE MARKETERS CAN TAKE ADVANTAGE of the business benefits of Big Data, organizations need to surmount the technical and organizational challenges. Here are some of the main concerns that came up in our conversations with industry leaders.

SCALING UP: The most obvious technical challenge in using Big Data is the sheer volume of information, which requires storage and processing capabilities far in excess of what most enterprise data centers are built to manage. Despite the enormous complexities, this is one area where innovation has produced increasingly workable, economical, and accessible solutions. Since the mid-00s, powerful technologies have become available to handle the high demands of real-

time analytics. These are typically built on a framework called Hadoop, which scales and distributes both storage and processing power across a massive network, enabling analytics engines to work with enormous, unstructured data sets such as social data, unformatted text, and rich media, as well as large volumes of machine-generated data from sensors, radio-frequency identification (RFID), and industrial automation systems.

Hadoop has been embraced as a de facto industry standard and providers—from the largest software and cloud services companies to the smallest startups—are rapidly innovating better, faster, and more intuitive ways to apply giant unstructured data in business scenarios of all kinds, including marketing. With the migration of more

systems to the cloud, the economic and technological barriers to Big Data insights are constantly falling lower, putting even more competitive pressure on companies to use that data effectively.

LEGACY DATA INTEGRATION: In our research, many marketers understand and are comfortable using modern tools to work with new sources of data. Their major problem is with older data that resides on legacy systems both inside and outside the organization. Much of this data is central to the business’s core operations and includes customer information, historical transaction and market data, financial records, and other critical information, and the problems of integrating it are both technical and business-related.



Big Data and Smart Clouds

Cloud computing is a driving enabler of Big Data. Many of the processing- and storage-intensive computing tasks around Big Data analytics are being performed in cloud-hosted environments, using software as a service (SaaS) or platform as a service (PaaS) models that charge based on usage. This brings the power of Big Data analytics within the reach of small and mid-size enterprises, and enables startup Big Data service providers to scale up quickly. Moving forward, experts expect cloud architectures to get smarter, taking advantage of advances in adaptive machine learning to improve speed, performance, and reliability for data management tasks.

What Makes Big Data a Big Deal?

From paid circulation to Nielsen ratings to CPM, marketing has always had a data-based component. So how is Big Data different? It comes down to the “4 V’s”:

VOLUME: The sheer quantity of data produced today by Internet usage, social networks, mobile devices, sensors, embedded systems, and enterprise IT is exponentially greater than anything seen previously in human history. Just sifting through this mound of bits requires unprecedented computational resources and scale.

VELOCITY: We’re not only producing more data, we’re producing it faster: nearly 2.5 exabytes each day. Every minute, there are more than 205 million email messages sent. A single 30-minute plane flight generates 10 terabytes of data. For marketing organizations that aspire to manage their brands in real time, deriving insights from this data flow is like sorting water molecules as they’re emerging from a fire hose.

VARIETY: All kinds of systems, devices, and sources contribute to the Big Data explosion, and the most valuable insights emerge from mashing up data sets to spot unusual correlations. Traditional computing systems are not built to handle this kind of diversity and complexity; traditional data analysis methods have had to evolve as well.

VERACITY: Poor data produces poor results, or, as IT engineers like to say, “Garbage in, garbage out.” How much of the data stream is spoofers, spammers, pranksters, and hackers? How much is coming from unreliable equipment or sources? When it comes to Big Data that’s driving your most important business decisions, hygiene matters.

The systems built to store these records were never meant to be used for real-time business and customer relationship management. The structured data stores of the 1970s and 80s, and the data warehouses and SQL databases of the 1990s, are built to handle defined queries and generate batch reports. Integrating these kinds of systems with high-performance Big Data architectures

turns out to be much more complex and costly than implementing Big Data solutions on their own.

“If organizations can’t process and integrate their own data, social graph and new data sources don’t matter,” said a senior marketing executive at a global hotel and hospitality corporation we spoke to for this project. “Big Data is hype if the back-end systems can’t support real-time transactions.”

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BUSINESS BALKANIZATION: On a more fundamental level, organizations began collecting their most important data for discrete purposes, managed by separate business units, often on purpose-built IT systems. No one imagined these would need to interact with completely unrelated systems and data stores, either inside or outside the enterprise, for analysis and visualization. Even when technology can provide solutions to enable integration and interoperability, the business owners of the data are reluctant to give up control or authorize their IT staffs to prioritize projects that don’t serve the core interests of their line of business and end users within their own organization.

TALENT: Businesses will never get useful insights from their data systems without asking the right questions and performing the right kind of analysis. Especially in the world of Big Data, where there are so many ways to slice, dice, and interpret the numbers, that comes down to the talent of the analysts and experts who design the systems and derive meaning from the findings. And that talent is in short supply.

In 2008, the term “data scientist” was barely on the radar. Today it is one of the hottest job classifications in the business world, with demand expected to exceed supply several times over by the end of the decade (see chart below). This poses several complications for marketers. Even well-resourced marketing departments will be hard pressed to outbid financial services companies and investment firms for the services of the top “quants.” Those that are available often have an IT orientation that does not mesh well with the culture of marketing and advertising, leading to misunderstandings and disconnects between creative and data-driven approaches. Also, the field is so new that even many IT professionals—and most HR professionals—do not yet have a firm grip on how to evaluate the true skills of candidates presenting themselves as data scientists, or how to determine the value of programs offering degrees and certifications in this area.

The Simpler the Experience, the More Complex the Data Challenge

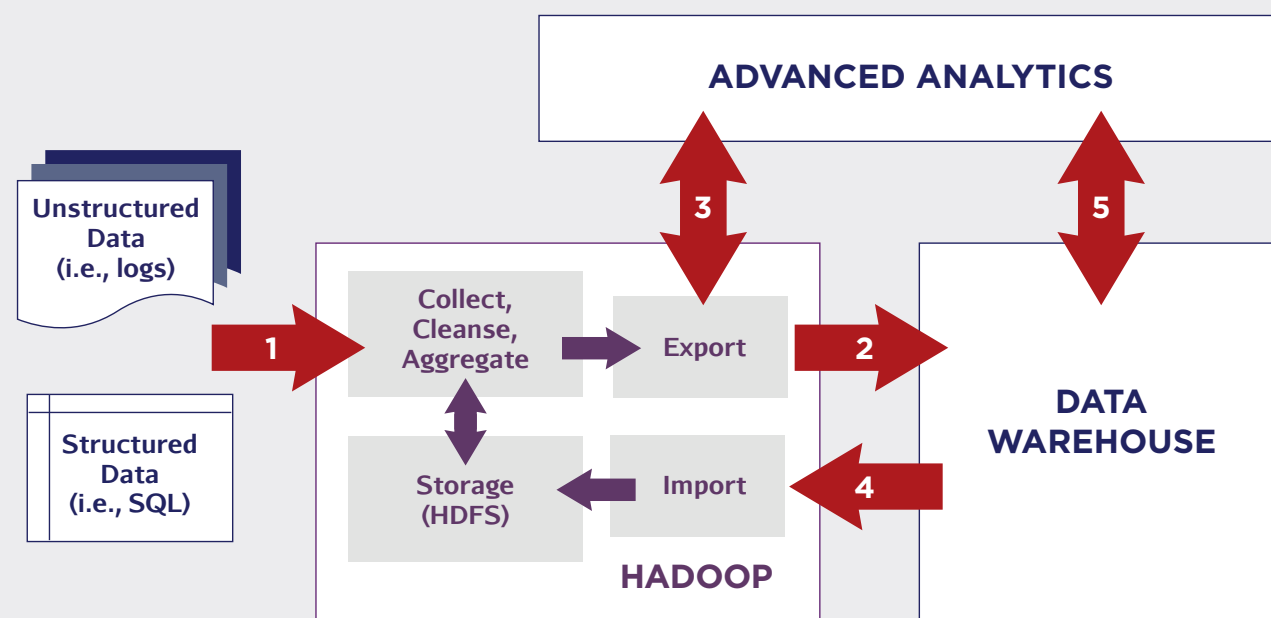
Even applications that can appear simple and straightforward to an end user can involve enormous complexities on the back end. One global consumer product brand we spoke to for this report is developing a mobile app to enable easy access to the company’s loyalty program.

“We want anyone who buys any of our products anywhere in the world, whether at a store, a restaurant, a vending machine, or wherever, to be able to easily add that purchase to their loyalty program profile via our app,” said the company’s director of mobile strategy. But providing a seamless experience for the end customer involves integrating dozens of stand-alone systems across geographies, channels, and sub-brands. In this case, the company is developing an application programming interface (API) to enable data exchange—a process that may take several years of intensive technical development and coordination.

That may seem like a large investment for a single application, but once you’ve freed the data from its silos, it becomes available for all kinds of other uses within the organization. “It always gets simpler the second time around,” said the executive. “We have dozens of pilot programs going on and expect to learn from all of them.”

Big Data Nuts and Bolts

THE ARCHITECTURE OF HADOOP

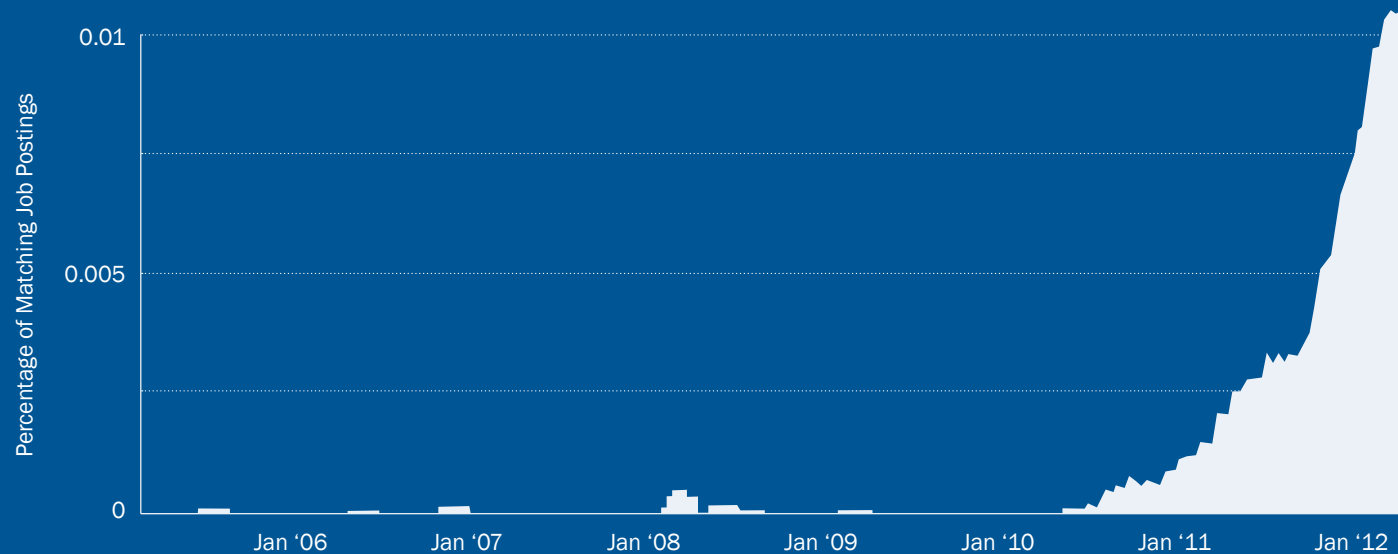


Hadoop uses massively distributed processing and storage to collect, cleanse, aggregate, and store data from unstructured sources (social, media, text, logs, etc.). It can then export that data, alongside data from structured databases and proprietary data warehouses, to be operated on by advanced analytics.

“THE SEXIEST JOB OF THE 21ST CENTURY”

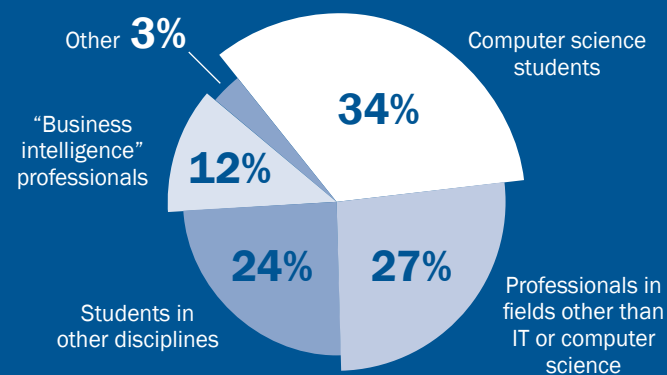
—Harvard Business Review, 2013

Job Trends: Data Scientist



Source: Indeed.com

Data Professionals Were Asked for the Best Source of New Data Talent



Source: The New York Times

How Challenging Is It to Source Analytical Skills in General?



Source: Data from a survey by NewVantage Partners (HBR.ORG)



COMMON LANGUAGE: To get the most out of Big Data investments, organizations need to democratize access to data and analytics tools beyond IT and technical data managers. In some cases, this requires not just basic skills training, but a cultural shift in how executives, business decision makers, and non-technical professionals approach their jobs. Facebook, where understanding Big Data is a core business competency, has instituted a two-week data “boot camp” for all employees to teach the fundamentals of analytics. They also embed statisticians within business teams to better align data and business goals.² This kind of training to give all business people a common language and understanding of data-based processes is likely to become routine in large organizations before long.

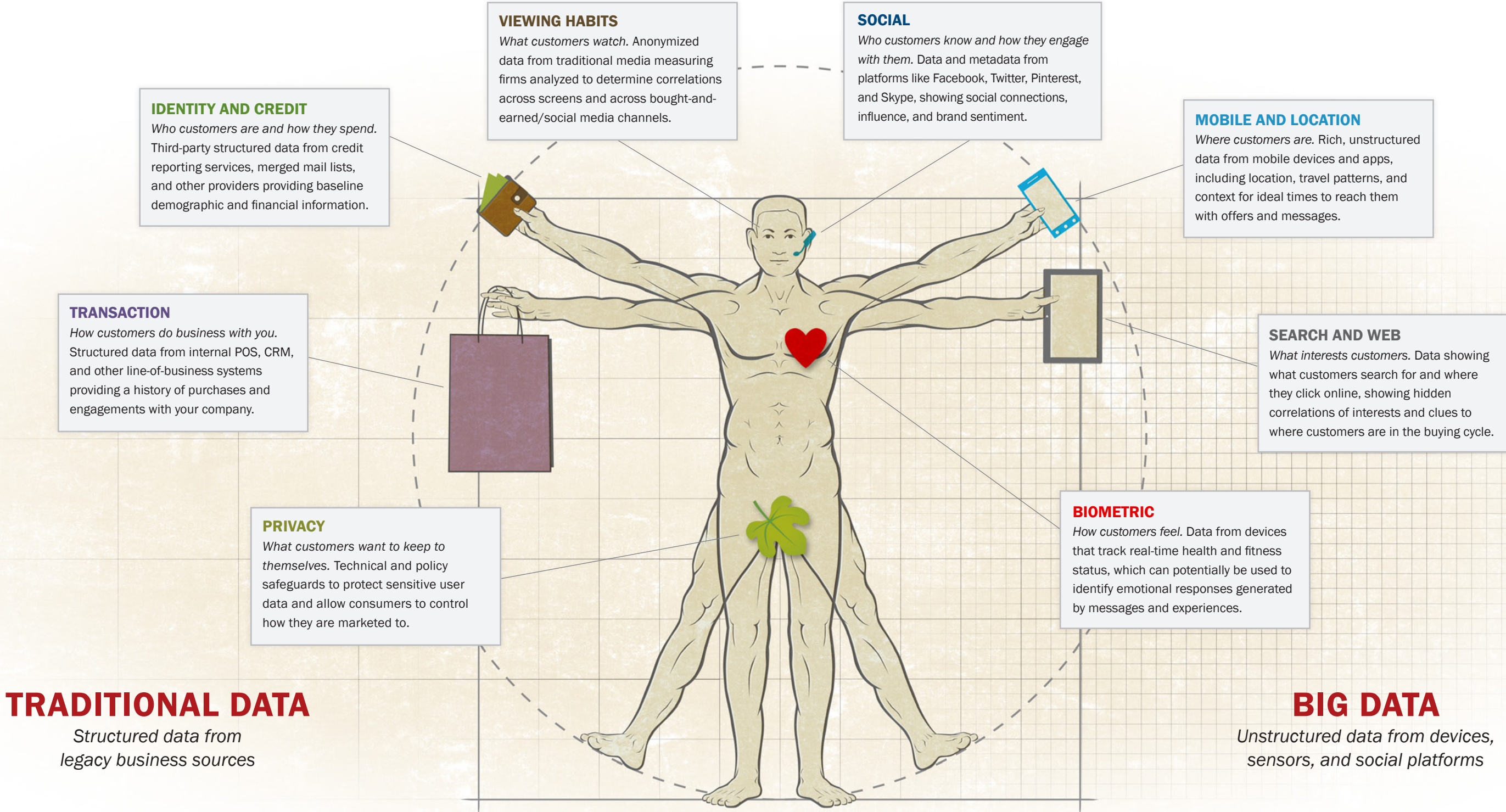
COMPLIANCE: Lastly, certain types of data including financial and medical records are subject to significant regulation, which can vary according to geography and legal jurisdiction. These regulations can make it difficult or impossible to use certain types of data; considering the risk of fines and jail time, compliance with these regulations is non-negotiable.

GETTING PAST THE ROADBLOCKS: Based on our conversations and the cases we researched, marketing organizations are adopting several strategies to overcome these hurdles:

- **New executive roles.** More organizations are adopting a chief marketing technology officer, chief digital officer, chief data officer, or comparable title to bring issues around marketing data policy, usage, and custody under one clear line of authority.
- **Interdepartmental working groups.** Global brands are bringing together specialists from different disciplines (marketing, IT, operations, service, sales, etc.) and from different divisions to tackle specific data-marketing challenges. Their tactical solutions are then applied as a template across the enterprise.
- **Democratization of access to data.** Current enterprise collaboration and CRM solutions provide data visualization tools—including ones as simple and ubiquitous as Microsoft Excel—that non-technical professionals can use to apply Big Data insights in day-to-day tasks.
- **Working with startups.** Some of the most interesting and innovative work around data, both for marketing and other applications, is coming from smaller firms and startups. Brands are successfully partnering with them to test and rapidly deploy solutions that would be difficult to execute in-house. See our paper “How Startups Are Reinventing Marketing from the Bottom Up” for more information.

BIG DATA: THE BIG PICTURE

BIG DATA GIVES MARKETERS A MORE COMPLETE VIEW of the customer in context, connecting traditional transaction and identity information with new sources from social, mobile, search, sensors, wearable devices, and market metadata. Integrating data across all these sources enables better targeting, conversion, measurement, and forecasting.



MARKET AND CONTEXT

What's going on? Data and metadata on weather, traffic, local and macroeconomic conditions, location-specific sensors, and other outside sources, which can provide time-and-place context for consumer behavior independent of customer characteristics.

THE USES OF BIG DATA IN MARKETING

FROM INSIGHT TO ACTION: Big Data enables quantitative measurement of complex processes throughout the marketing discipline down to a fine grain of detail that has not been possible in the past. Using this information to measure everything and set performance goals around arbitrary metrics can be tempting. However, marketing executives we interviewed for this research cautioned against the tendency to measure for measurement's sake. Here are some of the capabilities that effective use of Big Data allows marketers to do, not just know.

PERSONALIZATION AT SCALE: Having detailed knowledge of customer behavior and market trends enables large organizations to deliver personalization at scale: that is, to treat every customer as an individual, taking into account their likes, dislikes, interests, and tendencies, understanding where they are in the buying process, engaging with them in the right way at the right moment to influence their decision, and constantly adapting to anticipate future needs.

The ability to personalize brand experiences rests on knowing with confidence what each customer expects.

- What's the ideal context for attracting their attention?
- What's the right level of engagement to influence brand perception and consideration without "stalking" them?
- What combination of factors will move them toward the purchase decision?
- What level of service is required to keep them loyal, and to convert satisfied customers into brand advocates?

BLENDING MARKETING AND SALES: In a sense, highly sophisticated data-based marketing seeks to replicate the experience, intuition, and improvisational ability of a skilled sales representative in mediated transactions, using predictive analytics to anticipate behavior, short-circuit objections, and meet unspoken customer needs.

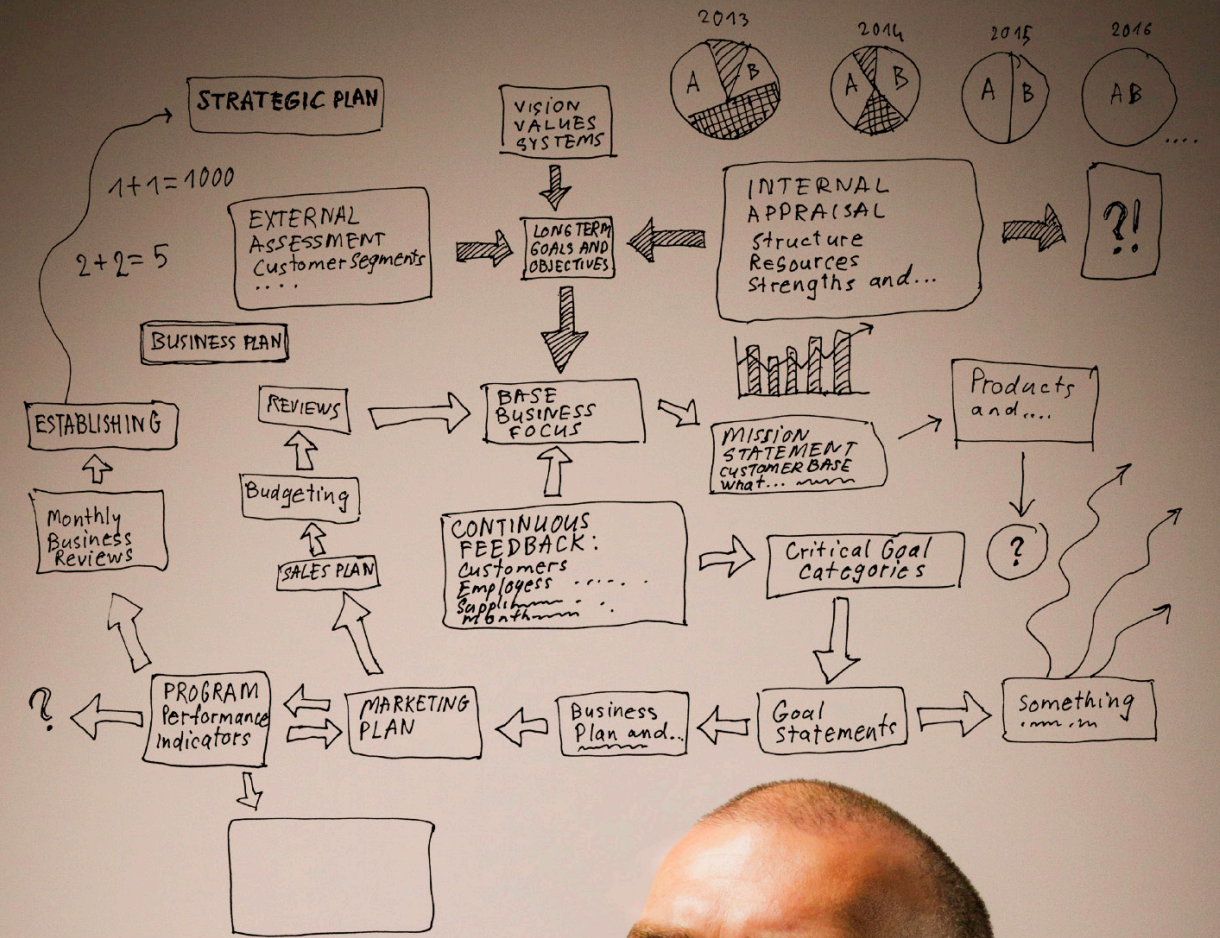
In the past, even the most sophisticated customer relationship management (CRM) and digital marketing solutions could not come close to delivering these capabilities because software only presented one, or at most two, dimensions of the customer relationship: who customers are (demographic data such as age, gender, ZIP code, income) and their transaction history.

Sometimes even providing this limited view is problematic because transaction history is segmented across physical point-of-purchase systems—which can only tie transactions to customers through credit card or loyalty programs—and digital e-commerce platforms with richer data capture capabilities. That means a retailer's best e-commerce customer could be shopping in a physical location and the store staff would have no way of providing any differentiated service or using what the company knows about the customer in any meaningful way to improve the experience.

A 360-DEGREE VIEW OF THE CUSTOMER:

The advent of Big Data allows companies to gain a far more nuanced picture of their customers. By connecting the proprietary data on their internal line-of-business systems and externally purchased customer data to the vast stores of rich, unstructured Big Data from search engines, e-commerce platforms, and social networks, as well as to emerging sources like geolocation and biometric apps, organizations can discover useful correlations in behavior and context that they would previously have had no basis to even suspect.

MEASURING TRUE PERFORMANCE: Companies can then use metadata to connect this full view of the customer to external conditions in the market, the environment (weather, traffic, etc.), and the customer's device, so companies can isolate relevant factors from ambient data and background noise.



Having detailed knowledge of customer behavior and market trends enables organizations to treat every customer as an individual.

WHAT'S NEXT FOR BIG DATA?

BIG DATA IS EXPANDING IN MULTIPLE DIRECTIONS. New devices and technologies are providing additional sources of quantitative information about people, places, and things, and software companies are developing richer tools to help non-technical decision makers view, manipulate, and understand what they are looking at.

New Sources of Data

BIOMETRIC INTEGRATION:

One relatively new source of data is from digital health and fitness devices such as wristwatches, headbands, digital pedometers, network-enabled running shoes, and even a sports bra.³ Increasing numbers of (mostly affluent) consumers are adopting these devices as part of a trend known as “Quantified Life,” which uses digital monitors to capture data about day-to-day activities. Access to this data could enable marketers to measure customers’ physiological response to ads, pricing, physical environments, products, and service delivery. Needless to say, access to this sort of intimate personal information would need to be permission-based, anonymous, and highly secure because any abuse would invite outrage and potential calls for regulation.

PERSONAL RECOGNITION:

Personal recognition technology, which has been honed to a high level of quality in security applications during the past decade, arrived in the mainstream consumer market with the launch of the Microsoft Xbox One gaming console in November 2013. The Xbox One Kinect sensor can identify individual users when they are in range of the camera and uses this information to automatically personalize the console’s settings according to

known and preset preferences. It is likely that similar technology will become part of mainstream home entertainment systems shortly, with the ability to provide precise data on who is in the room watching a given program. Advertisers could use this data to customize ad delivery to the device so that viewers would see only demographically (age and gender) appropriate commercials.

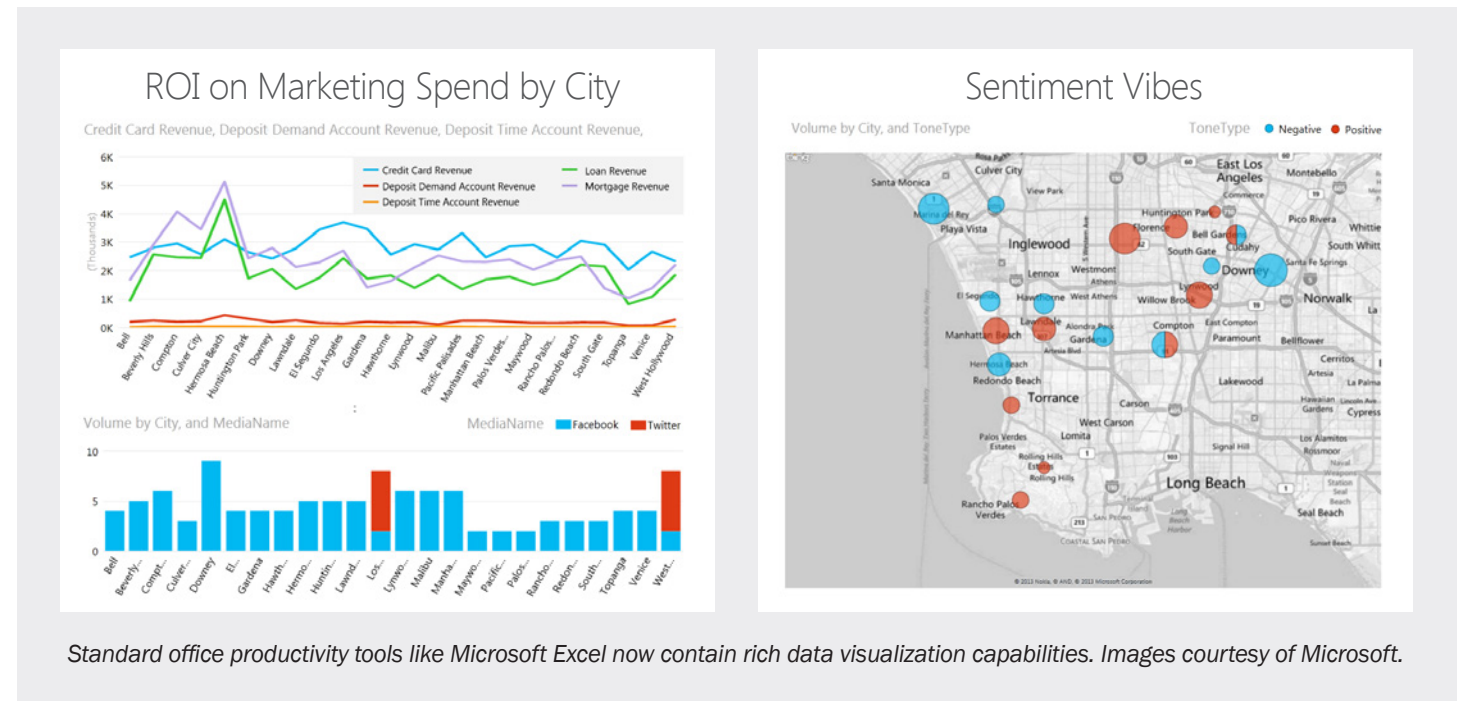
CULTURE HACKING: Subcultures have always been critical to marketing in that they incubate ideas with the power to influence mainstream opinion on everything from fashion to technology to art and music. For decades, brands have signified their edginess and cultural cache by incorporating aspects of subculture style and language into their marketing, and seeing breakthrough results when they choose the exact right music, style, design look, and attitude to capture the moment.

The challenge is that many genuine subcultures have high costs of entry and police their boundaries carefully against commercialization. Now, to the extent that these subcultures are present online not only on websites and blogs, but via platforms like Facebook, Twitter, Tumblr, and Pinterest, it is possible to quantify the kinds of conversations taking place within

specialized communities and intervene authentically and appropriately to influence the influencers.

Emergent marketing techniques such as *growth hacking* (which seeks to create a short-term “blow-up” of a specific idea or individual by accelerating its uptake through viral channels) and *scene hacking* (which seeks to “get inside the decision cycle” of a scene and influence conversations before they burst into public view) both benefit from richer social data that can assess the qualitative content and volume of conversations and the immediate effects of disruption.⁴

SMART SPACES: For the past several years, government and private entities have been deploying network-enabled sensors to monitor physical spaces and measure complex systems including traffic patterns, weather, energy consumption, and other items. These systems provide a detailed quantitative profile of physical environments for both analytic and predictive use. Marketers can use data from smart spaces to screen out uncontrolled variables—for example, to determine if poor sales at a particular store location might have been due to adverse weather or traffic rather than competition or other factors within the control of the business.



New Ways to Use and Explore Data

DYNAMIC GRAPHICS AND DASHBOARDS:

Dashboards and dynamic performance indicators have been a staple of business intelligence (BI) tools for more than a decade, but many are built to fit the needs of “small data” relational databases rather than Big Data. Hadoop provides a powerful framework for Big Data analytics at the lowest levels, but is too complex for non-technical users. Now some large software vendors and startups are developing visualization tools that operate on both standard and Big Data, using a technology called a federated query layer to bring together legacy and new data sources in a single view. Microsoft Excel, for example, brings this kind of visual functionality into a productivity tool familiar to just about every business user.

NEW DISPLAY TECHNOLOGIES FOR RICHER

VISUALIZATIONS: Large-format displays, 3-D displays, 3-D printers, and augmented reality all provide new opportunities to present data sets in vivid and interactive formats. Marketing analysts may soon be able to view campaign performance metrics and customer data the

way a surgeon analyzes an MRI or an industrial designer explores a CAD illustration or product model. This level of richness and detail can reveal hidden connections and leverage points that lead to better business decisions.

MACHINE-ASSISTED ANALYTICS:

IBM recently made its Watson supercomputing technology available for public use, where it will apply the same complex reasoning and problem-solving capabilities that bested human opponents in chess and *Jeopardy* to business and Big Data analytics. This is just one example of an area of computing known as cognitive systems, which is growing rapidly in capability and accessibility because the heavy processing is done in the cloud and distributed to mobile devices and tablets through apps. Cognitive systems can unlock the value of unstructured data by simulating the complex judgments that humans make in observing, evaluating, and classifying images, videos, and text. They can also automate much of the expertise that statisticians apply to the analysis of data patterns, bringing sophisticated analytics capabilities to a much broader constituency of business users.

Respect Consumers

ANONYMIZE DATA: In most marketing data scenarios, it is not necessary to connect the attributes of promising consumer targets to individual identities to get the desired business results. It is enough for marketers to know that “Customer X,” part of a group of males between the ages of 18 and 24, living in a specific set of ZIP codes, with a household income between \$25,000 and \$40,000, with a specific set of interests (music liked and streamed, events attended, celebrities “liked,” etc.), and a social circle that includes more than five others with similar interests, is most likely to respond to an offer delivered on his Xbox after a third successful attempt to level up, between 7:00 and 10:00 P.M., featuring a product discount of 20 percent.

We do not need to know that one of these consumers happens to be John Smith of Columbus, Ohio, who also collects stuffed animals and hasn’t been in a relationship in eight months. The only time a marketer is interested in Mr. Smith by name is when he identifies himself in a transaction, either in person or online, so that relevant information about his likes and dislikes can be used to create a better, more personalized service experience. And even then, it is in no one’s interests to invoke irrelevant personal data even if it is known or discoverable, unless the customer has given affirmative consent.

COMPENSATE CONSUMERS FOR THEIR DATA:

Growing numbers of consumers understand their personal data and opinions are valuable and do not want to give them away without permission or, in some cases, compensation. Many brands routinely offer gift credits, loyalty points, or other consideration for customers who take time to fill out surveys. Location-based data marketers like Placed and CheckPoints pay people to install their apps, check into locations, and have their movements tracked (anonymously). Apps like Locket and

SmartAds offer payment or credits for permission to serve mobile ads—ones that generate more reliable viewer metrics than other forms of digital advertising. One startup social network, Teckler, promises to pay users for creating, sharing, and searching for content as compensation for the value of the social graph data.

It is in no one’s interests to invoke irrelevant personal data even if it is known or discoverable, unless the customer has given affirmative consent.

While it remains to be seen if any of these approaches will catch on in a way that threatens to displace the current “free to use with implied consent” model pioneered by Facebook, the next few years are certain to see the widespread development of data collection countermeasures designed to block or fool tracking and measuring tools. In our forecast map, we call this trend App-Me-Nots. Technology platforms and brands that cannot come to terms with consumers on a fair deal for the use of their data may find themselves in an arms race with outside developers, privacy advocacy groups, and commercial businesses happy to provide these tools to the public.

Demonstrate Value

Perhaps the easiest way to overcome negative perceptions about data-driven marketing is to use the data to create new processes that benefit customers in direct, tangible ways by saving them time and money. Some of the best practices today include:

MAKE RELEVANT RECOMMENDATIONS. Amazon’s recommendation engine is the gold standard but other retailers are also becoming highly sophisticated about going beyond transactions and looking at customers’ social, search, and browsing interactions for clues to broader tastes.

TAILOR OFFERS AND DISCOUNTS ACCORDING TO KNOWN PREFERENCES. The grocery chain Safeway is one of several large retailers that uses customer shopping data to offer upsell and cross-sell promotions to members of its loyalty program via a mobile app, which includes general coupons and “Just for You” discounts. In some cases, the rules for personalization of discounts, loyalty programs, and targeted offers triggered by behavior patterns are creating a de facto system of personalized pricing, one of the endpoints of Big Data in marketing according to our forecast map.

SIMPLIFY CUSTOMER ENGAGEMENT. Many companies are finally getting better about bringing a complete view of the customer relationship into service channels, such that even a call to a far-away call center need not entail callers explaining their problem over and over again to different tiers of service agents or having to identify themselves using an order number or customer code. Large portions of this process can now be automated through voice and text recognition, data discovery, and analytics.

ENABLE PERSONALIZED SERVICE. In retail locations, facial recognition, biometrics, and other implicit detection technologies will soon assist sales associates in identifying high-value customers.



CONCLUSION

The influence of Big Data is being felt throughout business and government. It gives us the awesome and unprecedented ability to measure nearly every facet of daily life and correlate those measurements to discover relationships we could never have imagined. It gives businesses the ability to look at a market composed of millions of customers and see them not as a mass, not even as a collection of narrow niches, but as individuals with unique tastes, values, and triggers. It gives us a statistical basis for identifying propensities, a powerful tool for anticipating consumer and market reactions and decreasing risk.

The ability to gather and analyze Big Data is a technological accomplishment. The applications of Big Data in marketing and elsewhere remain human decisions. The experts and practitioners we consulted for this paper have different perspectives on the right approaches to the implementation of IT solutions, the right ways to collect and visualize data, expose it through apps and portals, and build the tools and apps to turn it into better customer experiences, but they agree on this: Organizations can make the investments and build the tools to get answers, but they need to ask the right questions.

KEY TAKEAWAYS

- Big Data's greatest value to marketers is to provide the means to personalize customer experiences at scale.
- Big Data's value to marketers comes in the intersection of existing customer information from enterprise systems with social, search, location, and other emerging sources of online data.
- The biggest challenges around Big Data among the marketing executives and technology professionals we talked to were organizational, managerial, talent-related, and cultural, not technological.
- Among the reported technology challenges, the most troublesome involved integration and migration of legacy data into systems that enable real-time operation.
- Privacy concerns arise from fears that data will be used to discriminate against or embarrass individuals. When data policies are based on anonymity, transparency, and fair value for consumers, objections diminish.
- Future sources of Big Data include sensors, smart spaces, wearable devices, and biometric and medical equipment, which can fill in crucial context for everything from the business climate to individual transactions.

The ability to gather and analyze Big Data is a technological accomplishment. The applications of Big Data in marketing and elsewhere remain human decisions.

BIG DATA BY THE NUMBERS

- **2.8 ZETABYTES** (1 ZB = 1 trillion GB) of data in the world in 2012. **90%** was created in the past **2 YEARS**.
—Digital Universe and IBM, 2012
- **0.5%** of the world's data is analyzed. **80%** is **UNPROTECTED**.
—Digital Universe, 2012
- **\$600 BILLION** estimated **REVENUE SHIFT** by 2020 to companies that use Big Data effectively.
—McKinsey and Company, 2013
- **84%** of consumers want a **SEAMLESS EXPERIENCE** across channels.
—Retail Systems Research, June 2013
- **56%** of companies say getting **VALUE OUT OF BIG DATA** is a challenge. **33%** say they are **CHALLENGED TO INTEGRATE** data across multiple sources.
—Gartner, 2013
- Walmart collects **2.5 PETABYTES OF DATA** every hour from customer transactions.
—ZD Net, 2013
- Currently **1.1 BILLION** Facebook users worldwide, **68%** on **MOBILE**.
—Internet Trends, 2013
- **140,000–190,000** current **JOB OPENINGS** for data scientists.
—Money, 2013

About This Report:

FROM BIG DATA TO SMART DATA is the fourth in a series of research papers looking at the convergence of digital technology and marketing during the next 5–7 years. Researchers gathered material and conducted interviews from February through June, 2013. Sponsorship for this research was provided by the Microsoft Developer Platform Evangelist (DPE) and Corporate Marketing (CMG) groups. All interview subjects were apprised of this in advance. Participation or citation in this report does not imply any relationship with or endorsement of Microsoft or its products. Contents of this report are © 2014 MediaPlant, LLC. Permission required to quote extended excerpts, redistribute, or syndicate.

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ROB SALKOWITZ is an internationally recognized author and expert in entrepreneurship, innovation, and the disruptive effects of technology on business. He is author of four books: *Young World Rising: How Youth, Technology, and Entrepreneurship are Changing the World from the Bottom Up* (Wiley, 2010), *Generation Blend: Managing Across the Technology Age Gap* (Wiley, 2008), *Listening to the Future* (with Daniel W. Rasmus, Wiley, 2009), and *Comic-Con and the Business of Pop Culture* (McGraw-Hill, 2012). His work has appeared in *Fast Company*, *Forbes*, *Bloomberg Businessweek*, *Entrepreneur*, and the *New York Times*. He is a cofounder and partner at MediaPlant, where he serves as director of strategy and content.

About MediaPlant:

MEDIAPLANT is a communications firm specializing in B2B marketing, strategy, and technical development. Founded in 1999, the company and its principle partners have completed projects for Microsoft, HP, Herman Miller, Watchguard, Ford Motors, and many other global leaders. MediaPlant has offices in the Pioneer Square neighborhood of downtown Seattle, Washington. For more information, see www.mediaplant.net.

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Notes and References:

¹ Lund, et al. "Game Changers: Five Opportunities for US Growth and Renewal." McKinsey Global Institute, July 2013. http://www.mckinsey.com/~media/McKinsey/dotcom/Insights/Growth/US%20game%20changers/MGI_Game_changers_US_growth_and_renewal_Full_report.ashx

² <http://www.pcworld.com/article/2058900/hadoop-is-not-enough-for-big-data-says-facebook-analytics-chief.html>

³ The sports bra was reportedly under development at Microsoft Research, but was suspended because of battery life problems. "Microsoft's stress-detecting sports bra loses its charge as a research project." *Seattle Times*, December 4, 2013.

⁴ Analysis courtesy of Venkat Rao, a thought leader who assisted with preliminary research on this series.

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