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Getting results from big data

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A capabilities-driven approach to the strategic use of unstructured information

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Executive summary

The world is facing a data deluge never seen before. Unstructured data — from online behavior, purchases, mobile devices, location tracking, sensors, and other sources — has been growing at a rate of more than 50 percent per year. By 2015, it is expected to reach close to 8,000 exabytes, which is about the equivalent of 500 billion fully loaded iPads. Companies are positioning themselves to compete based on their access to and use of big data. Many of them start with technology, but that won't serve you well. Instead, take a capabilities-driven approach. Look first at your company's overall strategy and the capabilities system that can help it reliably and sustainably outpace its competitors. Then look at the categories of data: external (outside your business) versus internal sources, and structured versus unstructured forms. Different types of information will be valuable to different companies, based on the purpose of the enterprise.

Third, consider where and how you can put big data to use — which parts of the business will gain the most from the added insight about customers or processes. Then, and only then, look at the tools you need to buy, build, and implement for your new approach. Finally, explore the skills, practices, and other aspects of your operating model that need to be in place to achieve your objectives with these tools.

The strategic use of big data

The amount of data available to businesses has grown significantly over the last few years. CIOs, technology evangelists, consultants, vendors, and many executives frequently use the term "big data" to refer to various possibilities. Strictly speaking, the phrase refers to the huge amounts of information from the world at large — from sensors, accumulations of digital text and video, electronic transactions, observed online behavior, and other forms of recorded activity — that can be used to analyze and predict what people and systems do. More generally, the term refers to the tools, processes, and procedures that organizations use (generally on a real-time, minute-by-minute basis) to gather big data; develop better knowledge about their customers, operations, employees, and other assets; and apply that knowledge in new decisions and automated actions.

Leaders in many industries are looking to gain valuable insights through big data. They believe it will lead to more intelligent decisions about which customers to target, how to target them, how to price, what products and services to launch, how to manage risk, whom to recruit, and more.

But despite the growing wave of interest and the dramatic potential of the concept, very few enterprises have found a way to embrace big data in a manner that actually yields better business results within a practical time frame. This gap between concept and practice reflects the fact that big data is still a relatively new functional specialty, and there is much to learn about its real-world use and value.

If you are a CIO, wondering if big data represents the next answer to supporting growth in your industry, you should resist the urge to move hastily, without a well-thought-out strategy. That means not just an IT strategy, but a focus on the overall strategic priorities and value propositions of your company, and an awareness of how these tools might fit. Investing for future growth should involve a lot more than buying open-source file system infrastructure, installing off-the-shelf software, and hiring analytic experts to make sense of the incoming

data. All too many companies have started down that data- and technology-centric path without much success.

The answer is in applying a capabilities-driven approach to big data. This means working with your company's overall strategy — and, in particular, the capabilities system that can help it reliably and sustainably outpace its competitors — to see what contribution big data can make to enable specific capabilities that will help you win and differentiate yourself in the marketplace. Then put in place the processes and practices that best fit the purpose of your enterprise.

The CIO's perspective

As recently as 2005, there was an estimated 130 exabytes (about 130 billion gigabytes) of data in the entire digital universe. Since then, the amount has been growing at a rate of more than 50 percent a year, and in 2015 it is expected to reach close to 8,000 exabytes — about the equivalent of 500 billion fully loaded iPads (*see Exhibit 1, next page*). A significant part of this data growth is unstructured; it consists of material including Web content, news and social feeds, message board postings, video clips, and other data that cannot easily be grouped into recurring fields. When people create this type of material on the Web, they share information about their interests, attitudes, and buying habits, among other things. Concerns about privacy are lower than ever before, and the data from location-aware mobile devices has exacerbated the amount of data, and the types of data, to be gathered. We are truly looking at a data deluge never seen before.

It is understandable that many CIOs and business executives resist jumping in to make major investments in this opportunity. After all, some industries have dealt with terabytes of information for years. In financial services, 83 percent of the industry's huge technology expenses come from acquiring, managing, and extracting value out of data. Healthcare, retail, telecom, and other industries are not very far behind. They see no reason to raise these investments higher. Moreover, many past initiatives aimed at gathering business intelligence have not realized the expected benefits. CIOs and business executives are wary of adopting another "intellectual" initiative or repackaging their traditional business intelligence and data mining efforts under a new buzzword.

Hence, most CIOs are torn. Should they embrace the big-data trend by spending money to build new capabilities? Or should they wait for the hype to settle down and risk losing competitive edge to other industry players? In making that decision for your enterprise, there are four fundamental questions to ask, and largely in this order:

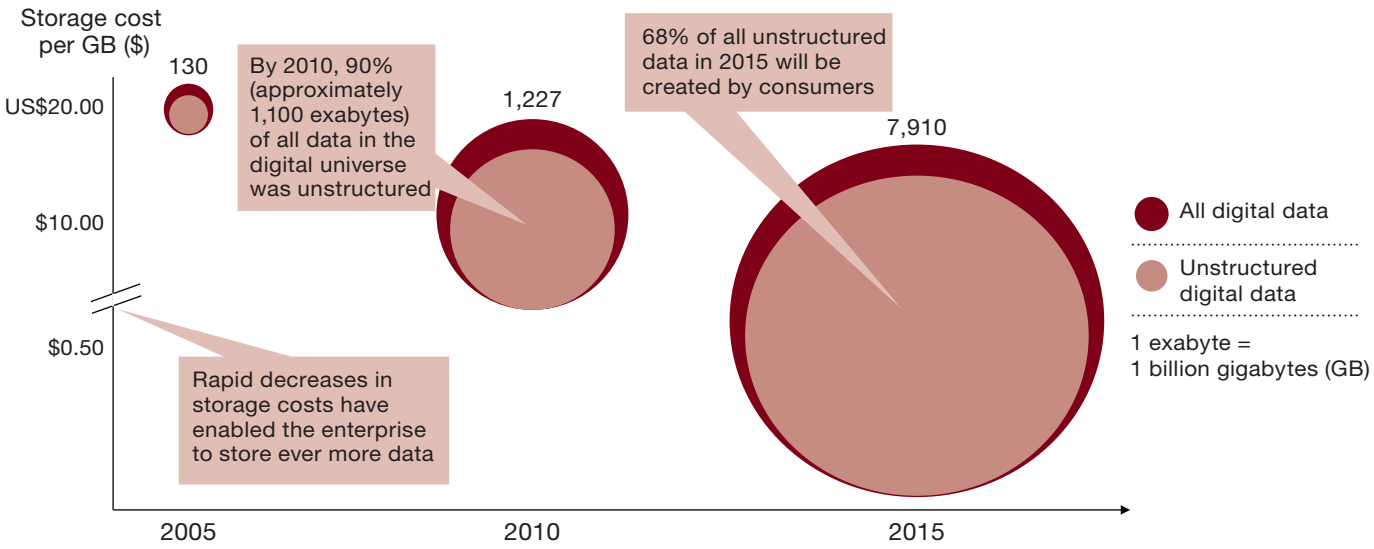
1. How does this technology fit with our strategy, and especially with our capabilities system?

2. Where and how can we put big data to use?

3. What tools do I need to buy, build, and implement?

4. What aspects of our operating model need to be in place?

Exhibit 1
Total global data storage in exabytes



Source: IDC's Digital Universe Study, sponsored by EMC, June 2011

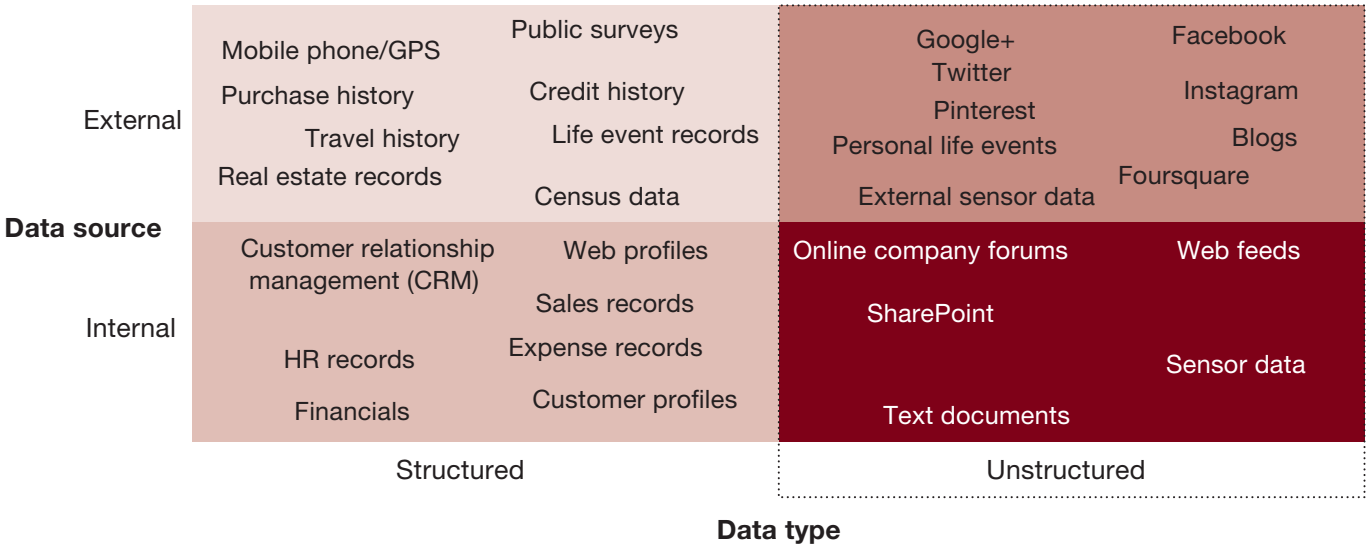
How does it fit with our strategy?

The first step toward building a winning strategy is to clearly articulate if big data is the right call for your company. To define big data in an actionable way, it is critical to understand what data sets are relevant to your enterprise — and especially to the drivers of its capabilities, and thus its profitability and growth. There is a universe of possible data to consider (*see Exhibit 2, next page*). It can be divided along two dimensions: data type (from tightly structured to loose and unstructured) and data source (from internal to external).

Different organizations have different information needs. If your biggest areas of growth and strategic focus are linked to the two right quadrants — for instance, if you glean significant opportunities from social media, online postings, and sensor-driven information — then pursuing a big-data strategy may be right for you. For business-to-consumer (B2C) companies, the top right quadrant offers the largest area of opportunity for firms to discover new consumer insights and ultimately transform products, marketing, and customer engagement strategy. In the business-to-business (B2B) world, internal unstructured data (the bottom right quadrant) is a prime learning ground for enterprises to understand how to mine value from unstructured data formats.

Some companies, in either B2C or B2B markets, may have more opportunities with their current framework of structured data management and business intelligence tools and solutions. For example, big-data analysis is not effective in managing traditional issues with structured data — such as the reconciliation of customer records or accounts of financial transactions — where ineffective data management practices and lack of data governance have led to problems over time.

Exhibit 2
Four dimensions of data



Source: IDC's Digital Universe Study, sponsored by EMC, June 2011; Strategy& analysis

Where and how can we put big data to use?

Where can you find the most value in big data? It is relevant in several functional areas including, but not limited to, customer and marketing analytics, electronic media analytics (covering web pages, mobile devices, and social media), operational effectiveness, performance management, and fraud and risk management. To unlock the value of big data, you should focus on the business needs of your company and customers.

For example, are you looking internally, at your practices, structures, and processes? Can you transform your business processes or create new business models by embracing next-generation analytics? Or are you looking externally, at your market? Can you bring customer insights to a more granular level, monetizing them by transforming your offerings, often on a real-time basis?

For example, the Progressive Casualty Insurance Company, as part of its "pay as you drive" program, offers drivers the chance to lower their insurance premiums based on real-time analysis of their driving habits. Drivers plug in a device called Snapshot, which collects a large volume of data (for example, time of day, miles driven, and number of hard brakes) over a period of time. Then, based on analysis of the data, Progressive offers a discount on the individual's insurance premium. Allstate has started providing a similar solution, offering premium discounts to customers who regularly drive safely. This plays well into Allstate's distinct competitive offering of customized products to meet the needs of the individual consumer.

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Similarly, Amazon and PayPal use their big-data capabilities for fraud detection in line with their reputations as secure e-commerce and payment platforms. American Express, by contrast, is working on a separate analytics-based business line for B2B clients — using the proprietary data it holds to create new services to enhance customer acquisition and retention programs for marketers and merchants.

Though identifying the right use for big data is critical, equally important is to clearly define expected outcomes and benefits from pilot initiatives in a quantifiable and verifiable manner. Pilots launched can then be expanded or fine-tuned based on outcome.

What tools do we need to buy, build, and implement?

Responding to the challenge and opportunity of big data by investing in IT infrastructure without the proper context and solution definition will only result in added complexity to the IT infrastructure and architecture, and could even lead to failure. Virtually every type of information from your customers and operations can be collected and stored, but doing so without a clear purpose is costly in the long run.

When looking for big-data tools to implement, a CIO must first transform the enterprise's information management technology stack to include non-relational databases, new data distribution architecture, in-memory processing, machine learning–based analytics, business-process management software with embedded analytics, bi-directional real-time data provisioning to channels and interactions, full population analytics, and so on. This is a paradigm shift in the way information should be managed to make big data useful and fully integrated into internal information environments. It is also important to realize that there is no single standardized big-data software stack and that the technology is still maturing.

New distributed technologies such as MapReduce (developed by Google) and Hadoop (an open-source Apache platform) process large volumes of unstructured data, and import the results for a broad range of business functions. There are vendors such as Cloudera, Hortonworks, and MapR, among others, that distribute open-source Hadoop platforms; in the database space, MongoDB, Cassandra, and HBase are prominent. Some other products in the technology stack include programs for unstructured data conversion (voice-to-text or video-to-text), security, and niche analytics. There are several choices in the marketplace for investing in the rapidly evolving big-data technology stack. Each of these technologies and related products can be adopted in different ways depending on your business needs and the capabilities that will be supported, and the solutions have to be used flexibly to address functional requirements. Executives should also be careful not to invest heavily in any one particular solution until technologies mature.

However, the speed and uncertainty of technological change should not dissuade you from making targeted investments that will help your organization develop a better understanding of what the technology offers while delivering against ROI expectations for business transformation. For most companies, the best way to start is with a small, niche-oriented, and flexible approach. That way, you can prepare to engage with customers and business functions in a selective way at first, and then be ready to scale up.

What aspects of our operating model need to be in place?

Successful execution of a big-data road map requires an operating model that incorporates the right skills, practices, processes, and funding patterns. The business leaders need to understand the value of data and how it can enable the strategy and winning capabilities system. There should be technology experts who know how to collect, organize, structure, and store data for use; and "usage" experts, sometimes known as "data scientists," who bridge the business and technology areas and know how to architect big data, use the data, create required insights, and embed the insights into operational business processes that enable the target business capabilities. The skill sets required are highly specialized and sometimes scarce, both within the typical enterprise and in the marketplace. CIOs should balance recruitment of external new hires (data experts) and internal resources (IT and business requirements experts) with selective use of service providers for high-end data analytics to bring in complementary capabilities and build out their teams.

Interestingly, big data could also mean the beginning of a shift in the role, or the expansion in remit, of a CIO (*see "Does the Company CIO Have a Future?"* by Mike Cooke, *Financial Times Online*, February 15, 2012). For a long time now, CIOs have focused the majority of their time and effort on managing technology. Slowly, more and more technology executives are realizing that their firm's success is dependent on the analyses of the information the company collects and manages, while the technology management part gets commoditized or outsourced. In the future, the role of a CIO could get bifurcated into the role of a chief strategic information officer (responsible for managing information assets) and a chief technology officer (responsible for technology assets). Big data presents an excellent opportunity to transition to a new model that includes both of these positions within an enterprise.

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Conclusion

The next decade of competitive advantage and productivity improvements will increasingly involve highly "intelligent" technologies and processes that digitize, analyze, and assimilate the ever-growing realm of data at speeds never seen before. Enterprises that embrace this fact early on will have a head start over their rivals to drive newer growth opportunities.

CIOs have a tremendous opportunity with big data to be champions of a technology-driven growth strategy for their organizations. But this requires having a clear understanding about the relevance and complexity of data in their organization and how it can transform business processes or help build the winning capabilities needed to provide value. The margin for error in this highly competitive market landscape is small, and CIOs would be well advised to craft a winning big-data agenda that is aligned with their enterprise's capabilities-driven strategy and core strengths.

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