

Big data: New insights transform industries



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Organizations today are collecting tremendous volumes of data, generated by a wide variety of sources, often at extreme velocities. This is “big data”—the millions of stock trades, call detail records (CDRs), social media posts and patient test results produced every single day.

Leading organizations in financial services, telecommunications, retail, healthcare, digital media, insurance and other industries are adopting advanced technologies to generate new, actionable insights from big data that can help them dramatically reduce financial risks, increase operational efficiencies, enhance customer loyalty and improve healthcare outcomes (see Figure 1). These organizations are tapping into big data to transform not only their businesses but also their industries.

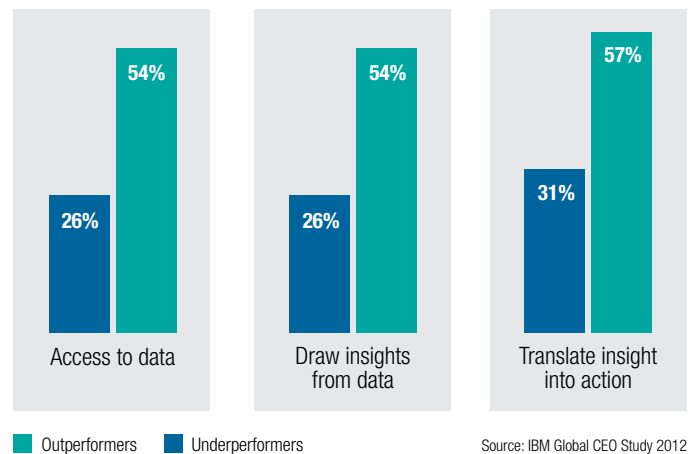


Figure 1: Outperforming organizations (those with high revenue growth and high profitability) surpass underperformers across three dimensions—data access, insight and action—highlighting a correlation between success and the ability to derive value from data.

What's new in big data?

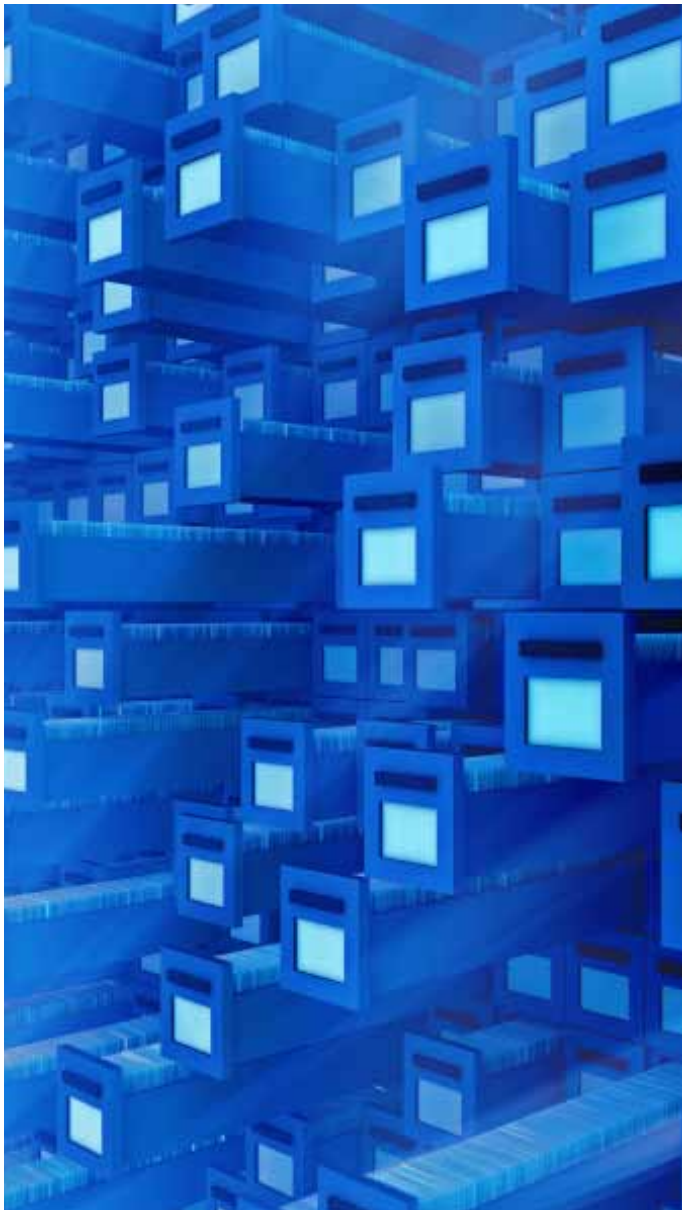
In the past, organizations used technology solutions to analyze historical data and identify broad trends based on a limited collection of information housed in structured databases. Today, however, cutting-edge technologies enable organizations to analyze much more data from an extensive array of sources at incredible speeds. Now, leading organizations can:

- Conduct real-time analysis of customer behaviors to produce tailored experiences and targeted promotions.
- Measure the effectiveness of online advertising to fine-tune campaigns while they are in progress.
- Adopt advanced content analytics solutions to mine social media posts and call-center logs in order to assess customer sentiment and avoid churn.
- Analyze data continuously streaming in from operational sensors to increase service uptime, facilitate better planning and anticipate risks.
- Implement predictive analytics solutions to anticipate future customer behaviors, avoid risks and identify potential outcomes.

With the right tools, organizations are capitalizing on the wealth of opportunities that big data presents.

Know and serve customers as individuals, not segments

According to the IBM® Global CEO Study 2012, forward-thinking CEOs identify customer insight as the most important area for new investment.¹ (See the sidebar, “Invest in analytics to generate new customer insights.”) These leaders want to capitalize on the vast potential of big data to provide deeper insight into customer preferences, needs and trends.



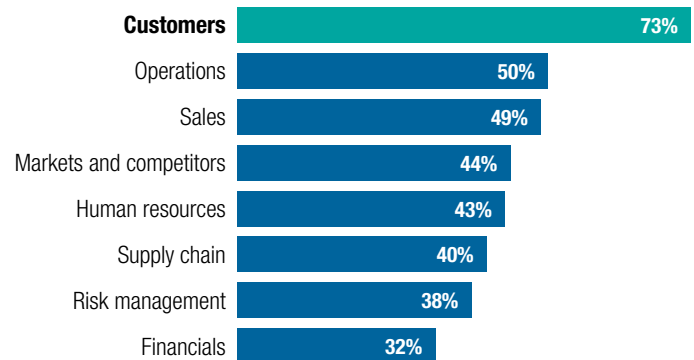
For most organizations, there is no shortage of customer data available. Banking customers provide financial information on credit applications and discuss banking problems during customer service calls; telecommunications subscribers continuously generate smartphone usage data; and retail customers enter information for online transactions and register their “likes” on social media networks. The challenge lies in handling the volume and velocity: businesses must efficiently analyze that data in order to generate timely insights that can help them enhance the customer experience.

Many organizations already use data management solutions to integrate customer information from multiple sources and create a single, holistic view of each customer. New solutions designed for understanding big data can now push those capabilities further. Organizations can use advanced analytics to provide near-real-time trend analysis and anticipate future outcomes. These solutions can produce insights that help organizations create targeted marketing promotions, optimize ad campaigns, avoid churn and improve cross- and up-sell opportunities.

Invest in analytics to generate new customer insights

The IBM Global CEO Study 2012, the fifth biennial CEO study from IBM, drew on more than 1,700 interviews of CEOs, general managers and senior public-sector leaders from around the globe to assess how executives are responding to the complexity of increasingly interconnected organizations, markets, societies and governments.

According to the study, these leaders identify solutions that can generate customer insights as by far the most critical investment area for future success (see Figure 2). By implementing solutions that analyze the increasing volume and variety of customer data available, including data generated through social media, organizations intend to connect pieces of data into more complete profiles; empower staff with predictive analytics to better understand the individual customer’s needs; respond to demands with focus, precision, relevance and speed; and blend the physical and digital worlds to offer value independent of the customer’s location.



Source: IBM Global CEO Study 2012

Figure 2: CEOs and business leaders identified customer-insight solutions as the most important area for new investments.

In retail, leading organizations are investing in advanced analytics solutions to explore big data, detect patterns and reveal new insights that are helping them better understand and engage with individual customers. They are capturing customer sentiment and discovering new insights by examining a variety of structured and unstructured data, ranging from information they have already collected to sentiments expressed through social media.

Predictive analytics capabilities enable retailers to conduct precise segmentation, down to the individual level, by gauging future customer behaviors. Marketing teams can be more precise in identifying prospects, managing their marketing budgets to maximize their marketing return on investment, and developing targeted and relevant offers across all channels that deliver a richer, more personalized shopping experience. (See the sidebar, “Better serve individuals across multiple retail channels.”) At the same time, retailers can optimize merchandising decisions for pricing, assortment, inventory and demand forecast.

Some forward-thinking telecommunications companies are capitalizing on big data to transform call centers from cost centers to revenue drivers. They use solutions to analyze previous customer interactions, integrate information with existing customer information and present real-time results to call-center agents so they can provide timely cross- and up-sell offers. Drawing on micro-segment, location and search-history information from across multiple channels (such as smartphone, landline, TV and Internet services) enables companies to deliver highly targeted product bundles.

Better serve individuals across multiple retail channels

Bass Pro Shops needed ways to increase retail shopping consistency across a full range of channels, including its retail store, boat dealership, Internet, catalog, wholesale, restaurant and resort channels. The company selected an IBM Netezza® customer intelligence appliance, which provides retail marketers with business intelligence and analytic reports on customer behavior.

Impact: The company can increase customer satisfaction and improve loyalty by providing a consistent experience no matter how customers choose to shop. New customer insights enable the organization to tailor offers and fine-tune each of its customer channels to maximize their appeal and ultimately drive more sales.

“IBM analytics allowed us to quickly get information across our multiple channels and lines of business in one place to deliver meaningful analytics that drive top-line and bottom-line results. We can now create and deliver more targeted promotions, circulars and catalogs to create a better customer shopping experience.”

—Leslie Weber
Chief Information Officer
Bass Pro Shops

Communication service providers are also leveraging predictive analytics to reduce customer churn. By gaining insight about customers with a high propensity to change services or move to competitors, they can proactively engage and service those customers' individual needs and retain their business. (See the sidebar, "Anticipate customer behavior with predictive analytics.")

At the same time, banks are using analytics solutions to mine big data for insights that help them create more customer-focused enterprises that foster lasting relationships. They are moving beyond customer surveys and the review of customer service logs to analyze a variety of structured and unstructured information. For example, leading banks are analyzing Internet feedback and social media posts to address negative comments and build on positive ones to improve their reputation and retain customers. Building stronger, lasting relationships with customers is having a direct, positive impact on revenues.

Anticipate customer behavior with predictive analytics

US-based communications service provider XO Communications wanted to reduce customer churn among midsized business groups without having to devote additional resources to managing those numerous accounts. XO implemented IBM SPSS® predictive analytics software to analyze large volumes of customer data and anticipate which midsized businesses were most likely to move to competitors.

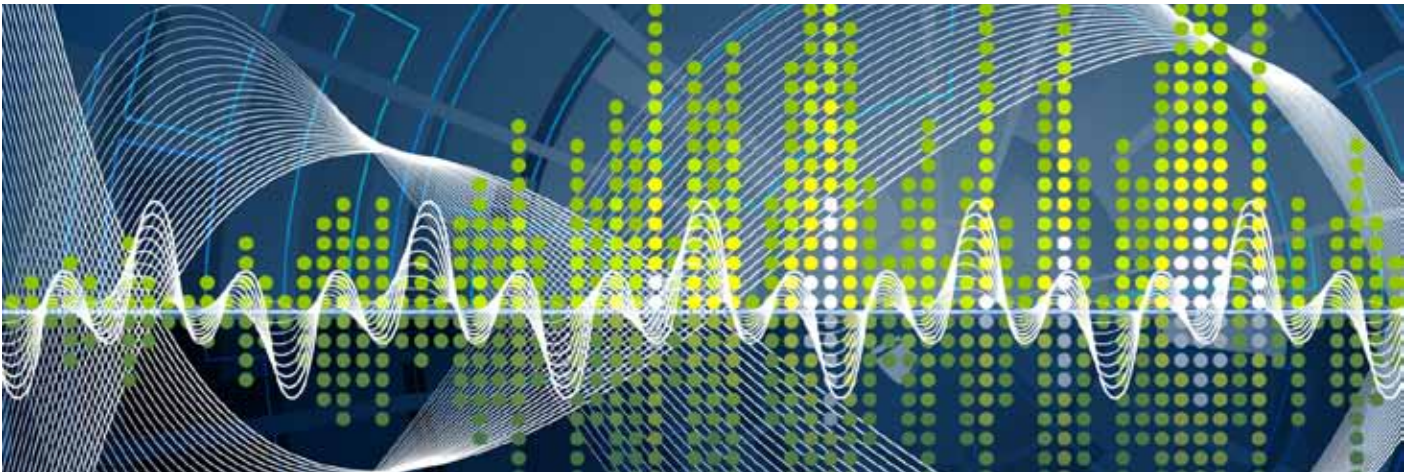
Impact: By predicting customer behavior and focusing personnel resources on customers with a high churn potential, XO has increased customer retention and retained subscription revenues. Since deploying the software, the company reduced churn by 8 percent in the first year and an additional 18 percent in the second year.

Run zero-latency operations

While many organizations have experienced the benefits that analytics and business intelligence solutions can provide for specific back-office functions, advanced solutions for in-depth analysis of big data are providing important new opportunities to change the way businesses operate. Analyzing streaming data from instrumented operational systems, deeply analyzing data from inventory and supply-chain operations, and analyzing data streaming from financial systems can help organizations significantly increase operational efficiency, boost revenues and ensure service availability.

For example, leading telecommunications organizations are performing real-time, root-cause analysis on data streaming in from a variety of sensors as well as retrospective analysis on massive volumes of CDR and network event data. (See the sidebar, "Spot problems and accelerate decision making with real-time reporting.") Instead of struggling to address customer problems and unanticipated outages, organizations are using solutions for analyzing big data to help rapidly respond to and prevent connectivity and bandwidth problems while optimizing performance and improving capacity planning. Business users can perform network quality-of-experience (QoE) analysis, traffic engineering and data analysis to identify and address network bottlenecks faster.

Leading investment firms are using real-time analytics solutions for big data to improve financial decision making. For example, stock market traders are conducting real-time analysis of streaming market data and incorporating contextual awareness—such as global news events and weather—into trading decisions. Consuming, analyzing and acting on real-time market data helps traders maximize gains.



Spot problems and accelerate decision making with real-time reporting

iBasis, a leading provider of international voice over IP (VoIP) network services, needed to analyze tremendous amounts of CDRs to produce enterprise-critical reports on revenue, margins, network traffic and quality. With the volume of CDRs growing, the company's infrastructure could not deliver reports in real time or store sufficient historical data for comprehensive trend analysis.

In a proof of concept, the company learned that a data warehouse appliance—as part of the IBM big data platform—could accelerate report delivery by an impressive 125 times, reducing report processing time from two hours to just one minute. After implementing an IBM Netezza data warehouse appliance in production, iBasis can now conduct complex CDR analysis on 150 million records in a matter of seconds.

Impact: With faster analysis and reporting, the company can spot quality problems in real time and make better decisions about pricing and network management.

“Our sophisticated back-office systems have enabled us to turn complexity into competitive advantage.... The Netezza system will be a vital tool in accelerating future improvements, growth and profitability.”

—Paul Floyd
Senior Vice President, Research and Development
Engineering and Operations
iBasis

Innovate new products at speed and scale

In many industries, product innovation is critical for success, but the process of researching, developing, testing, reporting, adjusting and retesting new offerings can be long and resource-intensive. Big data is a common factor in product development efforts, and leading organizations are using it to drive innovation by employing analytics solutions to explore large, complex data sets and generate new insights.

Analytics solutions also enable organizations to test “what-if” scenarios and anticipate the performance of new products and services, fueling experimentation and guiding research investments. Retailers, banks and telecommunications companies can use analytics to collect valuable feedback on current offerings and identify emerging market trends. These organizations can draw insights from unstructured customer data generated through social media posts, call-center interactions and online chat sessions, and they can use these insights as the basis for developing new products and services.



Predictive analytics solutions enable organizations to anticipate how new products and services will be received in the marketplace. By helping to gauge future customer behaviors, predictive analytics solutions enable organizations not only to create products that meet customer needs but also to scale production appropriately.

In addition, analytics solutions help organizations in all industries efficiently and successfully market innovative products. (See the sidebar, “Fuel online innovation with accelerated analytics.”) Using cluster analytics, organizations can identify shared customer attributes that may not have been obvious to analysts. Teams can then create marketing campaigns or promotions tailored to precise customer segments, allowing them to focus their resources on the customers most likely to embrace new products.

Statistical analytics solutions also help companies test the effectiveness of websites, direct email campaigns or other marketing collateral. Organizations can determine which outreach efforts generate the most qualified leads and ultimately yield the strongest customers.

Gain instant awareness of fraud and risk

Effective analysis of big data provides tremendous potential for enhancing risk management and avoiding costly losses. With analytics solutions for big data, organizations gain instant awareness of risks and can generate insights that help enhance investment decisions, improve lending decisions and increase fraud detection.

Leading financial services organizations are using big data to minimize credit risks and make smarter investments. Data management solutions help integrate market, credit, operational and regulatory data to create a comprehensive

Fuel online innovation with accelerated analytics

Kelley Blue Book (KBB), which offers factory list prices and cash values for thousands of vehicles, selected an IBM Netezza data warehouse appliance to accelerate internal advertising forecasts and speed the value calculations it provides to consumers in print and online. Analytics are now at the heart of KBB's online strategy: the company can process all of its DoubleClick DART (Dynamic Advertising Reporting and Targeting) forecast models in one day instead of three to four days. Plus, KBB can produce vehicle values in near-real time instead of waiting up to two weeks to push those values out to the marketplace.

Impact: Faster, more accurate forecasting enabled KBB to increase advertising revenue and customer satisfaction, making operations more profitable.



“Netezza is a critical component in the tech stack that we use to analyze our DART data and generate more ad revenue using existing data. It is one of the best investments we have made within our database infrastructure.”

—Karen Simmons
Senior Director of Data Warehousing
Kelley Blue Book

view of enterprise risk exposure. Advanced analytics capabilities enable these organizations to analyze years' worth of structured and unstructured identity, behavior and financial transaction data to make more informed decisions. Implementing new solutions for analyzing big data is delivering significant returns on the investment: with better risk analysis, these organizations can reduce write-offs and help minimize losses.

For savvy insurance companies, analytics solutions for big data are helping to prevent and detect fraud—which can account for a significant portion of an insurance company's

losses. Predictive analysis technologies assess the future fraud potential of policy applicants by scrutinizing the past history of applicants and other people associated with them, giving organizations another tool to help prevent fraud attempts. Content analytics technologies deliver a more complete view of information than service bureaus or existing solutions can provide. As a result, organizations are able to correlate information from multiple departments and data sources—for example, they can monitor and analyze social media sources for rumors, deliberate misinformation and fraudulent impersonation of employees. Better fraud prediction and detection helps these insurers significantly reduce costs.

Exploit instrumented assets

From RFID tags and smart utility meters to building security systems and railroad trackside sensors, today's world is more instrumented than ever before. Data collection devices offer organizations access to a tremendous volume of information that streams in at high velocity. Leading organizations are capitalizing on this availability by employing analytics solutions for big data to identify problems in real time, improve asset management, enhance operational efficiencies and provide real-time feedback to customers.

Many telecommunications companies, for example, are using solutions for analyzing big data to improve service quality and availability by analyzing data that streams in from a wide range of sources. With analytics and reporting solutions for big data, they can conduct operational and failure analysis from device, sensor and GPS inputs to solve existing problems as well as prevent future ones.

In healthcare, top providers are integrating large volumes of data from multiple sources so that doctors can access a full range of individual patient information—from previous discharge orders to new test results—right away. They are using analytics solutions for streaming data to improve real-time decision making. (See the sidebar, “Provide life-saving care by analyzing streaming biomedical data.”) Incorporating content analytics capabilities enables healthcare organizations to find valuable information in unstructured content—such as doctors' notes or medical journal articles—to treat current patients, identify important trends and improve treatment regimens over the long term.

The IBM platform for big data

The IBM platform for big data is a comprehensive collection of best-of-breed technologies and services that helps organizations integrate data from disparate sources, analyze big data in real time, help anticipate future outcomes and rapidly generate insights for capitalizing on new opportunities (see Figure 3).



Provide life-saving care by analyzing streaming biomedical data

Leading healthcare organizations are incorporating solutions that enable real-time analytics for streaming data to facilitate fast, real-time clinical decision making. For example, the University of Ontario Institute of Technology (UOIT) collaborated with IBM on a first-of-a-kind research project to help doctors detect subtle changes in the condition of critically ill premature babies. As part of the project, physicians in neonatal intensive care units at Toronto's Hospital for Sick Children used IBM InfoSphere® Streams to analyze a constant stream of biomedical data, such as heart rate and respiration, along with environmental data gathered from advanced sensors and more traditional monitoring equipment on and around the babies.

Impact: The neonatal care team discovered important correlations that helped doctors and nurses quickly respond to immediate issues and anticipate potential future problems. In the long term, neonatal care teams such as this one can use collected data to fine-tune treatment protocols.

Platform components include:

- **IBM InfoSphere Data Explorer:** Discovery and navigation software (previously known as the Vivisimo® Velocity™ Platform) that provides real-time access and fusion of big data with rich and varied data from enterprise applications for greater insight and ROI.
- **IBM InfoSphere BigInsights™:** An enterprise-ready Apache Hadoop-based system with sophisticated text analytics, visualization, performance, security and administrative features for managing and analyzing massive volumes of structured and unstructured data.
- **IBM InfoSphere Streams:** In-motion streaming analytics software that enables continuous analysis of massive volumes of streaming data with sub-millisecond response times, helping to improve your organization's level of insight and decision making, as well as promoting real-time response to events as they happen.
- **IBM Netezza:** High-performance data warehouse appliances that are purpose-built to make advanced analytics on exploding data volumes simple, fast and accessible; uses advanced analytics to deliver deep insights in minutes on petabyte-scale volumes of relational data.
- **IBM InfoSphere Warehouse:** Comprehensive data warehouse software platform that delivers access to structured and unstructured information in real time; supports operational analytics and applications with up-to-the-minute insights.
- **IBM InfoSphere Information Server:** A complete collection of data integration and data quality capabilities that help ensure delivery of trusted information; enables organizations to understand, cleanse, transform and deliver trusted information to critical business initiatives by integrating big data across enterprise IT systems.
- **IBM InfoSphere Master Data Management:** Creates trusted views of master data about customers, products and more, and provides a centralized data source that promotes accuracy and data quality to help improve your applications and business processes.

Powering analytics for big data requires a deliberate IT architectural approach and infrastructure to reap the benefits and drive business outcomes. The IBM Systems and Technology Group offers flexible integrated systems designed to access the latest information, regardless of type or location, by allocating the right resources at the right time for analysis on demand. These systems provide:

- **A scalable systems and storage foundation** that helps improve IT economics and optimizes analytic workload performance by using all available data and information.
- **High-performance parallel technologies** that optimize complex decision making by spotting trends and anomalies to predict outcomes.
- **Resilient architectures**, either on-premise or in the cloud, that help organizations deploy analytics throughout their business, and with customers and suppliers.

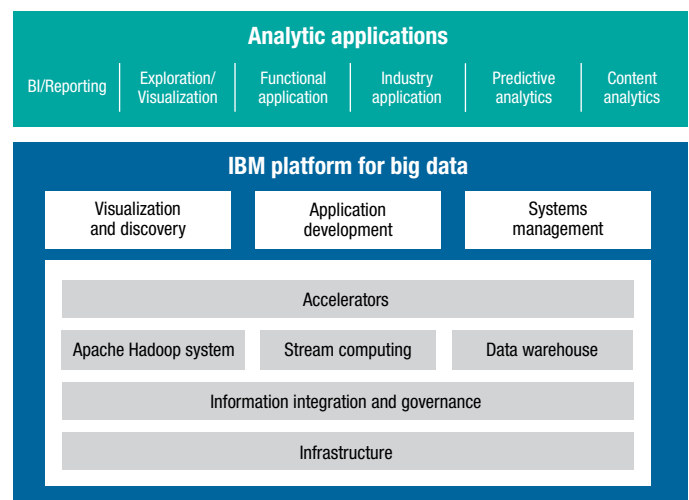


Figure 3: The comprehensive IBM platform for big data offers a broad range of solutions for managing, analyzing and generating insights from big data.

A maturity model for big data

To help organizations assess their current standing and future plans to work with big data, IBM Business Analytics and Optimization services developed a unique maturity model for big data. Based on an objective industry technique, this maturity model helps organizations evaluate their place on the big data adoption pattern and benchmark their status against emerging best practices around big data. The maturity model incorporates data and findings from the latest big data studies and research, and helps organizations assess their maturity level across big data-focused areas such as business strategy and value, big data technologies, architectures and components, approaches, governance and data types—key inputs for defining a big data roadmap.

The business value accelerator for big data

IBM also offers a business value accelerator for big data, a short-term consulting engagement that helps deliver business value through an exploratory analysis of your voluminous, rapidly generated or complex big data. It enables the development of a prioritized list of initiatives and an implementation roadmap based on the data exploration, assessments, use-case prioritization and benchmarking against industry best practices to enhance business value.

Transform business with big data

Analytics solutions for big data offer tremendous possibilities for transforming businesses and their industries. Leading organizations in retail, financial services, telecommunications, healthcare and other industries are already capitalizing on new opportunities.

In the past, the barriers to capitalizing on big data appeared formidable. Today, the IBM platform for big data offers a comprehensive, integrated collection of state-of-the-art technologies for data management and analytics that can help organizations address the challenges of big data and realize its potential for transformation.

For more information

For more information on how IBM solutions can help your organization capitalize on big data, visit: ibm.com/bigdata



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¹ IBM Global CEO Study 2012. ibm.com/services/us/en/c-suite/ceostudy2012



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