



Innovative analytics

How the world's most successful organizations use analytics to innovate

IBM Institute for Business Value

Executive Report

Business Analytics and Strategy

Tapping data and analytics to innovate faster and at scale

To succeed in today's environment, businesses need to navigate complexity and volatility, drive operational excellence, collaborate across enterprise functions, develop high-quality leadership and talent, manage amid constant change and unlock new possibilities grounded in data. The IBM Business Analytics and Strategy practice integrates management consulting expertise with the science of analytics to enable leading organizations to succeed.

Follow the analytics leaders

Big data keeps getting bigger. Its power filters through every industry, as organizations generate business insights through analytics to overcome challenges and pursue new opportunities. According to our recent innovation survey, a group of organizations — which we call Leaders — takes big data and analytics to the next level by creating a platform for new types of innovation.¹ These Leaders approach analytics and innovation differently — and more effectively. They offer key lessons for other organizations that wish to join this elite club utilizing innovative analytics.

Executive summary

Data continues to grow exponentially. Indeed, IDC projects that the digital universe will reach 44 zettabytes (ZB) by 2020.² As big data becomes evermore ubiquitous, organizations worldwide are seeking ways to capitalize on the plethora of information in today's digital world.

Across industries, organizations are realizing the power of big data and analytics to solve business challenges. For example, retailers are using big data solutions to more accurately forecast product demand and optimize pricing, while healthcare providers have applied predictive analytics solutions to large volumes of electronic health records to help improve patient outcomes and lower costs.

Not only are big data solutions adding value for diverse organizations, but they are being used for a variety of innovative purposes. In fact, big data and analytics have become crucial for organizations seeking to innovate, according to data from the 2014 innovation survey of more than 1,000 business leaders conducted by the IBM Institute for Business Value in collaboration with the Economist Intelligence Unit.³ Business innovation today is about more than simply introducing new things or methods. Innovation is now a critical business process — and technology is at its core.⁴

Leading organizations are investing in innovation that leverages the ever-growing opportunities to collect new data, combine external and internal data, and apply big data and analytics to outperform competitors. For example, today's most successful companies understand the potential for technological capabilities to help them predict and better meet customer needs, and they are using those capabilities to create competitive advantage.

Data from our innovation survey revealed a group of Leaders that are using innovation infused with big data and analytics to drive outperformance.⁵ These Leaders have adopted some distinct strategies that enable them to succeed. They pursue innovation more effectively — with enhanced data quality and accessibility, superior skills and tools, and a more innovative culture.

71 percent

of organizations use big data and analytics to develop innovative products or services.

Organizations using big data and analytics to innovate are

36 percent more

likely to outperform their peers in revenue growth and operating efficiency.

Data and analytics Leaders are almost

two times more

likely to measure the outcomes of innovation.

Identifying the Leaders

To understand how the most successful organizations innovate, we conducted a latent class cluster analysis of 341 respondents' usage of big data and analytics tools for innovation.⁶ We asked questions related to innovation goals, barriers to innovation, metrics used to measure innovation outcomes, treatment and types of innovation projects, and the role of big data and analytics in innovation processes. Three distinct groups emerged: Leaders, Strivers and Strugglers (see Figure 1).

Figure 1

Analysis of how effectively organizations use big data and analytics to support innovation revealed three groups

Leaders: Successfully innovate using big data and analytics



Strivers: Strive to develop innovation based on big data and analytics



Strugglers: Struggle to support innovation with big data and analytics



Leaders are markedly different as a group: They innovate using big data and analytics within a structured approach, and they focus in particular on collaboration. Strivers, while investing in tools that support innovation for specific functions, are less certain about which activities are the most important for innovation. The group we defined as Strugglers is the weakest in innovation activities across the board. Strugglers have no formal innovation processes and possess other internal challenges. They are more risk averse by nature, and when they do innovate, it tends to occur in isolated pockets.

Analysis revealed organizations using big data and analytics within their innovation processes are 36 percent more likely to beat their competitors in terms of revenue growth and operating efficiency. Indeed, outperforming organizations are 23 percent more likely to use big data tools compared to others, and almost 79 percent more likely to use analytics tools.

Outperformers' capability to extract valuable data from different sources and translate it into concrete results through deep analysis sets them apart from others. Of the outperformers in our survey, 92 percent were Leaders or Strivers, and only 8 percent were Strugglers. As for the underperforming organizations, almost half were Strugglers.

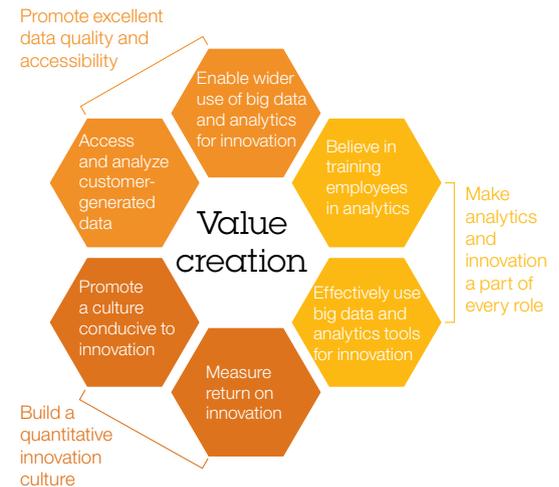
Leaders don't just embrace analytics and actionable insights; they take them to the next level, integrating analytics and insights with innovation. So, what is their secret? How do Leaders combine analytics and innovation so much more effectively than others?

Leaders follow three basic strategies that center on data, skills and tools, and culture (see Figure 2):

- Promote excellent data quality and accessibility
- Make analytics and innovation a part of every role
- Build a quantitative innovation culture.

Figure 2

Leaders combine analytics and innovation in more effective ways through three main strategies



Source: IBM Institute for Business Value.

Monsanto brings big data and analytics to farmers⁹

Monsanto, a multinational agrochemical and agricultural biotechnology corporation, has released a prescriptive-planting system that generates location-specific customer insights. To determine which seed grows best in which field under what conditions, the system combines a database of 25 million mapped fields, 150 billion soil observations and 10 trillion weather-simulation points with a library composed of hundreds of thousands of seeds and terabytes of yield data.

Farmers using Monsanto's system have increased yields by roughly 5 percent over two years. And some seed companies think technology solutions like this could help improve the average corn harvest from the current 160 bushels an acre to more than 200.

Promote data quality and accessibility

The 29 percent of respondents identified as Leaders excel at obtaining and gleaning insights from customer-generated data. They also use big data more aggressively across their organization.

Access and analyze customer-generated data: Leaders recognize the value of analyzing data for customer insights and innovation and are better able to derive those insights. For example, Leaders are much more likely and prepared to leverage social media than their counterparts: Almost two-thirds indicate they have the tools needed to gain insights from social media, compared to only a quarter of Strugglers.

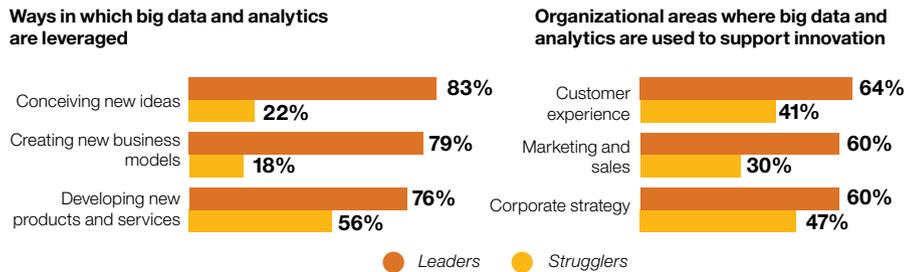
The city government of Toulouse, France, provides a great example of a Leader leveraging customer-generated data. In the first year of implementing a cutting-edge social media analytics solution, the city analyzed over 1.6 million online comments and pinpointed 100,000 comments that related directly to the city, helping significantly decrease response times and increase understanding of citizen needs.⁷

Enable wider use of big data and analytics: Leaders leverage big data and analytics more effectively over a wider range of organizational processes and functions. They are significantly better at leveraging big data and analytics throughout the innovation process—from conceiving new ideas to creating new business models and developing new products and services. And they apply analytics to more areas within their organization (see Figure 3).

When BBVA, a global financial group, deployed a solution in Spain to analyze social media data, it knew the information could be useful across the company for a variety of purposes. Insights obtained are now distributed among the various business departments, enabling a holistic view across all areas of the company's business. They are used not only to better understand customer needs, but also to devise appropriate solutions and support campaigns.⁸

Figure 3

Leaders leverage big data and analytics for innovation for a wider range of organizational processes and functions



Source: 2014 IBM Innovation Survey, IBM Institute for Business Value in collaboration with the Economist Intelligence Unit.

Recommendations

To emulate Leaders that promote excellent data quality and accessibility, organizations should:

- *Evangelize the connection between analytics and innovation:* Perpetuate a philosophy that data begets insights and insights beget innovation.
- *Infuse analytical capabilities throughout the organization to spark innovation:* Make data accessible and available, and focus on end-user analytic tools.
- *Embrace customer insight and opinion:* Collect and analyze customer-generated data, and create customer interaction environments.

Include analytics and innovation in every role

For Leaders, analytics are pervasive throughout the organization—available and useful for all. Leaders recognize the importance of providing employees with the knowledge and skills they need to reap the rewards of big data. They also invest in analytics tools that facilitate innovation and make those tools available to all employees.

Train employees in analytics: Leaders invest in employee training. In fact, our survey revealed that Leaders are 110 percent more likely to believe in the potential of training their employees in analytics than Strugglers. As a result, although 67 percent of Strugglers cited insufficient skills as a barrier to innovation, only 42 percent of Leaders did.

Westfield Insurance understands the power of training. As part of an analytics transformation to extract more value from its data, the company created an Analytics Resource Center that conducts regular employee training sessions, made analytics a key competency for all employees and added analytics-related objectives to employee goals.¹⁰

Use big data and analytic tools for innovation: Leaders are better able to analyze and interpret data, as well as transform it into actionable insights. They also invest in the resources required to succeed. Almost 80 percent of Leaders use analytic tools to facilitate innovation, compared to 56 percent of Strugglers.

For example, an international team of molecular scientists used an analytic crowdsourcing tool to unravel a mystery that had stumped them and more traditional analytic tools for 15 years. In less than 10 days, players of a collaborative online game on protein folding called FoldIt were able to resolve the detailed molecular structure of a protein-cutting enzyme from an AIDS-like virus. Scientists are now able to move forward with research to design drugs that may potentially halt the AIDS-like virus triggered by the molecule.¹¹

Recommendations

To help make analytics and innovation a part of every role, organizations can:

- *Use collaborative tools as a platform for enterprise-wide innovation:* Bring back the (digital) suggestion box, and create broad opportunities to share data and ideas.
- *Build skills, cross-train and co-locate analytics and innovation teams:* Create networks of trust and shared objectives, and cross pollinate points of view and discoveries.
- *Promote entrepreneurialism:* Advocate exploration and innovation, and enable greater openness.

Innovation is central element of Alibaba strategy¹²

Recognizing the power of data, Alibaba, a Chinese online and mobile commerce company, has created an open culture based on information sharing and transparency. This culture, which values entrepreneurship, innovation and service, facilitates the sharing of data efficiently across the organization.

Alibaba strives to educate all of its employees about big data. In many companies, business intelligence and other departments are clearly divided, making it difficult to link data analysis with daily operations. Alibaba believes those in charge of commercial operations should also being familiar with data analysis and, as such, provides necessary training.

In addition, the company's policies and procedures are designed to promote and encourage innovation. By giving employees enough "space" to innovate, the company seeks to unleash each employee's full potential. For example, under the company's "horse race" program, employees are encouraged to submit ideas to a committee. Approved ideas then become projects that are pursued with adequate resources and funding.

Build a quantitative innovation culture

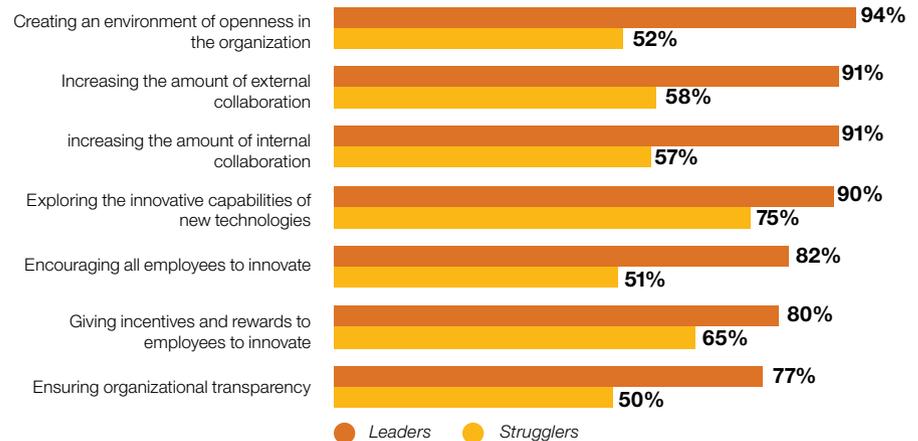
For companies trying to unlock creativity, internal forces are just as potent as external factors and can support and facilitate effort. Accordingly, Leaders focus on fostering a culture of innovation. And to effectively measure their success, they establish a system of innovation metrics.

Promote a culture conducive to innovation: To build an organization culture geared toward innovation, Leaders aggressively seek mechanisms and promote behaviors that reinforce collaboration, creativity and imagination. When asked about innovation-related activities for the next three to five years, Leaders were significantly ahead of Strugglers in proactively pursuing such activities (see Figure 4).

Figure 4

Leaders actively build organizational cultures that are more conducive to innovation

Innovation-related activities to be pursued in the next three to five years



Munich RE, a global leader in reinsurance, understood the importance of a collaborative environment when it launched its big data strategy project in 2014. To foster creativity, collaboration, innovation and communication, the company conducted *innovation workshops, where diversity and inspiration from state-of-the-art big data analytics technology inspired more than 160 ideas. More than 70 of these ideas were explored more deeply, with five pilots chosen for implementation.*

Measure return on innovation: With more and more resources aimed at driving innovation, organizations increasingly seek ways to gauge resource effectiveness. Those that are unable to or simply don't measure the success of innovation efforts are more likely to waste resources and less likely to sustain innovation investment. Leaders show a greater capability to successfully measure returns from innovation. Almost 70 percent of Leaders indicated they were effective at measuring innovation success, compared to less than a quarter of Strugglers.

University of Telecommunications Leipzig, a privately held university of applied sciences, uses a natural language processing-based analytics solution to analyze job requirements posted by technology companies to gain insights into changing industry needs. The information is used to shift academic priorities and launch new programs. The university measures success by tracking job placement rates and its ability to respond to industry needs. For example, in response to changing requirements, it was able to launch a new course in 2.5 months rather than 12 months, a 76 percent improvement.¹³

Tata's innovation culture reaps measurable benefits¹⁴

The Tata group, a global enterprise headquartered in India that includes more than 100 operating companies exporting products and services to over 150 countries, views innovation as critical to its business strategy. To encourage innovation across business sectors and companies, Tata adopted a strategy focused on improved communication and recognition of innovative ideas and efforts; creation of innovation centers that facilitate research, development and new technologies; and support for collaborative research and partnerships with academia.

As a result, innovation is part of the Tata employee review and professional development process, and employees are encouraged to devote time to developing new ideas, which they can share via an internal social network. In addition, the company created the Tata Group Innovation Forum (TGIF), a network to connect Tata companies. In addition to enabling communication and collaboration among managers across the enterprise, TGIF organizes seminars and workshops where innovation experts and academicians can discuss new concepts, introduce new and tools and stimulate creativity. Since its formation, TGIF has facilitated more than more than 7,000 successful innovations involving 25,000 employees.

The forum also sponsors Tata Innovista, an annual event that recognizes outstanding Tata company innovations across the globe. To help measure the value of innovation, the company tracks a variety of metrics related to the event and recently began estimating the economic benefit from finalist entries. In the 2014 Promising Innovations category alone, the estimated combined economic benefit of the 43 finalist entries was US\$1 billion.

Recommendations

To build a quantitative innovation culture, consider the following:

- *Support a broad portfolio of innovation:* Optimize an innovation mix of incremental and disruptive, and make innovation central to all initiatives and processes.
- *Fund innovation separately:* Establish a separate funding pool for innovation initiatives, and calculate and report ROI of innovation funds.
- *Apply rigorous metrics to the value innovation generates:* Create financial and other metrics to measure innovation, and create learning processes based on successes and failures.

Are you ready to be a Leader?

The Leaders from our survey share a common trait: the ability to successfully employ data and analytics to support innovation. By mirroring the Leaders' commitment to data quality and accessibility, skills and tools, and a quantitative innovation culture, other organizations can begin reaping the rewards of innovative analytics. To join the Leaders, start by asking...

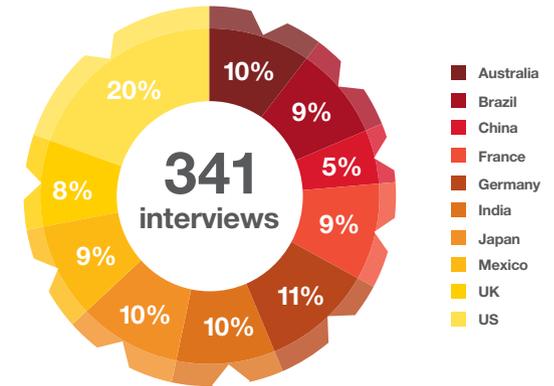
- Has your organization integrated analytics into its structured innovation processes?
- Does your infrastructure support combining internally and externally generated data for innovative analysis?
- Does your organization collect and mine customer-generated data such as e-mails, comments and social media?
- Is your organization conducting predictive analysis to better understand your markets and customers?
- Are your employees and executives trained to use analytics as part of their daily work, and does your organization measure the value of innovation?

Research methodology

IBM surveyed 1,004 global C-suite executives or their direct reports on topics related to innovation. Of the 1,004, 341 actively use big data and analytics across 10 countries and 17 industries.



Big data and analytics users were identified from the larger population



About the authors

Anthony Marshall is Strategy Leader and Program Director of the Global CEO Study for the IBM Institute for Business Value. Previously, Anthony led numerous projects in IBM's Strategy and Innovation Financial Services Practice, focusing on business strategy and innovation. Anthony has consulted extensively with U.S. and global clients, working with numerous top-tier organizations in innovation management, digital strategy, transformation and organizational culture. He has also worked in regulation economics, privatization and M&A. Anthony has more than 20 years of consulting, research and analytical experience. He can be reached at anthony2@us.ibm.com.

Dr. Stefan Mueck is the Big Data Leader, Europe Financial Services, for the IBM Global Center of Competence Business Analytics and Strategy. Stefan led numerous innovation, strategy and first-of-a-kind projects with globally leading companies in Germany, Switzerland and Europe. He advised on digital transformation in support of new business models, products, services and the required organizational transformation. Beyond finance, he also worked for leading companies in the automotive, travel and transportation, and telecommunications industries. Stefan holds a doctorate in mathematics and has more than 20 years of consulting, research and innovation management experience. He can be reached at stefan.mueck@de.ibm.com.

Rebecca Shockley is the Big Data and Business Analytics Global Research Leader for the IBM Institute for Business Value, where she conducts fact-based research on the topic of business analytics to develop thought leadership for senior executives. Rebecca spent more than 15 years consulting with top-tier U.S. and global organizations regarding data and information strategy, innovative analytics and technology usage, organizational transformation and information governance. Rebecca can be contacted at rshock@us.ibm.com.

Contributors

Rachna Handa, Rajrohit Teer, Sachi Desai, Steve Ballou and Kathleen Martin

Notes and sources

- 1 2014 IBM Innovation Survey. IBM Institute for Business Value in collaboration with the Economist Intelligence Unit.
- 2 "The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things." IDC White Paper (sponsored by EMC2). April 2014. <http://idccdocserv.com/1678>
- 3 2014 IBM Innovation Survey. IBM Institute for Business Value in collaboration with the Economist Intelligence Unit.
- 4 Ikeda, Kazuaki; Anthony Marshall; and Abhijit Majumdar. "More than magic: How the most successful organizations innovate." IBM Institute for Business Value. December 2014.
- 5 2014 IBM Innovation Survey. IBM Institute for Business Value in collaboration with the Economist Intelligence Unit.
- 6 Respondents were from the 2014 IBM Innovation Survey. We conducted cluster analysis with 81 variables. The three cluster solution was determined deploying latent class analysis (LCA), a family of techniques based around clustering and data reduction that is fast becoming the state-of-the-art technique for segmentation projects. It uses a number of underlying statistical models to capture differences between observed data or stimuli in the form of discrete (unordered) population segments; group segments (e.g., groups of countries, within which there are population segments); ordered factors (segments with an underlying numeric order); continuous factors; or mixtures of the above.
- 7 "City of Toulouse: Social data analysis used to better understand and meet citizens' needs." IBM Software Group, Smarter Planet Solution. October 2013. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=AB&infotype=PM&appname=SWGE_YT_YT_USEN&htmlfid=YTC03711USEN&attachment=YTC03711USEN.PDF#loaded; Watson, Zach. "How data analytics can improve government projects." TechnologyAdvice. July 1, 2014. <http://technologyadvice.com/business-intelligence/blog/know-public-sector-uses-business-intelligence/>
- 8 "BBVA seamlessly monitors and improves its online reputation, Using IBM Business Analytics solutions to monitor and respond to online feedback." IBM España, S.A. January 2014.

For more information

To learn more about this IBM Institute for Business Value study, please contact us at iibv@us.ibm.com. Follow @IBMIBV on Twitter and for a full catalog of our research or to subscribe to our monthly newsletter, visit: ibm.com/iibv

Access IBM Institute for Business Value executive reports on your phone or tablet by downloading the free “IBM IBV” app for iPad or Android from your app store.

The right partner for a changing world

At IBM, we collaborate with our clients, bringing together business insight, advanced research and technology to give them a distinct advantage in today’s rapidly changing environment.

IBM Institute for Business Value

The IBM Institute for Business Value, part of IBM Global Business Services, develops fact-based strategic insights for senior business executives around critical public and private sector issues.

- 9 Vance, Ashlee. “Monsanto’s Billion-Dollar Bet Brings Big Data to the Farm.” Bloomberg Business. October 2, 2013. <http://www.bloomberg.com/bw/articles/2013-10-02/monsanto-buys-climate-corporation-for-930-million-bringing-big-data-to-the-farm>; “Digital disruption on the farm.” *The Economist*. May 24, 2014. <http://www.economist.com/news/business/21602757-managers-most-traditional-industries-distrust-promising-new-technology-digital>
- 10 “Westfield optimizes decision making through analytics.” IBM Software Group, Smarter Planet brief. December 2012. <http://public.dhe.ibm.com/common/ssi/ecm/en/ytc03551usen/YTC03551USEN.PDF>
- 11 “Gamers solve molecular puzzle that baffled scientists.” NBC News. September 25, 2011. http://cosmiclog.nbcnews.com/_news/2011/09/18/7802623-gamers-solve-molecular-puzzle-that-baffled-scientists
- 12 “How does Alibaba create successful corporate culture.” *China Business Journal*. February 24, 2014. <http://money.163.com/14/0224/09/9LRB3k0500253G87.html>; Shanshan, Wang. “Alibaba Intending to Dig Deep for E-commerce Gold.” Caixin online. May 21, 2013.
- 13 “University of Telecommunication Leipzig, Powerful analytics scan job postings for emerging trends, helping to prepare students for job market.” IBM Software Group. December 2013. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=AB&infotype=PM&appname=SWGE_ZZ_VH_USEN&htmlfid=ZZC03269USEN&attachment=ZZC03269USEN.PDF#loaded; Shacklett, Mark. “Better training: In search of next-generation IT workers.” TechRepublic. December 9, 2013. <http://www.techrepublic.com/blog/big-data-analytics/better-training-in-search-of-next-generation-it-workers/>
- 14 “Tata companies introduce 1,010 innovations in 2013-14.” Tata press release. April 29, 2014. <http://www.tata.co.in/media/releasesinside/Tata-companies-introduce-1010-innovations-in-2013-14>; “Investing in innovation.” Tata website, accessed March 25, 2015. <http://www.tata.com/innovation/articlesinside/Investing-in-innovation>; “About us: Tata profile.” Tata website, accessed March 25, 2015. http://www.tata.com/aboutus/sub_index/Leadership-with-trust; “Tata Group to encourage and enhance innovation across business sectors and companies.” *The Economic Times*. April 30, 2014. http://economictimes.indiatimes.com/articleshow/34382109.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst; Sawyer, Keith. “India’s Tata Group.” The Creativity Guru. September 1, 2009. <https://keithsawyer.wordpress.com/2009/09/01/indias-tata-group/>

© Copyright IBM Corporation 2015

Route 100
Somers, NY 10589

Produced in the United States of America
April 2015

IBM, the IBM logo and ibm.com are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

The information in this document is provided "as is" without any warranty, express or implied, including without any warranties of merchantability, fitness for a particular purpose and any warranty or condition of non-infringement. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

This report is intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. IBM shall not be responsible for any loss whatsoever sustained by any organization or person who relies on this publication.

The data used in this report may be derived from third-party sources and IBM does not independently verify, validate or audit such data. The results from the use of such data are provided on an "as is" basis and IBM makes no representations or warranties, express or implied.



Please Recycle

IBM[®]