FINDING GROWTH THROUGH BIG DATA

Cicero INSTITUTE

RANDY SHUMWAY, MATHEW HARRISON

Map generated by more than 250 million public tweets on Twitter.com between March 2011 and January 2012[1]

"Sixty years ago, digital computers made information readable. Twenty years ago, the Internet made it reachable. Ten years ago, the first search engine crawlers made it a single database. Now Google and like-minded companies are sifting through the most measured age in history, treating this massive corpus as a laboratory of the human condition. They are the children of the Petabyte Age."

– Chris Anderson, editor in chief of Wired, 2008[2]

The editorial quoted above was groundbreaking: it essentially introduced the concept of "big data" to the masses.[3] Since 2008, when that article was published, data creation rates have swelled almost exponentially throughout the world, and big data is revolutionizing the realm of business. Savvy companies in the Petabyte Age are regularly tapping into big data to boost efficiency, productivity, and bottom-line returns.

If you're just getting up to speed on big data and wondering how it can make a difference for your business, this white paper is for you. We provide here a detailed explanation of big data and then highlight

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[1] PLOS Computation Biology. (n.d.). Retrieved November 20, 2015, from Journals.Plos.org: http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1002616

[2] Anderson, C. (2008, June 23). The End of Theory: The Data Deluge Makes the Scientific Method Obsolete. Retrieved November 20, 2015, from Wired.com: http://archive.wired.com/science/discoveries/magazine/16-07/pb_theory/

[3] Marr, B. (2015, June 9). A Brief History of Big Data Everyone Should Read. Retrieved November 20, 2015, from SmartDataCollective.com: http://www.smartdatacollective.com/bernardmarr/323216/brief-history-big-data-everyone-should-read

specific ways you might apply it to the following functions in your business:

1. **Product Development:** Identifying new product ideas
2. **Sales & Marketing:** Increasing sales by identifying important customer segments
3. **Operations:** Reducing costs through supply chain improvements
4. **Customer Experience:** Reducing attrition by identifying triggers
5. **Finance:** Maximizing revenue by accurately pricing products and services
6. **Talent Optimization:** Improving performance with real time feedback

WHAT IS BIG DATA?

Big data is a "situation where the volume, velocity and variety of data exceed an organization's ability to use that data for accurate and timely decision-making."[4] More than just a mountain of information, big data can help business leaders in any industry make accurate and timely decisions. Compared with other types of data, big data is distinguished by three Vs—volume, velocity, and variety.
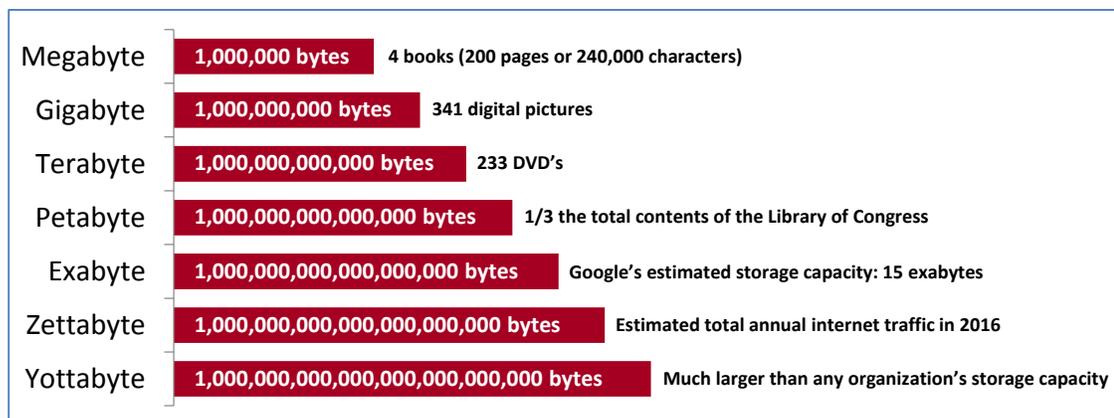
While there is no specific size qualification for big data, this term commonly tags datasets ranging from a few terabytes to many petabytes. The dividing line between big data and 'small data' is somewhat arbitrary, but it makes sense to have a flexible threshold since this year's big data will become next year's normal-sized data. How big are we talking here? Data is measured in chunks called bytes. Most people are familiar with a megabyte (MB) or a gigabyte (GB), but the size rises significantly toward the larger bytes that are relevant in the language of big data (see Figure 1).

Already, more than 20% of large companies have over a petabyte of data.[5] As this figure swells in coming years, successful businesses need reliable strategies for separating noise from valuable insights.

VELOCITY

In today's world of machine/device sensors and systems that are constantly tracking activity, new data is created and received at high velocity. An important component of big data, velocity affects businesses' end goal of making "timely" decisions based on that information. While data that has millisecond response rates creates real opportunities for business leaders, its speed also makes it challenging to extract value.

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VOLUME

Megabyte	1,000,000 bytes	4 books (200 pages or 240,000 characters)
Gigabyte	1,000,000,000 bytes	341 digital pictures
Terabyte	1,000,000,000,000 bytes	233 DVD's
Petabyte	1,000,000,000,000,000 bytes	1/3 the total contents of the Library of Congress
Exabyte	1,000,000,000,000,000,000 bytes	Google's estimated storage capacity: 15 exabytes
Zettabyte	1,000,000,000,000,000,000,000 bytes	Estimated total annual internet traffic in 2016
Yottabyte	1,000,000,000,000,000,000,000,000 bytes	Much larger than any organization's storage capacity

Figure 1: Putting "bytes" in perspective

[4] SAS. (2012). Big Data Meets Big Data Analytics: Three Key Technologies for Extracting Real-Time Business Value from the Big Data. White Paper. Retrieved November 20, 2015, from

http://www.sas.com/content/dam/SAS/en_us/doc/whitepaper1/big-data-meets-big-data-analytics-105777.pdf
[5] Cicero Group internal research.

VARIETY

Finally, big data comes in a wide variety of types. Each type of data offers specific benefits and creates specific challenges as we work to extract value. Broadly, big data can fall into two categories: "structured" and "unstructured" (see Figure 2).

Type	Definition	Example
Structured	Data that can be immediately identified within an electronic structure/database.	The name of a city from a form's "city" field.
Unstructured	Data that are not in fixed locations and need to be scanned and analyzed.	Free-form text in documents, emails, blogs, etc.

Figure 2: Structured versus Unstructured Data[6]

In addition to the structured and unstructured categories, it is also helpful to look at data variety from an organization's perspective: internal vs. external. Along with capturing data from internal sales information and sensors, organizations can also track public responses on Facebook, Twitter, or other social media sites. When analyzed optimally, each type of data brings valuable insights that business leaders can use to make accurate and timely decisions.

BIG DATA OPPORTUNITY FOR BUSINESS

At first glance, it may seem that big data is mainly relevant for large companies that deal primarily in technology—electronics, telecommunications, software, etc. However, business leaders in industries ranging from retail[7] to agriculture[8] to sports[9] are employing big data to get a leg up on their competitors.

As data continues to pile up, companies are now hiring data-savvy managers who can locate and interpret the gems in big data. The projected annual growth rate of big data spending within organizations from 2014 through 2020 is 14.26%.[10] It is estimated that by 2018 the United States will need over 1.5 million more data-informed managers.[11] All of this growth has real implications for businesses: in a poll of executives, 89% believe that big data will revolutionize business as much as the Internet has.[12]

Many business leaders are trying to tap into big data ahead of their competitors. For instance, in 2015 global businesses are expected to spend over $125 billion on

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[6] PC Mag. (n.d.). Definition of: Unstructured Data. Retrieved November 20, 2015, from PCMag.com: http://www.pcmag.com/encyclopedia/term/53486/unstructured-data

[7] Morgan, L. (2015, May 27). Big Data: 6 Real-Life Business Cases. Retrieved November 20, 2015, from InformationWeek.com: http://www.informationweek.com/software/enterprise-applications/big-data-6-real-life-business-cases/d/d-id/1320590?image_number=5

[8] Fehrenbacher, K. (2014, February 20). Granular: Bringing farms into the modern software world. Retrieved November 20, 2015, from GIGAOM.com: https://gigaom.com/2014/02/20/granular-bringing-farms-into-the-modern-software-world/

[9] Norton, S. (2014, July 10). Germany's 12th Man at the World Cup: Big Data. Retrieved November 20, 2015, from The Wall Street Journal:

http://blogs.wsj.com/cio/2014/07/10/germanys-12th-man-at-the-world-cup-big-data/

[10] Kelly, J. (2015). Big Data Vendor Revenue and Market Forecast, 2011-2026. Retrieved November 20, 2015, from http://wikibon.com/executive-summary-big-data-vendor-revenue-and-market-forecast-2011-2026/

[11] Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Byers, A. H. (2011). Big data: The next frontier for innovation, competition, and productivity. McKinsey Global Institute. Retrieved November 20, 2015, from http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation

[12] How to achieve big success from big data. (2014). Retrieved November 20, 2015, from Accenture.com: https://www.accenture.com/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_14/Accenture-Big-Data-Infographic#zoom=50
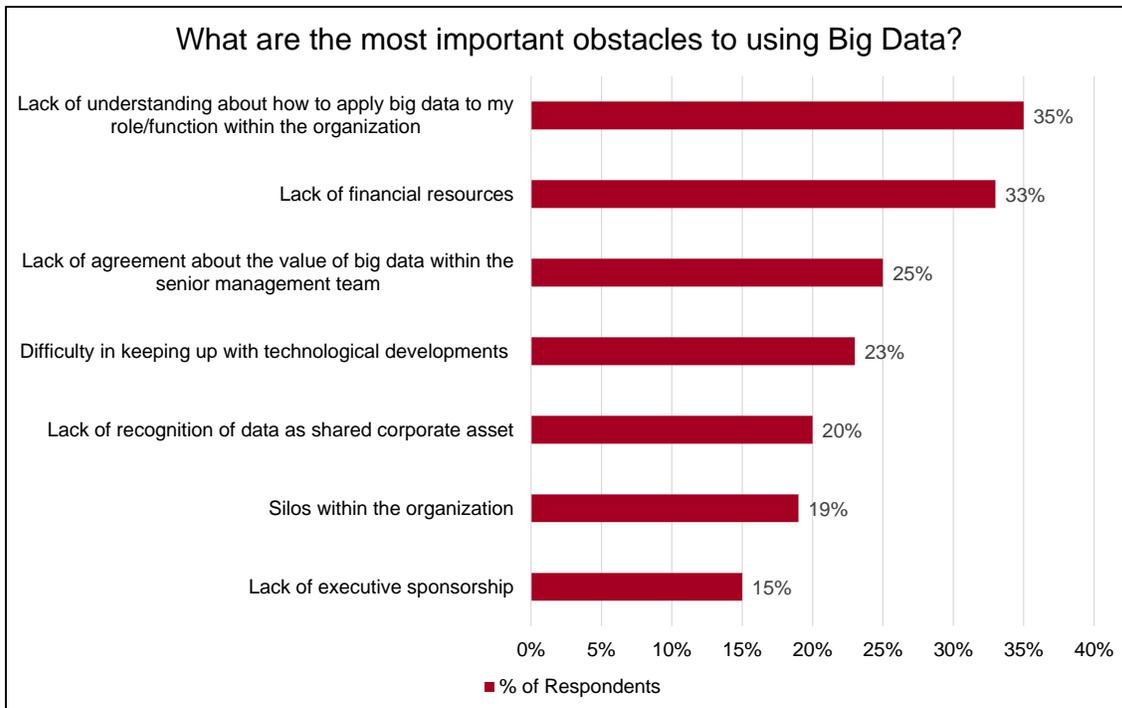
What are the most important obstacles to using Big Data?

Obstacle	% of Respondents
Lack of understanding about how to apply big data to my role/function within the organization	35%
Lack of financial resources	33%
Lack of agreement about the value of big data within the senior management team	25%
Difficulty in keeping up with technological developments	23%
Lack of recognition of data as shared corporate asset	20%
Silos within the organization	19%
Lack of executive sponsorship	15%

■ % of Respondents

Figure 3: What are the most important obstacles to using big data? Source: (Economist Intelligence Unit, 2014)

analyzing big data.[13] In the first quarter of 2015, venture capitalists invested the better part of $5.6 billion in big data-related startups.[14] Significant financial opportunity motivates businesses to exploit big data for short-term gains and long-term payouts

BIG DATA ACROSS BUSINESS FUNCTIONS

True or false: big data is only relevant for specific functions within an organization (e.g. marketing or operations). False! Wherever there is data, leaders can harness it to achieve the goals of the function and the organization. Seems like an easy concept, but it's harder to put into play: there is a big difference between having data and being able to use it to make accurate and timely decisions. For example, when 395 C-level executives were asked what stops them from using big

data, they indicated that they did not understand how it applies to their role or function (see Figure 3).

Knowing how to analyze, categorize, and make sense of the big data you already have delivers tangible returns in terms of productivity, efficiency, and performance.

In an effort to bridge this gap, the remainder of this paper focuses on how leaders can apply big data to six important business functions. We'll explain the application and provide a couple of examples so it's easy to see big data in action in each business function.

1) PRODUCT DEVELOPMENT

As organizations work to improve product development and allocate resources more efficiently, big data becomes an essential tool: it provides real-time

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[13] Press, G. (2014, December 11). 6 Predictions For The $125 Billion Big Data Analytics Market in 2015. Retrieved November 20, 2015, from Forbes.com: http://www.forbes.com/sites/gilpress/2014/12/11/6-predictions-for-the-125-billion-big-data-analytics-market-in-2015/

[14] Woodie, A. (2015, July 16). Despite Startup Slowdown, VCs Keep Investing in Big Data. Retrieved November 20, 2015, from datanami.com: http://www.datanami.com/2015/07/16/despite-startup-slowdown-vcs-keep-investing-in-big-data/

information at any point in the product lifecycle. In the process of product development, big data has an impact on analysis of customer sentiment, sales trends, and R&D ROI. Three types of analysis can be useful in this endeavor:

- **Customer Sentiment Analysis** taps into unstructured, publicly-available social media and online data to understand consumer preferences toward products and brands. This analysis is especially useful during product creation and feasibility evaluation. We regularly analyze customer sentiment to identify new trends in the marketplace.
- **Sales Trends Analysis** helps business leaders identify key attributes in both top-selling and under-performing products. This data informs future product development efforts.
- **R&D ROI Analysis** uses data to make smart visual dashboards that show potential value, research progress, and risk. This supports efficient allocation of R&D funds in the organization.

APPLICATIONS OF BIG DATA IN PRODUCT DEVELOPMENT

Netflix Inc.[15]

To compete in the world of online content delivery systems, Netflix needed to develop original content. Harnessing vast amounts of subscriber viewing data and social media data, the company was able to predict how much appeal a show with specific actors and directors might have. As the show went public, it won three Emmys— it was the first series that was not shown on cable or a network to win an Emmy. This popular show

> "Marketing is [now] able to move from speaking to large customer segments to a "segment of one" and deliver highly-targeted, relevant messaging and content—exactly what connected customers expect."
>
> Leslie Dinham, Senior Business Consultant for Retail and Ecommerce, Teradata

also played a large role in increasing the company's revenue by 21% in that same year.

Merck & Co., Inc.[16]

To improve the effectiveness of R&D efforts, Merck used big data to inform funding decisions based on the result of clinical trials. The company implemented a big data system based on R to speed up analysis time and quickly abort trials that showed little promise of progress. The result: the company improved the effectiveness and efficiency of clinical trials, significantly reduced costs, and saved more than $10 million on one trial alone.

2) SALES & MARKETING

The proliferation of customer data allows marketing and sales teams to target audiences and tailor their messages like never before. Every time a customer uses a phone, computer, or other device to learn about or buy a product, the vendor can receive information designed to improve sales and marketing efforts. Unfortunately, many companies are failing to tap into sales-related big data: a survey of Chief Marketing Officers showed that 63% of marketing projects are not informed by marketing analytics.[17] It is likely that these

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[15] Big Data Analytics and Netflix's House of Cards. (2014, February 15). Retrieved November 20, 2015, from DataEnthusiast.com: http://www.dataenthusiast.com/2014/02/big-data-analytics-and-netflixs-house-of-cards/

[16] Revolution Analytics. (2010). Merck Optimizes Critical Drug. Case Study. Retrieved November 20, 2015, from

http://d8070b9645895168c92d-e4d4fb3aace3eb384a29da3ffd6bd6d0.r92.cf1.rackcdn.com/Merck-gsDesign-Case-Study.pdf

[17] Monier, J.-H., Gordon, J., & Ogren, P. (2013, November). How CMOs can get CFOs on their side. Retrieved November 20, 2015, from Mckinsey on Marketing & Sales:

companies are unfamiliar with functional analysis techniques for vast data sets. We regularly perform four analyses to help marketers make informed decisions:

- **Segmentation Analysis** crosses behavioral data with demographic data to segment customers. Marketers can then target a specific segment's needs and wants.
- **Micro-targeting** involves reaching out to the market based on individual data points, often tailoring messaging to certain known characteristics.
- **Lead Prioritization** allows businesses to determine whether someone will become and remain a customer by statistically analyzing characteristics that positively correlate with that likelihood.
- **Cross- and Up-Selling Analysis** allows marketers to prioritize sales opportunities within a customer base, and is similar to lead prioritization.

APPLICATIONS OF BIG DATA IN SALES & MARKETING

Home Automation Company[18]
In order to increase its market share and profitability, a home automation company wanted to improve the effectiveness of door-to-door sales representatives. By conducting a national market study and combining it with internal and external data sources, the company generated a "likelihood to buy" score for every home in America. Company leaders built this information into a mobile phone app that helped sales representatives prioritize their efforts. The result: a 17%-increase in sales volume.

Kroger Company[19]
To compete with larger discount retailers without reducing margins, Kroger reviewed transaction data from their nationwide loyalty program and saw an opportunity to personalize direct-mailer coupons based on purchase history. With this micro-targeting effort, the company built the #1-rated loyalty program in the grocery industry and saw a 70% coupon return rate, compared to the national average of less than 4%.

3) OPERATIONS

Internal data enhances operations in a variety of ways, from process optimization to predictive maintenance. At this point, most companies are only analyzing an estimated 12% of the data they have.[20] Our clients have led successful operations-related big data initiatives by employing the following approaches:

- **Performance Management** allows businesses to monitor and improve key performance metrics using data. Geographies and products that outperform or underperform their peers can be identified and analyzed for key differentiators.
- **Process Optimization (Lean/Six Sigma)** utilizes a variety of data sources to evaluate processes and identify inefficiencies. The power of lean/six sigma techniques is greatly improved when combined with robust data sources.
- **Predictive Maintenance** helps businesses understand all the factors that go into the breakdown of inputs. Big data can predict where maintenance is likely to be needed so that repairs can be made before a breakdown or stop in production.

APPLICATIONS OF BIG DATA IN OPERATIONS

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http://www.mckinseyonmarketingandsales.com/how-cmos-can-get-cfos-on-their-side
[18] Cicero Group internal research.
[19] Groenfeldt, T. (2013, October 28). Kroger Knows Your Shopping Patterns Better Than You Do. Retrieved November 20, 2015, from Forbes.com: http://www.forbes.com/sites/tomgroenfeldt/2013/10/2

8/kroger-knows-your-shopping-patterns-better-than-you-do/
[20] Forrester Research. (2014, February 27). THE FORRESTER WAVE™: BIG DATA HADOOP SOLUTIONS, Q1 2014. Retrieved November 20, 2015, from Forrester.com: https://www.forrester.com/The+Forrester+Wave+Big+Data+Hadoop+Solutions+Q1+2014/-/E-PRE6807

UPS[21]

To reduce fuel costs and optimize usage of fleet vehicles, UPS installed GPS tracking devices and other sensors on various parts of each vehicle (e.g., the engine). By constantly streaming data from vehicles, the company was able to uncover important inefficiencies. They calculated better routes, reduced engine idle time, and programmed system alerts when it was time for vehicle maintenance. By leveraging big data, the company saved over 39 million gallons of gas and 364 million vehicle miles.

> "This is very different from the old approach of customer data coming in a week later or a month later. We can now capture and process the data in nearly real time. We crunch large amounts of data to get to decisions in a matter of minutes, and ultimately even seconds."
>
> Mazin Gilbert, Assistant Vice President of Inventive Science at AT&T Labs

Raytheon[22]

With 70% of project costs coming from materials, Raytheon sought smarter ways to source materials. To improve decision-making across 10,000 suppliers, the company created a system that integrated structured and unstructured data from internal and external sources. For example, the system tracked weather and natural disasters, suggesting which suppliers should be used to avoid disruptions. Leveraging this data helped the company maintain a consistent supply chain, access key information for negotiations, identify the best

suppliers to work with, and reduce supplier costs dramatically.

4) CUSTOMER EXPERIENCE

By tracking customer care data, businesses can tap into what customers are thinking and feeling, and can personalize their messages. Along with social media, phone conversations between customers and customer service representatives are a great source of this information. Analyzing this data provides insight into different customer segments, showing how the company might enhance brand perception. The four approaches below have provided valuable insights to Cicero Group clients:

- **Customer Retention Improvement:** This data can help businesses identify key drivers of attrition and point toward initiatives that will increase retention.
- **Social Media Text Analytics:** A company can identify and address customer trends in real time with social media text analytics, measuring what customers have to say about their interaction with a specific company.
- **Predictive Modeling for Communications:** Using external information and customer experience data, businesses can quantify what messages will be most effective for target customers and what timing might have the greatest impact.
- **Customer Satisfaction Tracking & Resolution:** Customers often share their dissatisfaction, but big data can help distinguish between a simple anomaly and a growing trend.

APPLICATIONS OF BIG DATA IN CUSTOMER EXPERIENCE

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[21] 20 Examples Of ROI And Results With Big Data. (2015, May 26). Retrieved November 20, 2015, from Pivotal.io: https://blog.pivotal.io/big-data-pivotal/features/20-examples-of-roi-and-results-with-big-data

[22] Trebilcock, B. (2015, August 15). Supply chain, data analytics, and Big Data. Retrieved November 20, 2015, from Supply Chain Management Review: http://www.scmr.com/article/supply_chain_data_analytics_and_big_data

Toyota[23]

In order to retain customers, Toyota analyzed text and voice-based data from customer service calls to find key indicators of dissatisfaction. Patterns showed that unhappy customers tended to refinance to pay off their loan and buy a different brand in the future. The data also highlighted a number of consistent red flags. For example, one negative indicator correlated to an increased the likelihood of the customer leaving was the phrase, "I pay my bill on time and have not missed a payment." In response, the company trained customer service representatives to address red flag comments positively. They also created a means of automatically identifying potentially-dissatisfied customers and proactively reaching out to them to preempt loss. With this data-driven customer experience initiative, the company's retention rates increased significantly.

Vodafone[24]

Despite having plenty of aggregate metrics, Vodafone decided to pull all of its data into one location in order to enhance customer experience. The data analytics team gathered network performance data, customer service records, and information about customer use of the company website to clarify root causes of customer dissatisfaction. Very quickly, the team identified which customers were having problems and, more importantly, why they were having problems with the network. As a result of this initiative, the company began implementing customer-specific solutions. Its net promoter score increased steadily, and the number of customer service calls decreased.

5) FINANCE

As more of the purchase journey occurs digitally and more payments happen electronically, big data becomes an essential component of financial management. In 2013, the total number of global non-cash payments was an estimated $345 billion; by 2017, that number is projected to hit $411 billion.[25] Every non-cash payment provides a wealth of information that corporate finance professionals can use to increase both efficiency and revenue. We help our clients harness the potential of big data in finance using these three strategies:

- **Pricing Optimization:** Using big data, companies can identify relevant buyer attributes and price points. Then they can price services and products to capitalize on buyer attributes.
- **Risk Management:** Big data reveals the drivers of risk, allowing companies to more accurately predict and uncover fraud, and insure against it.
- **Customer Economics:** By mining big data to evaluate customer economics in the aggregate, companies can gain specific information about how a customer impacts their bottom line. Then they can identify various customer types and allocate resources more effectively.

APPLICATIONS OF BIG DATA IN FINANCE

AIG[26]

AIG harnessed big data to prioritize claims and identify which should be investigated for fraud. First, the company analyzed databases of structured and unstructured data consisting of handwritten notes and historical information on known fraudulent claims. Then, using text-mining algorithms, influence mapping, and fraud factor analysis, the company created a composite fraud propensity score that prioritized for

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[23] Rohatgi, N. (n.d.). Using Text Analytics in Financial Services. Retrieved November 20, 2015, from Innovation Enterprise: https://channels.theinnovationenterprise.com/presentations/using-text-analytics-in-financial-services

[24] Carter, R. (n.d.). Using Big Data to Enhance Customer Experience. Retrieved November 20, 2015, from Innovation Enterprise: https://channels.theinnovationenterprise.com/presentations/using-big-data-to-enhance-customer-experience

[25] Lodge, G. (2014, December 3). Noncash Payments: Global Trends and Forecasts, 2014 Edition. Retrieved November 20, 2015, from Celent.com: http://www.celent.com/reports/noncash-payments-global-trends-and-forecasts-2014-edition

[26] Norton, S. (2014, July 10). Germany's 12th Man at the World Cup: Big Data. Retrieved November 20, 2015, from The Wall Street Journal: http://blogs.wsj.com/cio/2014/07/10/germanys-12th-man-at-the-world-cup-big-data/

investigators which claims should be investigated. In a test, the fraud propensity score identified 90% of actual fraud cases while only requiring investigation of 3.5% of the total claims in the sample set. The score could identify 20% more fraudulent claims, which equates to an estimated annual savings of $30MM.

Auto Insurance Company[27]

To mitigate risk while increasing profit and market share, an auto insurance company needed to understand individual driving patterns. The company gave customers the option of installing a black box in their cars that would send information about driving times, speeds, braking patterns, etc. back to the company. After analyzing this big data, the company offered discounts based on customer driving behavior. As a result of this initiative, claims fell by 30% and low-risk (safe) drivers were attracted and retained with cost incentives.

6) TALENT OPTIMIZATION

In 2014, global spending on talent management software surpassed $6 billion.[28] Human resource professionals regularly tap into big data from talent management software, which houses large amounts of information about each individual employee. We help talent-focused organizations apply big data in the following three ways:

- **Recruitment:** Managers can now easily identify top performers, and characteristics or behaviors that correlate with positive performance. This information helps them recruit candidates who match this profile.
- **Employee Engagement and Retention:** Since not all employees have the same needs, big data can be used to create profiles for individual employees. Then managers can harness this information and tailor their interaction with employees to improve engagement and retention.
- **Compensation Management:** By identifying factors that predict employee attrition and pinpointing the compensation needed to retain various types of employees, big data can help companies manage investment intelligently.

APPLICATIONS OF BIG DATA IN OPTIMIZING TALENT

German National Soccer Team[29]

Leading up to the 2014 World Cup, the once-great German National Soccer Team had not won a World Cup championship in more than 20 years. To optimize their training, the team partnered with a German big data firm to collect team and player performance data. Then the firm created a mobile app that allowed German players and coaches to regularly check updated performance data. The result was stunning: average player possession time dropped from 3.4 seconds to 1.1

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> "New data-driven tools offer innovative approaches to help accelerate leadership by better assessing leadership qualities, understanding career patterns of successful leaders, and learning what development works best."
>
> Adam Canwell, Global and UK Leader, Deloitte Leadership Consulting

[27] Intel. (2015). Intel and Cloudera Use Telematics. Retrieved November 20, 2015, from Cloudera: https://www.cloudera.com/content/dam/cloudera/Resources/PDF/casestudy/intel-telematics-analytics-auto-insurance.pdf

[28] Deloitte. (2014, June 26). Bersin by Deloitte: Global Spending on Integrated Talent Management Systems Anticipated to Rise 17 Percent to More Than $6 Billion in 2014. Retrieved November 20, 2015, from Berin by Deloitte: https://www.bersin.com/News/Content.aspx?id=17687

[29] Norton, S. (2014, July 10). Germany's 12th Man at the World Cup: Big Data. Retrieved November 20, 2015, from The Wall Street Journal: http://blogs.wsj.com/cio/2014/07/10/germanys-12th-man-at-the-world-cup-big-data/

seconds, and this played a significant role in the team's 2014 World Cup win.

Credit Suisse Group[30]

Credit Suisse calculated that a one-point reduction in unwanted employee attrition rates would save the bank $75–100 million a year. Motivated to retain employees, the bank began using data to identify factors that predicted an employee would leave within a year. After reviewing individual employee profiles, the bank noticed that providing internal opportunities for job mobility encouraged employees to stay with the company. At that time, less than half of the open jobs were posted internally. Now, the bank posts about 80% of open jobs on an internal program, which has helped promote and retain around 300 people.

FINDING VALUE IN BIG DATA WITH CICERO GROUP

Successful business leaders regularly use big data to make accurate and timely decisions and, thereby, gain competitive advantage. In almost every industry, organizations that harness big data are increasing efficiency and making strides toward their goals.

If your company is lagging behind this crucial trend, it's time to get on board. At first glance, using big data can feel overwhelming, but we're here to help. As an experienced third party, we have been creating successful data-driven solutions for years—we've been through the process numerous times and with numerous clients, and we welcome the opportunity to assist your company. Our strategic approaches can help kick start or enhance your big data initiatives across any business function.

Cicero Group is a premier data-driven strategy consulting firm. Cicero integrates inductive problem solving with insightful data analytics to guide business strategy.

For more information, visit www.CiceroGroup.com *or follow us on Twitter:* @Cicero_Group.

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[30] Silverman, R. E., & Waller, N. (2015, March 13). The Algorithm That Tells the Boss Who Might Quit. Retrieved November 20, 2015, from The Wall Street Journal: http://www.wsj.com/articles/the-algorithm-that-tells-the-boss-who-might-quit-1426287935

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