



# Analytics: Real-world use of big data in telecommunications

*How innovative communications service providers are extracting  
value from uncertain data*



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*By Bob Fox, Rob van den Dam and Rebecca Shockley*

**“Big data”** is made for the telecommunications industry. Thanks to their networks and the proliferation of smart devices, communications service providers (CSPs) have access to a wealth of information about their customers’ behaviors, preferences and movements. Big data is a tremendously valuable asset for these companies. It puts them in a prime position to win the battle for customers and create new revenue streams – provided they can get their acts together. Our newest global research study reveals how CSPs are responding to today’s big data opportunity.

CSPs have always lived in the world of big data. They have very large subscriber bases, and data is generated every time a customer makes a call, creates a text or uses the Internet. This data provides information about who customers called, what web sites were visited, which apps were downloaded, where the customer was when the phone was used, as well as his or her current location. The data also provides valuable information about the customer experience. Did the call go through? Was it dropped or interrupted? How fast did the song or app download? What was the response latency during the game that was played?

Further customer information is generated through direct customer relationships via retail shops, web sites, call centers and face-to-face interactions. Additionally, the increased use of smart devices and the popularity of social networking are generating an ever-growing flow of data that reveals customer demographics, spending behavior, lifestyle and social influences.

CSPs are at the heart of their customers’ digital universe. They are sitting on a gold mine of digital data that enables them to understand their customers at an unparalleled level. It is a key corporate asset, much needed in a competitive landscape where over-the-top (OTT) players, such as Google and Facebook, are eating into their revenues. Big data provides the opportunity for CSPs to become more competitive and reverse recent declines in revenue and profit levels.

With the opportunities it provides, it is no wonder big data has emerged as a key topic for telecommunications Chief Executive Officers (CEOs) and Chief Marketing Officers (CMOs). In the IBM 2011 Global CMO study, for example, 53 percent of telecommunications CMOs said that the explosion of data will have the most impact on their organization over the next three-to-five years.<sup>1</sup> Among CEOs, 83 percent of the telecommunications CEOs in the IBM 2012 Global CEO study expressed their intention to improve the ability to draw meaningful and executable insights to understand customer behavior from available information.<sup>2</sup>

To more clearly understand how CSPs view big data today and for the near future – and to what extent they are currently using it to benefit their businesses – we analyzed the CSP respondents in our global 2012 Big Data @ Work Study, conducted by the IBM Institute for Business Value in partnership with the Saïd Business School at the University of Oxford.<sup>3</sup> Representing both mature and growth markets, the survey included 1,144 business and IT executives from 26 industries, of which 53 were from the telecommunications industry.

We found that CSPs are starting to see the enormous potential of their customer data and the ways it can be used to help them create new revenues and new businesses. CSPs executives told us that the use of information and analytics is creating a competitive advantage for their organizations.

More than executives from any other industry we studied, CSP respondents define big data as the capabilities needed to perform *real-time* information analysis. In fact, 40 percent of CSPs defined big data as such, in contrast to only 15 percent in the cross-industries sample. For CSPs the real-time aspect is extremely important – as location-based services, smarter network operations, intelligent marketing campaigns, next best actions and fraud detection require a more contextual real-time view of information.

Though CSPs have handled large amounts of data for years, the game-changing aspect of big data today lies in using data to derive new insights – mostly real-time or near real-time – to become more competitive and to create business value. The current focus is on supporting the CSP's core business, such as improving customer experience, driving new products, increasing productivity and optimizing networks.

But a number of CSPs are taking more expansive steps with big data to create entirely new revenue streams, adding “upstream” partners – such as retailers, advertisers and car manufacturers – to the revenue they already get from “downstream” end-users, such as consumers and enterprise-customers. This is often referred to as the two-sided business model. Some CSPs are expanding to become information companies. Sprint, for instance, reports early success selling its data to marketing agencies.<sup>4</sup> And France's SFR has found itself contributing data to help increase blood donations among its customer base, build a better public transport infrastructure in Paris and, even, fight crime.<sup>5</sup>

Our study found that many CSPs are taking a pragmatic approach to big data. The most effective big data solutions identify business requirements first, and then tailor the infrastructure, data sources and analytics to support the business opportunity. These CSPs are initially extracting new insights from existing and newly available sources of information, defining a big data technology strategy and then incrementally upgrading their infrastructure over time.

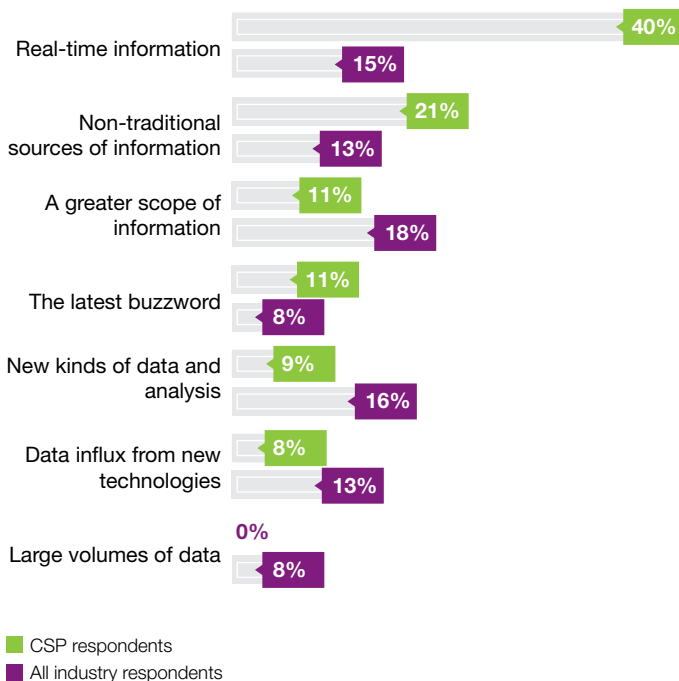
Our study findings led to five key recommendations for CSPs to progress their big data efforts and seek the greatest business value from big data:

- Commit initial efforts to customer-centric outcomes
- Develop an enterprise-wide big data blueprint
- Start with existing data to achieve near-term results
- Build analytics based on business priorities
- Create a business case based on measurable outcomes.

## CSPs future in big data

Big data means many things to many people. To understand our study respondents' definition of the term, we asked each to select up to two characteristics of big data. For 18 percent of the cross-industries sample, "a greater scope of information" was selected as the characteristic best describing big data. Forty percent of CSP respondents, however, said big data is best described by the emerging requirements for more "real-time" information (see Figure 1).

### Defining big data



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

**Figure 1: For CSPs, big data is best described by the emerging requirements for more real-time information.**

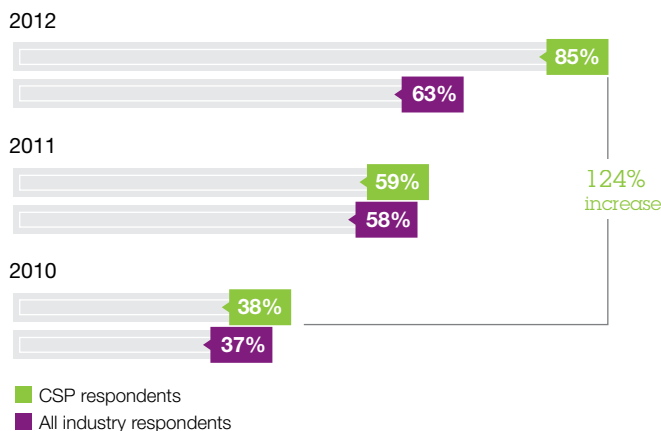
While large volumes of data are not new to CSPs – collecting millions of call detail records per day has become routine – the level of complexity of data today is a significant challenge. The voice data that CSPs have always collected is simplistic compared to the contextual data provided today by smartphones, tablets, personal computers, networks, sensors, RFID tags, social media and the like. And analyzing all this data in near real-time is becoming increasingly crucial. Moreover, with the advent of smart phones, tablets and other devices that are application dependent, the volume of signaling data – i.e. non-message information about the device, its location and updates – has also increased significantly.

CSPs that can ingest and analyze contextual data in real-time or near-real time have much to gain. Within big data lies the opportunity to derive new insights and predict trends that may spark new ways of doing business internally or externally. Using big data in delivering location-based services, tailored marketing campaigns, next best actions for sales and services, network intelligence, social media insights and high-velocity fraud detection has the potential of both increasing revenue and reducing costs, often while improving the customer's experience.

*Although CSPs have historically managed large volumes of data, the complexity of data today is a significant challenge.*

CSPs hold a treasure of customer-related data, and the nuggets of insights buried in big data can be a gold mine. Next-generation analytics can help CSPs mine and refine the value of this economic asset. CSPs are increasingly starting to realize that this stockpile of information is an untapped asset. Eighty-five percent of CSP respondents in our study – significantly more than the cross-industry average of 63 percent – reported that the use of information (including big data) and analytics is creating a competitive advantage for their organizations (see Figure 2). This compares to 38 percent of CSP respondents in IBM's 2010 New Intelligent Enterprise Global Executive Study and Research Collaboration – a 124 percent increase in just two years.<sup>6</sup>

#### Realizing a competitive advantage



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

**Figure 2: Use of information (including big data) and analytics is creating a competitive advantage for CSPs.**

Using big data as a competitive advantage is key in the evolving communications landscape. With the emergence of OTT players, coupled with the increase use of smart devices, it has never been more important for CSPs to leverage their unrivalled data assets to drive greater service innovation and deliver the best possible customer service. In doing so, CSPs can transform their business and customer engagement models and become more competitive, increasing customer value and benefit.

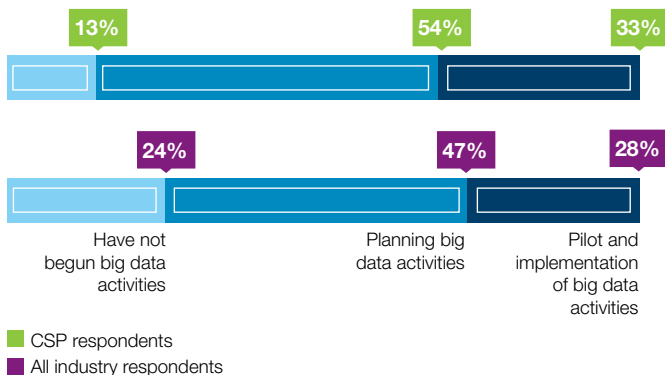
An increasing number of CSPs are also thinking about exploiting customer information commercially, such as generating new revenues from packaging and selling data. Some CSPs see great opportunities in making money from data and even believe the future of their organization is as an information company. The network has become a commodity. How CSPs capture data and put sensors in their networks, that's where the real gold is.<sup>7</sup> Or, as expressed by Von McConnell, director of technology development and strategy at Sprint: "If Telco's became nothing more than a dumb pipe, we could make a living just out of analytics."<sup>8</sup>

Possibilities abound for CSPs to partner with other parties. For example, they can team up with advertisers, retailers, car manufacturers and public administrations – just to mention a few – for e-commerce, machine-to-machine applications and location-based services. They can play a role in smarter cities, health care and other areas, both in mature and growth markets. France CSP Orange, for example, recently participated in an experiment called "Traffic Zen" with highway operator Autoroutes du Sud de la France to create traffic forecasts.<sup>9</sup> And, as previously mentioned, some CSPs have had success in selling data to marketing agencies.<sup>10</sup>

## CSPs are being practical about big data

CSPs are increasingly seeing the enormous potential of big data. More than half (54 percent) are in the process of developing a strategy and roadmap on big data and how to apply it to business challenges. One-third are developing proofs of concepts (POCs), or have already implemented big data solutions at scale. Only 13 percent of CSP respondents, far fewer than other industries, have not started any big data activities yet (see Figure 3).

### Big data activities



Source: Big Data @ Work survey, a collaborative research survey conducted by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 3: Most CSPs are in early stages of big data developments.

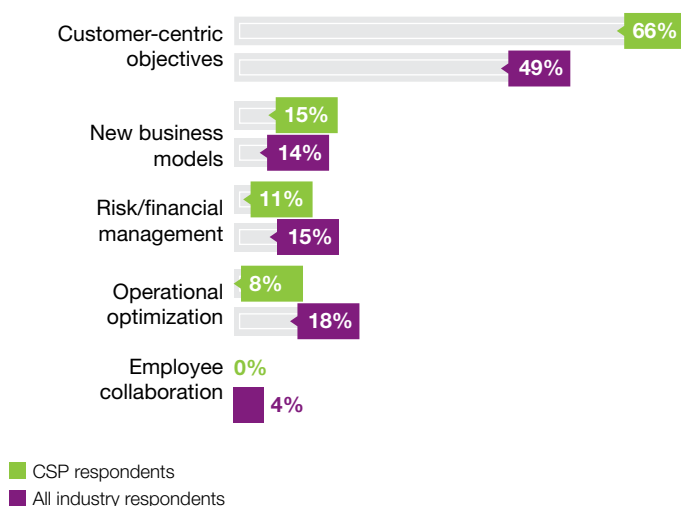
Whether CSPs are using big data to support their core business, or are considering big data sales as a source of revenue, they need to develop a roadmap, set up an adequate infrastructure and adopt new methods, processes and tools to manage the unique volume, velocity, variety and veracity requirements of big data. By analyzing survey responses, five key findings emerge that reveal common insights and trends:

- The business case for big data is strongly focused on addressing customer-centric objectives
- A scalable and extensible information management foundation is a prerequisite for big data advancement
- CSPs are beginning their pilots and implementations by using existing and newly accessible internal sources of data
- Advanced analytic capabilities are required, yet often lacking, for CSPs to get the most value from big data
- The emerging pattern of big data is focused on delivering measurable business value.

## Customer-centric objectives are driving big data initiatives

When asked to rank their top three objectives for big data, two-thirds of CSP respondents identified *customer-centric objectives* as their organization's top priority (see Figure 4). CSPs are committed to improving the customer experience and better understanding customer preferences and behavior. Better understanding, predicting and giving today's "empowered customers" what they really want was also identified as the top priority for 93 percent of CSP CEOs in IBM's 2012 Global CEO study.<sup>11</sup>

### Big data objectives



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Said Business School at the University of Oxford. © IBM 2012

**Figure 4: Two-thirds of CSP respondents' big data efforts target customer-centric outcomes.**

Providing a greater customer experience every time is vital for limiting churn and building loyalty. As confirmed by IBM's 2011 Global Telecom Consumer Survey, customer loyalty is very low in the telecommunications industry, and CSPs are having difficulty retaining customers.<sup>12</sup> In addition, CSPs are facing stiff competition from over-the-top players, such as Google, Apple, Facebook, WhatsApp and Skype, companies that have proven adept at creating compelling online experiences for consumers. The focus of CSPs,

therefore, has shifted from reducing cost to delivering a superior customer experience over their networks. In today's world, competitive advantage requires a distinctive customer experience that goes beyond satisfaction and creates real value for the customer.

As customers provide information every day through their device and network usage, CSPs are well-positioned to learn their customers' wants and needs. Smartphones are, by nature, on virtually all the time, providing CSPs with the opportunity to know their customers better than most, if not all, industries. Also every less-than-satisfactory customer experience – from dropped calls to poor bandwidth performance to excessive latency – is known or knowable. CSPs have an unparalleled opportunity to link traditional customer insights, segmentation and lifetime value to the actual performance of the network as experienced by the customer – real or near-real time. From call detail records to billing records, to customer profiles and location data from mobile devices, CSPs have the information to determine how to offer well-tailored products and services, as well as to deliver a user experience that is meaningful at the right location at the exact right time.

Since CSPs own their networks, the opportunity exists to use analytic tools – developed specifically to handle big data – to identify problems, perform real-time troubleshooting and quickly fix network performance issues, all improvements to the user perception of CSP's services. As an example, if high-value smartphone customers are experiencing poor through-put performance, big data analytics can enable the CSPs to immediately identify the issue and take the necessary steps to ensure the customer experience is not affected – or, in cases where disruption occurs, acknowledge that the experience was affected to minimize the damage.



Intelligent marketing campaigns use big data analytics to create targeted promotions customers are more likely to embrace. For example, Telefónica's Brazilian subsidiary, Vivo, implemented a solution that uses call data, demographics and predictive modeling to reach out to customers and only offer them products and services that match their needs and lifestyles.<sup>13</sup> This solution, for instance, can preemptively contact customers who have recently exceeded their allotted calling minutes and offer discounted upgrade options that will prevent future overages. This approach demonstrates to the customer that Vivo values their business and is likely to result in a positive customer experience. These types of customized marketing promotions can help to prevent churn, increase sales and lower marketing campaign costs.

The ability to anticipate the wants and needs of customers in a sales or customer service situation, known as "next best action" modeling, can increase revenue, profits and customer satisfaction, as well as reduce churn. Next best action responses are most effective when they take into account recent customer interactions across all sales and service channels and automatically determine the best course for each customer, such as offering a new service, an upgrade for an existing service or a service call to address a specific issue.

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*Anticipating customer wants and needs can increase revenue and customer satisfaction, as well as reduce churn*

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In addition to customer-centric objectives, other functional objectives are also being addressed through early applications of big data. Enabling *new business models*, for example, was cited by 15 percent of CSP respondents to the 2012 Big Data @ Work Study. Insights generated from big data have the potential to provide access to entirely new business propositions and revenue streams, such as the aforementioned sale of data to third parties.

The early successes of CSPs to commercialize the big data are evidenced by initiatives from Telefónica and Verizon.<sup>14</sup> Telefónica's Dynamic Insights division launched its first service in November 2012: "Smart Steps." This service is designed to provide insights to retailers to help them tailor local offerings for existing stores, and determine the best locations and most appropriate formats for new stores. Verizon's Precision Marketing division has already trialed its solution with a sports team. Joint promotional opportunities and ticketing packages have boosted season ticket sales by up to 35 percent.

*Risk and financial management focused activities* were identified by 11 percent of CSP respondents as important objectives for early big data efforts. Applying advanced analytics tools, CSPs can scour big data for potential fraudulent activities as transactions occur, scoring and rating the probability that they are fraudulent. The challenge for real-time fraud detection – such as the use of cloned SIM cards – includes the need to ingest and analyze large volumes of high-velocity data from across geographies and subscribers and act quickly enough to identify and prevent unauthorized use. One CSP executive estimated that using real time analytics tools could reduce fraud by more than US\$100 million per year.<sup>15</sup> As well as driving down overall debt-collection costs, targeting risky customers also has the added advantage of lowering churn rates.

**Big data is dependent upon a scalable and extensible information foundation**

The opportunity to achieve significant, measurable business value from big data can only be realized if CSPs put into place an information foundation that supports the rapidly growing volume, variety and velocity of data. We asked CSP respondents to identify the current state of their big data infrastructures. Those who have already implemented big data solutions have an information foundation that is scalable, extensible and supports (near) real-time requirements. They use technologies such as Hadoop and NoSQL to efficiently process large amount of data in less time in distributed environments. These technologies provide higher scalability than traditional technologies.

It's no surprise that CSPs rank scalability, extensibility and (near) real-time aspects at the top. CSPs all over the world are seeing an unprecedented rise in volume, variety and velocity of information due to next generation network roll-outs, increased use of smart phones and rise of social media. It is increasingly important for CSPs to correlate this data in a way that it can be used to monitor network performance and to provide improved services and customer experience in (near) real-time.

T-Mobile in the United States, for example, is collecting a staggering 17 billion events a day from its network, storing this data and running analytics on it.<sup>16</sup> This analysis enables T-Mobile to examine and correlate network performance with high-value subscribers and services to better target its capital expenditure and networking engineering.

The stream of incoming data, both structured and unstructured, CSPs must collect and manage is increasing exponentially. According Cisco Visual Network Index, global mobile data traffic will increase 13-fold between 2012 and 2017.<sup>17</sup> As a result, the load on CSPs' big data infrastructures will continuously increase. This surge in data promotes the concept that, even though the era of big data has barely begun, the era of "really big data" is on the immediate horizon. As the world becomes increasingly connected, CSPs will play a crucial role in enabling mass personalization through contextual-awareness. Continuously processing data from interconnected devices will reveal meaningful inferences that can benefit the end user.

Though scalability, extensibility and real-time aspects are cited by CSP executives as the top three components in the information foundation, the other components, including security and governance, are also important. Strong security and governance processes are in place at 50 percent of the CSPs that report having active big data initiatives underway. While security and governance have long been an inherent part of business intelligence, the added legal, ethical and regulatory considerations of big data introduce new risks and expand the potential for public missteps. Some companies have lost control of data or used it in questionable ways. Recent privacy blunders, such as copying customers' contact lists without consent, or inadequate privacy policies, serve as examples of what customers, regulators and society-at-large are willing to accept.

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*CSPs rank scalability, extensibility and real-time aspects as top factors in creating an information foundation.*

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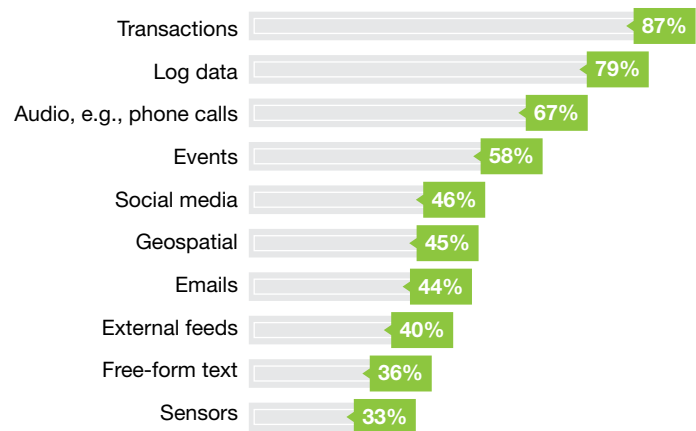
Data security – and especially data privacy – has always been a critical part of information management, but big data's size, scale and depth take the need to an entirely new level. Security and governance will become even more important and daunting as CSPs embrace new sources of information, especially social media data. Compounding this challenge, privacy regulations are still evolving and can vary greatly by country.

“There is the perception that privacy and security is easy, but it's very regulated, very closely watched,” one telecommunications industry executive explained.<sup>18</sup> And it's not just governmental agencies watching, but also the customers themselves. The executive continued: “There are a number of new areas – like web browsing data – where a gray area exists between what's legal and what's right. We have taken the approach to consider every action using the standard of what the customer would think if (the way we used the data) was splashed across the front page.”

### Initial big data efforts are focused on gaining insights from existing and newly accessible sources of internal data

Most early big data efforts are targeted at sourcing and analyzing existing data. According to our survey, more than half of the CSP respondents reported internal data as the primary source of big data within their organizations. This suggests that CSPs are taking a pragmatic approach to adopting big data. It further indicates that tremendous untapped value is still locked away in these internal systems (see Figure 5).

#### Big data sources



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

**Figure 5: For CSPs, big data is best described by the emerging requirements for more real-time information.**

Internal data is the most mature, well-understood data available to CSPs. By applying analytics, internal data extracted from phone calls, transactions, call center interactions and events can provide valuable information. Call detail records captures information about who made the call, who received it, how long the call was, etc. With the proliferation of smartphones, a new category of transaction records has emerged – XDRs (extended data record) – which capture other transactions, such as the purchase and download of a song or a video clip, a recharge on a prepaid account or a mobile payment. CSPs can make good use of the information they already have. They can build a view of their customers across all touch points – from wired and wireless networks to customer-facing channels – and use it to improve customer experience, profile customers, align solutions to customer needs, predict the up-selling potential and more.

Executive interviews confirmed that many telecommunications CIOs guiding their companies' big data initiatives are beginning with these untapped sources of internal information. For example, TEOCO, a telecom software solution provider, analyzed 500 terabyte of data daily from call detail records and inter-carrier invoices to help CSPs identify cost savings and improve service delivery.<sup>19</sup> The company helped a Tier 1 mobile operator save more than US\$400 million in four years. It also enabled clients to proactively respond to network issues before they affected customer service.

The new trend is not only to understand who the customers are, but also to have a more contextual, location-based and real-time view of them. Terabytes of location data are generated every day and adds another dimension for CSPs. Forty-five percent of CSPs respondents with active big data efforts use location data, for example, to support intelligent marketing campaigns, detect fraud and improve network quality.

Forty-six percent of the CSP respondents in our study with big data efforts underway extract data from social media sources such as Twitter, Facebook, message boards and other online locations where consumers chat and post opinions. This enables them to quickly detect customer issues and consumer sentiments, and provides insight that can enable increased revenues, reduced costs and brand protection.

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*CSPs are looking to have a more contextual, location-based and real-time view of customers.*

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### **Big data requires strong analytics capabilities**

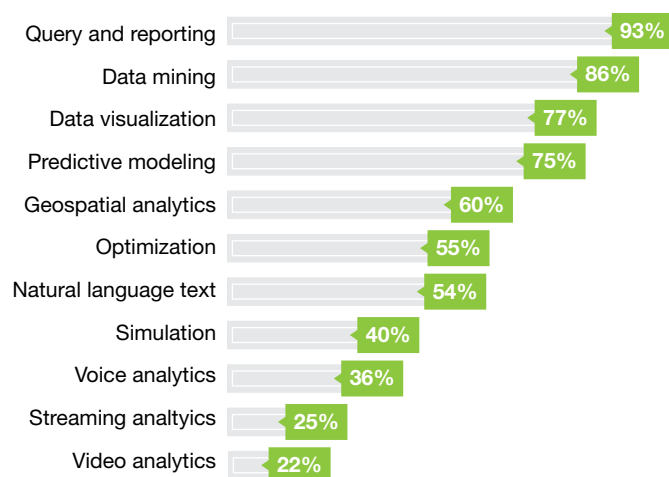
Big data does not create value, however, until it is put to use to solve important business challenges. This requires access to strong analytics capabilities that include both software tools and the requisite skills to use them.

Examining those CSPs already engaged in big data activities reveals that they start with a strong core of analytics capabilities designed to address structured data. Next, they add capabilities to take advantage of the wealth of data coming into the organization that is both semi-structured (data that can be converted to standard data forms) and unstructured (data in non-standard forms).

More than 85 percent of CSP respondents with active big data efforts reported using core analytics capabilities, such as query and reporting, and data mining to analyze big data (see Figure 6). Beginning with these foundational analytics capabilities is a pragmatic way to start interpreting and analyzing big data. The need for more advanced data visualization capabilities increases with the introduction of big data. Datasets are often too large for business or data analysts to view and analyze with traditional reporting and data mining tools. In our study, 77 percent of CSP respondents said that they rely on data visualization skills.

Predictive modeling uses algorithms to find patterns in data that might predict similar outcomes in the future. Three-quarters of CSP respondents with big data efforts report using predictive analytics. An example of predictive analytics is the use of customer data to find out which customers are likely to churn. If a CSP can predict the reasons for churn, they can take preemptive actions to try to avoid this undesirable outcome.

### Analytics capabilities



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

**Figure 6: CSP respondents are applying a variety of advanced analytics.**

XO Communications, a wholesale and enterprise-focused CSP in the United States, has been using predictive analytics with its monthly account-management cycle to predict churn. Within the first year, a 60-percent improvement in revenue retention rates was realized. Although XO account managers have been surprised from time-to-time at the likely candidates to churn, the use of analytics in this way has enabled an improvement in customer experience to the degree that one particular XO service line has swung from loss to profit.<sup>20</sup>

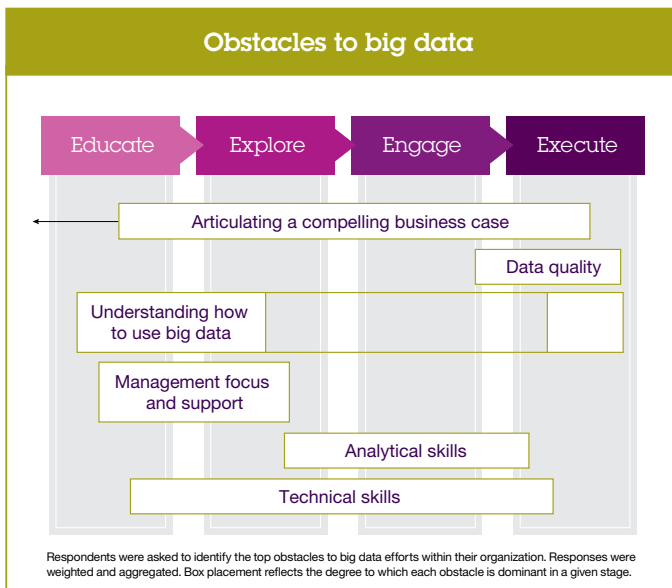
Today, most CSPs are directing their initial big data focus toward analyzing structured data. But big data also creates the need to analyze multiple data types, including location data, social media, data from sensors and natural language text. By combining location information with customer profiles and usage patterns to separate travel and stationary patterns, CSPs can identify network loads and bottlenecks. Location analytics enable CSPs to manage the network and user experience, identify customers at relevant locations and drive location-based marketing in real-time. Three-in-five CSP-respondents with big data efforts use geospatial analytics.

In more than half of the active big data efforts, CSP respondents reported using advanced capabilities designed to analyze text in its natural state, such as the transcripts of call-center conversations. These analytics include the ability to interpret and understand the nuances of language, such as sentiment, slang and intentions.

As described in IBM Institute for Business Value's "Telecom's future is social" study, a number of CSPs have started using data from social media to generate richer insights.<sup>21</sup> By combining social characteristics with existing behavioral knowledge, CSPs are able to create extended and deeper insights to engage and retain customers. Social network analytics can also be used to find key influencers and engage them with customized messaging, to evaluate how new campaigns, product and services are resonating, and to quickly respond to negative chatter to protect their brands and reputation. Bharti Airtel, for example, uses social network analysis to determine customer issues by tracking mentions of the company on social media and following up on any problems.<sup>22</sup>

### The emerging pattern of big data adoption is focused on delivering measurable business value

The overall challenge that inhibits big data adoption as CSPs move through the big data adoption stages – from education (building a base of knowledge, through exploration and engagement, to execution (implementing big data at scale) – is understanding the potential that big data presents, i.e. the ability to articulate a compelling business case (see Figure 7).



Source: Big Data @ Work survey, a collaborative research survey conducted by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 7: Understanding key big data adoption obstacles.

The current telecommunications industry climate – especially slowing or flat revenue growth and the increasing demand for capital expenditures to build 4G/LTE networks – has left CSPs with little appetite for new technology investments without measurable benefits – a requirement that is of course, not exclusive to big data initiatives. Examples of benefits that should make big data attractive to CSPs, include greater capital and operational expenditure efficiencies, better customer relations, or more product/service innovation and speed. Decision making is mainly driven by business value. Proposed investments not likely to deliver reasonable return are not a high priority.

The limited number of CSPs that report economic and competitive advantage from big data – as mentioned before, only a few CSPs have already operationalized and implemented big data and analytics capabilities within their organizations – makes others anxious about the returns forecast from big data investments.

This economic skepticism means that the greatest obstacle confronting those in the early stages of big data development centers on understanding and articulating a compelling use case worthy of the needed investments in big data capabilities – and getting management's attention long enough to have them understand and support it moving forward.

Once CSPs begin to focus on a specific business challenge through proofs of concepts and pilots, it is no surprise that the struggle becomes finding the needed skills to make big data real: first, the skills to implement and evaluate the technologies; later, quantitative and visualizations skills required to perform the advanced analytics and to make the insights actionable.

## Recommendations:

### Cultivating big data adoption

Analysis of our big data survey findings provided new insights into how CSPs are advancing their big data efforts. Driven by the need to solve business challenges, in light of both advancing technologies and the changing nature of data, CSPs are starting to look closer at big data's potential benefits. To extract more value, we offer a broad set of recommendations to CSPs as they proceed down the path of big data.

### Commit initial efforts to customer-centric outcomes

It is imperative that CSPs focus big data initiatives on areas that can provide the most value to the business. And that means beginning with customer analytics that enable better service to customers as a result of being able to truly understand customer needs and anticipate future behaviors. Better understanding, predicting and giving customers what they really want is by far the key priority of telecommunications CEOs.

Mass digitization, one of the forces that helped to create the surge in big data, has also changed the balance of power between the consumer and the CSP. If CSPs are to understand and provide value to empowered customers, they have to concentrate on getting to know their customers as individuals. They will also need to invest in new technologies and advanced analytics to gain better insights into individual customer interactions and preferences.

But today's customers – end consumers or business-to-business customers – want more than just understanding. To effectively cultivate meaningful relationships with their customers, CSPs must connect with them in ways their customers perceive as valuable.

The value may come through more timely, informed or relevant interactions; it may also come as CSPs improve the underlying operations in ways that enhance the overall experience of those interactions. Either way, analytics fuels the insights from big data that are increasingly becoming essential to creating that level of depth in these relationships.

### Develop an enterprise-wide big data blueprint

A blueprint encompasses the vision, strategy and requirements for big data within the organization. It is critical to establishing alignment between the needs of business users and the implementation roadmap of IT. It creates a common understanding of how CSPs intend to use big data to improve business objectives.

For CSPs, big data means a fundamental rethinking of the way data is managed. Many CSPs are still organized by products, services and function, not by customers; a number do not even have someone who owns the data or data strategy. CSPs need to break the data silos to enable data to be used in a more flexible and innovative way and to increase the velocity of data as it flows around the organization. CSPs need to set up an enterprise-wide information foundation to move forward.

An effective blueprint defines the scope of big data within the organization by identifying the key business challenges to which it will be applied, the business process requirements that define how big data will be used, and the architecture, which includes the data, tools and hardware needed to achieve the big data strategy. It is the basis for developing a roadmap to guide the organization through a pragmatic approach to develop and implement its big data solutions in ways that create sustainable business value.



**Start with existing data to achieve near-time results**

To achieve near-term results, while building the momentum and expertise to sustain a big data program, it is critical for CSPs to take a pragmatic approach. As respondents confirmed, the most logical and cost-effective place to start looking for new insights is within the enterprise.

Looking internally first allows CSPs to leverage their existing data, software and skills to deliver near-term business value and gain important experience. They can then extend their capabilities to address more complex sources and types of data. Most CSPs will want to do this to take advantage of the information stored in existing repositories while scaling their data warehouse(s) to handle larger volumes and varieties of data.

When the basic processes, frameworks and technical infrastructures needed to capture and manipulate existing data have matured, CSPs can extend to other sources. With the proliferation of smart devices and sensors and the explosive growth in structured and unstructured data, new opportunities emerge to provide contextually aware and just-in-time personalized services based on individual user views, desires, preferences and location. CSPs are in the best position to serve the smarter consumer, who increasingly expects unique products and services customized to his or her unique preferences.

**Build analytics capabilities based on business priorities**

The first step in leveraging big data is using analytical tools, such as query and reporting, dashboarding and scorecarding, to support key business processes, including generating key performance indicators and customer experience management. This can transform data into insight by delivering relevant, integrated, timely and actionable information. There is enormous value in making real-time network information available to the contact center, for example.

With predictive capability, CSPs can start to transition to an optimized, outcomes-focused organization. It can create foreknowledge and deep awareness of customer, operations and network behaviors. Predictive analytics delivers more than informed decision making. It can, for example, reveal patterns that help identify customers who might have a high propensity to buy rich media services, thereby delivering new, untapped revenue streams.

The final step – intelligent analytics and autonomics – can help create a highly dynamic and efficient information-centric enterprise. A system that is automated and aware of real-time events can provide input to promote solutions for immediate execution. For example, a customer walking past a particular coffee shop can be sent an offer for a beverage discount at that same store.

As contextual information from the “Internet of Things” and data produced by social platforms becomes more important to support effective decision making, CSPs should increasingly focus on acquiring the capabilities needed to wield prescriptive analytics designed to automate actions. New powerful technologies – including cognitive systems – are capable of evaluating large amounts of both structured and unstructured data in or near real-time.

Watson technology, for example, can sift through an equivalent of about 1 million books or roughly 200 million pages of data, and analyze this information and provide precise answers in less than three seconds.<sup>23</sup> Watson applies advanced natural language processing, information retrieval, knowledge representation and reasoning, and machine learning technologies to answering questions. This technology, for example, can be useful in enabling CSP call centers to respond to customer questions faster, more efficiently and with greater accuracy.



In addition to acquiring tools, CSPs should also focus on having the right analytical knowledge, not easy in a world where there is a high demand for – and critical shortage of – appropriate analytical skills.

### Create a business case based on measurable outcomes

To develop a comprehensive and viable big data strategy and the subsequent roadmap requires a solid, quantifiable business case. Therefore, it is important to have the active involvement and sponsorship from one or more business executives throughout this process. Equally important to achieving long-term success is strong, ongoing business and IT collaboration.

Many CSPs are basing their business cases on the following benefits that can be derived from big data:

- *Smarter decisions* – Leverage new sources of data to improve the quality of decision making.
- *Faster decisions* – Enable more real-time data capture and analysis to support decision making at the “point of impact,” such as when a customer is at a particular location or on the telephone with a customer service representative.
- *Decisions that make a difference* – Focus big data efforts toward areas that provide true differentiation.

An important principle underlies each of these recommendations: business and IT professionals must work together throughout the big data journey. The most effective big data solutions identify the business requirements first, and then tailor the infrastructure, data sources and quantitative analysis to support that business opportunity.

### Kick off your big data evolution

The ability to systematically collect and analyze data represents a new world of exploration open to CSPs. With the wealth of information CSPs have about their customers, they have big advantages over others in the ecosystem. CSPs that act swiftly to capitalize on the insights locked inside the vast volume, velocity and variety of big data will position themselves to keep ahead of the competition, improve customer experience, drive new products, increase productivity, predict future trends, and especially, make money.

CSPs that are able to extract maximum value from their data assets can become fully two-sided businesses. They can uncover entirely new revenue streams by partnering with advertisers, retailers, health care and public administration, just to mention a few. The existing telecommunications ecosystem creates the potential to become the preferred and trusted keeper of personal data, given the industry’s good record in dealing with customers’ data, the strict regulatory framework already in place, and its inherent data protection obligations.

CSPs should see big data as a crucial window of opportunity. Telecommunications is an industry poised to be at the forefront of the big-data wave, using big data analytics as a differentiator today and, eventually, as a most valuable core capability.

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