



## Columns

# WALL STREET JOURNAL



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## Making the Case for the ‘Long Tail’ of Big Data

By Randy Bean | Contributor | August 27, 2015

Around the time Chris Anderson [introduced the “long tail”](#) to the masses in a 2004 Wired cover story, MIT’s Erik Brynjolfsson and others [were studying](#) how products in low demand could produce a larger market share than higher demand items — if the distribution channel was large enough. The “long tail” came to reference these harder to find items that, taken collectively, could create a big market. Now we can apply the term to Big Data.

I recently had the opportunity to spend some time with Michael Stonebraker, a pioneer in the field of data management and the 2014 recipient of the ACM Turing Award, which is often called the “Nobel Prize of Computing.” Prof. Stonebraker, a member of the faculty at the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL), has drawn upon Prof. Brynjolfsson’s statistical research to apply the “long tail” concept to Big Data.

For most large companies, Big Data is less about managing the “volume” of data they have, and much more about integrating the wide “variety” of data sources that are available to them – which can include data from legacy transaction systems, behavioral data sources, structured and unstructured data, and all sizes of data sets. Prof. Stonebraker estimates that corporations manage to capture a small fraction of this data within their enterprise data warehouse systems. He’s calling for companies to shift their focus to “the long tail” of data that may actually be the key to their most critical business insights.

Prof. Stonebraker believes that corporations minimize and misunderstand the difficulty of data integration, which he calls the foundation of data management. “Data integration is damn hard,” he said at the MIT Chief Data Officer Symposium in Cambridge, Mass. last month. “Data warehouses work for less than 25 data sources – they don’t scale.” He continued, “The notion of a global data model and data standards alone being sufficient for data integration is fantasy. It doesn’t work!”

Instead, the future of data management lies in “data curation,” which he describes as being “aimed directly at the ‘long tail’ – the hundreds or thousands of data silos not captured within the traditional



data warehouse, and which can only be captured and integrated at scale by applying automation and machine-learning based on statistical patterns.

While many firms are embracing the notion of the “data lake” as a staging area for data management, Prof. Stonebraker views the data lake as “just a bunch of un-curated data, a junk drawer that, on its own, is not solving any significant problem.” Data curation relies upon machine learning systems that use statistical techniques to learn and build knowledge over time, he says. As business analysts continue to demonstrate an insatiable appetite for more data, data curation holds the potential to release firms from the “bondage of traditional schema.”

Prof. Stonebraker acknowledges that he is challenging conventional wisdom about data warehousing, a discipline that has grown in stature over the past two decades with many thousands of practitioners. He foresees a changing data and information landscape, part of the Big Data revolution, where complex data analysis supplants the simple data analysis that he sees as the current state of analytics today. He concludes, “We are in the midst of an explosion of new ideas that will change the data landscape. We are going to be at this for a while.” Given the continuing proliferation of data and new data sources, he may be exactly right.

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# WALL STREET JOURNAL



## Mainstream Corporations Poised for Big Data Investments

By Randy Bean | Contributor | July 16, 2015

For mainstream corporations operating in mature markets, finding the opportunity for disruption using Big Data can be a daunting challenge. Although the economic opportunity is enormous, mainstream corporations face business impediments and complex legacy environments. The opportunity to realize significant business benefits is often based on optimization of operational processes that lack the glamour of new-economy entrants.

Silicon Valley Bank recently held a Big Data Summit to highlight some of the challenges facing mainstream corporations as they struggle to seize an advantage from the opportunity presented by Big Data. But first, for context, check out these past headlines:

- “World drowning in oceans of data” – BBC News. October 31, 2003.
- “Digital universe doubling every 18 months” – IDC. May 19, 2009.
- “Here comes the zettabyte age” – Wired. April 30, 2010.
- “90% of world’s data generated over the last two years” – Science. May 22, 2013.
- “One-fifth of organizations store more than 1 petabyte of data” – CIO. February 13, 2015.

The data challenge is multiplying. SVB highlighted what they perceive as a “discrepancy in maturation” in Big Data capabilities based on the selected vertical markets they analyzed. Referencing statistics drawn from The U.S. Department of Commerce, Gartner, and additional sources, SVB concluded that Big Data maturity is highest in smaller size markets, like advertising and travel, and is at an early-stage or nascent in the large economic markets, like financial services and health care. They cite two significant impediments to Big Data spending in these markets: Level of regulatory oversight and ease of data capture.

In spite of sizable investments in Big Data from some large financial services and health-care companies, Silicon Valley Bank concluded that the Big Data industry was at the tip of the iceberg (“nascent”) in



terms of future investment opportunities. SVB foresees a future driven by Big Data investment in “high friction, high value” industries.

The Big Data opportunity among high-value mainstream corporations will be a challenge for other reasons as well. Chris Parsons, who serves as vice president of Big Data Strategy and Business Development for AT&T, echoes SVB’s comments on market impact. He highlighted an additional challenge when he observes that for mainstream corporations, “the use cases may not always be sexy.” But still the business impact can be “enormous.”

The company recently opened a Big Data Center of Excellence in Plano, Texas. For AT&T, Big Data means dealing with 10 million columns of structured data for 62,000 services. AT&T hopes its center will bring speed and agility to its business capabilities and processes.

For financial service giant, American Express Inc., the challenges are similar — huge business impact, based largely on operational process optimization. Ash Gupta, chief risk officer and president for Risk and Information Management for American Express says AMEX is focusing its Big Data efforts on three areas: service excellence, generating billings and receivable growth, and risk management. “Big Data analytics have helped us significantly reduce the lag time to insight and discovery, allowing us to more rapidly enhance customer experience.”

If SVB is correct, mainstream companies will drive the future of Big Data investment. It may not all be classic disruption or glamorous stuff. However, when measured by investment and business value, expect the impact to be massive and at scale.

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# WALL STREET JOURNAL



## Big Data Fuels a ‘Data First’ Movement

By Randy Bean | Contributor | June 15, 2015

My esteemed friend and colleague Tom Davenport recently wrote in these pages about [The Shift to a New Data Architecture](#). With his usual instinct for wry observation Tom noted, “so this architectural revolution won’t be televised, but it will be revolutionary.” And, there will be bodies. To quote the French revolutionary Robespierre, “The king must die so that the country can live!”

Having spent many years as a firsthand practitioner on both the technology and the business side of the data fence, I can attest to how difficult it is to manage data well, and how frustrating it sometimes can be to be dependent upon the IT organization and the data warehouse for access. Can’t we just do it ourselves? Give us the data!

Well, things are changing, and changing fast. As Mr. Davenport notes, new data architectures like Hadoop represent “a classic disruptive innovation.” The question facing many organizations today is how to integrate newly developed Big Data architectural approaches into traditional legacy data environments. Business analysts have long clamored for firsthand access and control over the data they need to do their jobs. The data warehouse has represented an institutional compromise, providing a centralized repository of standardized data.

While proponents of the data warehouse approach have pointed to the benefits of standardization, consistency, and control, critics lament that data warehouses can be slow, costly, and lacking in agility in response to change. This becomes more acute in rapidly changing environments or dynamic markets. With the growing and accelerating proliferation of data, some business users have begun to sound a drumbeat as they demand a more flexible and dynamic data environment that is responsive to their needs – and by extension, the needs of their end customers.

Many of my colleagues in industry are enthusiastically embracing emerging Big Data architectures as the first data architecture approaches that deliver the speed and agility that businesses need to compete in a digital era. Within the data management community the debate is on, with defenders of the old and proponents of the new engaged in a dialogue aimed at winning the hearts and minds of the mainstream.



Out of this debate has emerged the “Data First” movement, which has fashioned its own manifesto and call-to-action based on a set of core principles:

**Businesses must have greater control over their data assets.** The argument is that in the same way that the Internet has driven end-customer self-service, Big Data can drive business analyst self-service. The times demand it. Victory goes to the fast and nimble.

**Data discovery must be encouraged, and not penalized.** Many of the most innovative firms have prospered by their ability to develop new products and services quickly, and validate them in the market. They have developed test-and-learn models which enable rapid analysis. In the past I have discussed the ability of leading edge firms to develop learning practices that enables them to “fail fast” and adapt quickly.

**Data efforts must move toward decentralization of control.** The pendulum swings between the benefits of centralization and organizational control, and decentralization and unit autonomy. New approaches aim to enable greater responsiveness to data discovery while ensuring lightweight data governance standards to maintain data integrity at a corporate level.

**Inexpensive data storage and processing power have liberated data.** Data can now be produced liberally and cost-effectively. Each data user is able to house and manage their own data environment. Data needs can be driven on-demand in the context of what information is required in the moment. Moving control of data to the business user means moving decision making closer to the customer.

As customers demand faster responsiveness to their needs and desires, pressure will mount on companies to find new ways to enable data discovery so that businesses can create the analytics they need at the pace they require. Brute-force processing power and the demand for agility will drive change. The data itself will dictate what information and patterns are relevant. Big Data gives us the power to learn from the data, and hypothesize based on actual results. Some will argue that we had forgotten about the data – and now, the data comes first, as it should be.

There will be honest debate and there will be resistance. So, in times like these, it’s worth recalling the legendary Apple marketing campaign, “Think Different” — “Here’s to the crazy ones. The misfits. The rebels. The troublemakers. The ones who see things differently. They’re not fond of rules. They change things.”

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# WALL STREET JOURNAL



## Tracing Some of Big Data's Big Paradoxes

By Randy Bean | Columnist | May 12, 2015

As we push ahead to fulfill the promise of Big Data, we should bear in mind that there can be perils that reflect a dark side if we fail to act responsibly.

I recently attended a talk on the topic of intellectual privacy by Neil M. Richards, Professor of Law at Washington University in St. Louis, and author of the recently published book, *Intellectual Privacy: Rethinking Civil Liberties in the Digital Age* (Oxford University Press). The underlying message of his talk was bracing and cautionary. Privacy breaches, unethical hacking, and other invasions of data privacy so often lead to the establishment of guardrails and restrictions that limit our ability to experience greater convenience, enjoy more personalized consumer experiences, benefit from greater customer self-service, or learn from data that we now have access to. We don't want to surrender our freedoms. We want the freedom to do with "our data" whatever we damn well please. Our intentions are good — upward and onward for the greater benefit of mankind, or for users of the next personalized mobile application.

Professor Richards called attention to what he calls the "Three Paradoxes of Big Data," and began his presentation with a cartoon depicting a patient at a doctor's office. The doctor asks the patient, "Would you mind if I transplant this GPS device under your skin? It will be painless." The patient reacts in horror with a painful grimace, eyes filled with fear, and perspiration flying off his face, and cries out, "No, that would be an invasion of my privacy!" In the next frame, the doctor replies, "The device will also have a camera, store your music and photos, provide access to the Internet, and allow e-mail and texting." The patient looks greatly relieved, and eagerly responds, "Great! How quickly can we get started?" Ha! This illustrates the paradox according to Professor Richards — we are willing accomplices to trade off our privacies if we perceive that we are getting a meaningful benefit in return. But, how far does this extend?

Professor Richards identifies the three paradoxes:

- **The Transparency Paradox.** Prof. Richards cites our movement past the Internet of Things to the "Internet of Everything". Cisco Systems Inc. projects that 39 billion intelligent devices will connect to the Internet by 2020. So, to quote Prof. Richards, "Big Data promises to use this data



to make the world transparent, but its collection is invisible, and its tools and techniques are opaque, shrouded by layers of physical, legal, and technical privacy by design.” Wow!

- **The Identity Paradox.** Prof. Richards observes that while Big Data seeks to identify, it also threatens identity, by removing anonymity and our “right to be left alone.” He cautions that the power of Big Data can also be the power to use information to “nudge, to persuade, to influence, and even to restrict our identities.” Hmm.
- **The Power Paradox.** Prof. Richards reflects on how Big Data enables us to develop a more informed picture of the world, and cites the Arab Spring as a positive example of the power of information. He cautions though that “Big Data will create winners and losers, and it is likely to benefit the institutions who wield its tools over the individuals being mined, analyzed, and sorted.” OK. Maybe I need a drink now.

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# WALL STREET JOURNAL



## Chief Data Officer Role Shifts to Offense

By Randy Bean | Columnist | April 7, 2015

Shakespeare said “April hath put a spirit of youth in everything.” It was one year ago that I published a column, [Chief Data Officers Blaze Uncharted Corporate Frontier](#). The premise was that a fresh new corporate role had emerged, originating in direct response to growing demands for coordination of corporate data policies, practices, and strategy. In an [executive report](#) I published later in the year, I noted that “the Chief Data Officer role is becoming a corporate standard,” with 43% of executives reporting that their firm had appointed a chief data officer, up from only 19% just two years earlier. This trend was most evident among financial service firms. In 2013-2014, AIG, American Express Charles Schwab, JP Morgan, Nationwide Insurance, Raymond James, State Street, and Wells Fargo, all established a CDO function. It seemed that a consensus had been established. Or, had it?

If you follow the ongoing trials and tribulations of Fortune 1000 organizations as they struggle to derive business value from their data initiatives and to leverage data as a corporate asset, you may note that levels of frustration and dissatisfaction with the progress of data initiatives continue to be high. For some firms, the chief data officer has been seen as a quick fix, a silver bullet – as if, by virtue of establishing the position and filling the role, an organization’s data challenges would immediately fall into place. And because of this, a backlash has been brewing in some quarters.

In late 2013, as many banks were announcing the establishment of the chief data officer role, Bank of America Corp. was concluding that the CDO role was not essential, and eliminated it. Banks like Capital One Financial Corp., regarded by many as being at the forefront of data and analytics, have steadfastly avoided naming a CDO. Leading insurance companies have largely bypassed naming a CDO, opting to organize the functions of the CDO under a range of roles – chief risk officer, chief analytics officer, or head of Informatics. Asset management firms have mostly sidestepped naming a CDO. Other industry sectors – life sciences, high tech, media, retail, and manufacturing – have been slow to adopt the CDO position. And, while Experian recently reported that “92% of CIO’s will be the new keepers of data strategy and data quality within large enterprises – with CDO’s grabbing corporate board seats by 2012”, Carlton Doty of Forrester challenged this assumption, characterizing the CDO role as a “short-term fix.” So, what does the future hold for the chief data officer?



**CDO as Compliance-Focused.** Companies have long aspired to use the data they have to become smarter. This is not new. Establishment of the CDO role was propelled by the 2008 financial crisis. Many financial service firms found themselves unable to fully trust the quality of their data, or understand its lineage – how it originated, was derived, or consumed. They lacked standards for managing data, or processes and policies for governing data, and concluded that they needed to establish a chief data officer to “stop the bleeding” and “get the data under control.” The initial breed of chief data officers adopted a largely “defensive” posture – to ensure regulatory and compliance satisfaction.

**CDO as Opportunity Focused.** In the ensuing years, there has been an additional imperative driving establishment of the CDO role – the idea of creating new information-based products and services, or providing more highly customized products and services in response to customer behaviors and needs – often associated with Big Data. This next wave of chief data officers has adopted a more “offensive” posture. Yet, things are never quite that simple. There is not a standard model for the CDO role. In different organizations, the CDO might sit at the executive table, or may report to the CIO, CMO, or another function. Most CDO organizations are small, with limited budgets and limited authority. John Bottega, who held an early incarnation of the position of CDO at CitiGroup in 2006, quips “Organizations did not know what the role was then, and they still don’t know.”

How will the CDO role evolve? Will it be the role of the CDO to be a change agent who forges a culture of data, or will the CDO operate largely as a data guardian who oversees and enforces the development of data standards, policies, and practices? Or, perhaps most likely, a blend of both? We’ll see.

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# WALL STREET JOURNAL



## Time to Focus on the Twin Pillars of Big Data 2.0

By Randy Bean | Contributor | March 12, 2015

While many executives claim to loath the term Big Data, they should nonetheless appreciate that the term has resonated from Wall Street to Main Street. Data may not provide insights or answers to all questions, but wouldn't we rather have good data available to inform our decisions? The great benefit of the Big Data wave of this decade, from my perspective, has been the elevation of the discussion, and the liberation of data from the exclusive purview of a small community of specialists. *Ich bin ein* Data Analyst. We are all data analysts and beneficiaries now.

In the same vein as the debate over Big Data as a term, another debate has swirled around what constitutes Big Data. For some, Big Data means only new forms of data, such as social media data or unstructured data. From my perspective, Big Data refers to the ability to access rapidly and cost effectively all types of data—new, old, large, small, or of any variety—by leveraging new tools and business processes. In this context, Big Data implies a vital new approach that is applicable to all data challenges and opportunities. The Bastille has fallen. The data warehouse will live on, but as one element of a comprehensive data strategy, which also includes data lakes, data hubs, centers of excellence, and analytic sandboxes. Rather than one size fits all, organizations must think in terms of what mix of approaches will be most effective based on the kind of business questions and analyses they need.

Today, we are moving rapidly into the world of Big Data 2.0. If the emerging years of Big Data were about the ability to cost-effectively process larger volumes, greater varieties, and rapidly moving data in motion, the formative years of Big Data will be about creating new businesses and business models that are data driven. As data driven business models emerge and mature, businesses must focus their attention on the two foundational pillars of Big Data 2.0:

**Data Integration.** According to the industry research firm Wikibon, 52% of Big Data tool investment is now being spent on technologies for ingesting and organizing data so that it can be more readily accessible and prepared for analysis. Data preparation has always been a big challenge for data professionals, with many organizations reporting that 75%-80% of their energies are devoted to up-front data engineering. Big Data approaches democratize data integration by enabling non-technical users to



directly access the data they need for analysis. As a result, businesses have more options to choose from and more approaches to consider. Developing an effective data integration framework becomes the first step in deriving business value from their data;

**Data Governance.** Having the data you need in a structure which you can access and analyze it is critical, but managing that data going forward is essential to avoiding chaos and undoing the results of your hard won efforts. Data Governance is fast becoming the glue in the Big Data life cycle, delineating the roles and responsibilities of every individual within a business that accesses, analyzes, reports on, or derives new data, and governing processes that ensure data quality, data integrity, and a single source of truth. Data Governance is like the Constitution. It is a living body of rules and rights that govern data from production to consumption across its lineage. We the People. Think of Data Governance as the human side, or soft side, of data.

How businesses organize, utilize, analyze, and benefit from the data at their disposal will manifest itself over time. Patience is essential. The process will be evolutionary, playing out over a decade or more. A new generation of data professionals, nurtured on Big Data approaches, will supplement and supplant data traditionalists. With the benefit of time, the impact of Big Data, like the impact of the Internet, will be seen as stages of a larger Information Revolution — making the world a much smaller place. As the bard of our time Bob Dylan astutely observed, “The Times They are a Changin.”

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# WALL STREET JOURNAL



## Developing the Right Data Strategy for Your Organization

By Randy Bean | Contributor | February 10, 2015

I was recently asked a thought-provoking question. I had shared a couple of my columns with an old friend who has spent his life in a very different line of work – as a jazz musician, vintage Louis Armstrong. Sometimes you have to get out of the woods to see the forest from the trees, you know. The jazz musician asked me, and I paraphrase, “So, if there is all of this new data, how come it doesn’t look like anybody is getting any smarter?” I had to think about that one, and I’m still thinking. Ultimately the path to wisdom can be a long and solitary process, even for data-smart organizations.

Certainly, there is indeed more data. Pick your most trusted source — most experts seem to agree that the volume of data being generated is doubling over an ever-shortening interval of time. I think the latest forecast is under two years. And certainly, there are more people working with data, except now we call them data scientists. And, there are more executives expecting big things from data. It should be interesting to see how that one plays out. And, there is more money being spent on data, especially if it is called Big Data. But, one might still be hard pressed to boast with any confidence that data has made us smarter, and certainly it is hard to make the case that we are a whole lot wiser.

Thirty years ago, when I started in industry, I was intrigued by the notion that there seemed to be a lot of data, which if organized and made accessible to the right people, might yield some genuine insights that could be beneficial to a business. It seemed obvious at the time that if only there was some kind of chief data executive whose job was to think about data and how to use it, we’d be all set. In the intervening years, advances in technology have enabled us to capture and manage more data than ever. Technology has even enabled us to create a lot more data than ever imagined. Vast amounts. Has more data led to a proportional increase in the level of insight, or has it made it more challenging to get to the big insight?

Albert Einstein once remarked “Not everything that can be counted counts, and not everything that counts can be counted.” As companies think about the vast amounts of data at their fingertips, they might be well suited to pause and step back for a few moments to consider the following. Having the most data seldom makes you the wisest, the fastest, or the most nimble. The champions of small data



appreciate that big insights often come from simple events. As the story goes, Isaac Newton got his big insight from a single data point – an apple falling from a tree onto his head.

Organizations would be well served to break from accepted dogma and apply fresh thinking as they consider how best to align their resources, capabilities, and people to make wise use of their data. There is no single playbook or set of common practices that apply universally to all businesses. Each business has its own culture, customers, and data assets which are unique to them. Every business has an opportunity to take a critical look at how impactful data can be to their operations. How much insight can be gained? How vital is that insight to the business? What is the cost of getting to this level of insight? What is the best way to optimize for business insight? While good data can help a firm make insightful decisions, capturing lots of data does not guarantee a result that is insightful or wise.

What advice can I offer to organizations that are serious about learning from their data assets? Developing a well-considered data strategy can be a good place to start, but not just because everyone else is doing it. Embark on a data strategy because it is the right thing to do for your organization to gain fresh insight and make informed decisions. Don't adopt a data strategy that is identical to what others are pursuing. Develop a data strategy that fits with your culture and is the right fit for your organization. Customize. Make sure that you view your data strategy as an ongoing process, not a finished state. Circumstances change and evolve, and your strategy should do the same.

Firms that gain the most will have invested thoughtfully — neither excessively nor indiscriminately. Steve Jobs challenged us to think differently. Mark Twain expresses the sentiment best: “Whenever you find yourself on the side of the majority, it is time to pause and reflect.”

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# WALL STREET JOURNAL



## Big Data Sparks a New Industrial Age

By Randy Bean | Contributor | January 15, 2015

While many financial services executives still struggle to identify compelling Big Data use cases there is another world where Big Data is yielding a big impact right now. This is the world of heavy industry, where companies like General Electric are finding many opportunities to generate meaningful outcomes from accurate, timely, and precise data.

For GE this pursuit falls under The Internet of Things, where embedded devices and smart systems connected to the Internet enable the automation and optimization of complex mechanical processes. “We are pursuing big industrial change,” said Bill Ruh, who heads GE’s Software, Big Data and Analytics initiative. “We are tackling big things with big complexity, big efficiency, and big payback.”

The company collects 50 million individual sensor data elements from sensor-enabled equipment found in its heavy industrial business, which includes gas and wind turbines, oil exploration, jet aircraft engines and locomotive equipment. “The opportunity is to use 100% of this data to predict and enable outcomes, which can result in \$20 billion in customer savings,” he said.

Mr. Ruh cites the ability to shorten and improve sensor data capture and analysis process cycles as an example. What were once 30-day processes can now be completed in 20 minutes. This has been made possible through the establishment of a data lake approach using the Big Data technology Hadoop, which enables GE to capture the “full flight” of available sensor data.

Mr. Ruh is a passionate advocate for the new Big Data approaches, noting that traditional data management and warehouse approaches were “schema bound,” requiring long cycles to rationalize the data. “We never got it right,” he notes. Hadoop represents a breakthrough for GE, because it can be fully optimized to the problem that is being solved, operating at speed and scale.

The ability to undertake pattern-matching in real-time, by sifting through vast amounts of highly disparate data in varying formats and in an “infinite number of patterns” enables GE to optimize warnings, remedy problems, and realize opportunities. “We are looking for early indicators” Mr. Ruh said. The ability to optimize a wind turbine can increase the electricity generated by 4%-5%, but this is a continual optimization process with a “short shelf life”.



Mr. Ruh notes that heavy industry data represents an order of magnitude greater data when compared to the volumes associated with traditional consumer applications. GE is routinely managing and analyzing petabytes and exabytes of data as part of highly complex industrial control systems, where the volumes of data are growing exponentially. In fact GE had to look to the consumer Internet giants – Apple, Google, Amazon – to find analogous examples which could operate at the inbound-outbound processing scale required, he said.

So, while in some industry sectors, Big Data remains a solution searching for a problem, in the harsh and unforgiving environment of heavy industry, Big Data seems to have become a brutal and transformative necessity.

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# WALL STREET JOURNAL



## ‘Fast Data’ Applications Emerge to Manage Real-Time Data

By Randy Bean | Contributor | January 6, 2015

Welcome to 2015, and part two of the Data Decade. If the past five years have been largely about the emergence of Big Data, the next five years are likely to be about the further evolution and application of data to a growing variety of challenges and opportunities where timely analysis and insight are critical, and where the ability to act fast is essential.

Remember the cartoon character, Road Runner? Beep! Beep! Road Runner was about Fast. As mobile data and sensor data sources accelerate, a class of data applications is emerging to manage and process massive volumes of real-time data. These applications are coming to be known as “Fast Data.”

It is said that data is “Fast” before it becomes “Big.” Big Data has largely been about the historical data businesses collect about customers, operations, events and interactions with customers, business partners and prospects. Big Data means “data at rest” for most corporations — large and rapidly growing quantities of data stored, and analyzed after the fact, to identify trends, patterns, and inform future decisions.

In contrast, Fast Data is about “data in motion” and immediate response and action. It’s the velocity component of the Big Data triad. While large corporations have been focused on the variety and volume of data they manage, Fast Data applications are being developed to seize on the opportunities presented by data velocity. Fast Data applications are designed to be:

- Personal — customized for consumer preferences, versus estimates based on averages or aggregates
- Contextual – aware of where you are and what you’ve looked at;
- Fast and Interactive — responsive in real-time to actions.

Dr. Michael Stonebraker is adjunct professor at The MIT Computer Science and Artificial Intelligence Laboratory (CSAIL) and was long-time professor of computer science at University of California, Berkeley, where he pioneered database research for more than a quarter century. His latest venture is VoltDB, a firm which has developed a data architecture designed specifically for Fast Data.



Dr. Stonebraker sees the business opportunity presented by Fast Data as fundamentally different from the challenge presented by Big Data. Companies that evolve their systems to use and extract value from Fast Data are “making their products and services more personal, providing real-time context and awareness, and responding interactively to users and opportunities in the moment. Their applications are smarter, more aware and more useful, and they are realizing extraordinary benefits.” Dr. Stonebraker, who previously launched successful database companies such as Ingres and Vertica, reflects, “It’s difficult to say which evolves first, business need or technology solution. Technology is always the key, in my mind. Technology makes possible what was, before, impossible.”

Fast Data is now making inroads among large corporations and mainstream financial services firms that extract business value from “data in motion” as it flows into the organization, as the customer is online, and as systems are in operation. Real world examples are accelerating:

**Banking** — Banks have been introducing small mobile banking, which enables a mobile banking customer, who may have recently inquired about financing a new property, to receive alerts on a new mortgage offer from the bank as they approach a local branch.

**Credit Cards** – American Express and Uber have established a relationship to pay for your Uber ride in return for double reward points. A credit card company, by knowing their customers destination and their historical purchases, can make a merchant reward offer. At checkout, they may receive another offer.

**Insurance** — An auto insurance company, in response to a customer’s having just had an accident, can in real-time based on GPS coordinates, arrange an approved towing service and, based on the customer’s policy, make arrangements with the nearest rental car service.

**Trading** — Risk assessment in a trading relies on Fast Data. Systems must evaluate the impact of trades in real time to prevent unbalancing portfolio metrics and increasing equity risk exposure.

By improving the customer experience and personalizing applications and services based on actual context, companies can create new revenue sources, improve customer satisfaction, make real-time offers, and reduce costs and churn. Fast Data applications make operations more efficient and “smart” by automating decisions, enriching data, and managing resources in real-time.

Bruce Reading, VoltDB’s President and CEO, notes, “In the very near future, all businesses will compete on their ability to make decisions ‘in the moment’ with fast data. It’s a rare, transformative market opportunity. Innovators in key segments, such as mobile, social, online gaming, and the Internet of Things, are already differentiating their businesses with Fast Data. Their experiences will be broadly adopted, and Fast Data will be common practice, within five years.”

So, move over Big Data, and make room for Fast Data, which promises the next stage of business disruption, and at least a good story. As Chuck Berry sang, “Roll over Beethoven, Better Give Tchaikovsky the News!”



# WALL STREET JOURNAL



## Looking Beyond Big Data in 2015

By Randy Bean | Contributor | December 3, 2014

This is generally the time when we take stock of the past 12 months and look ahead to the year in front of us. In this context, I was having lunch with an esteemed colleague and pundit the other day when he asked me somewhat rhetorically, “So, what will we write about after Big Data has run its course?” Hmm, good question. While Big Data has yet to run its course, we should expect to discover fresh topics to write about and call attention to. So, looking back at the run that Big Data has experienced over the course of the past four plus years, here is a reflection and a forecast.

Big Data captured the moment. Love it or hate it, the term Big Data has resonated. It has been noted here that senior executives have expressed a widespread dislike for the term Big Data, believing it to be unhelpful, insufficiently specific, overblown, or generally devoid of substantive meaning. That being said, Big Data has been the right term for the right topic at the right time, which is why it has resonated both broadly and deeply.

Let’s be clear that Big Data is not a magic bullet, a surefire path to success, or a breakthrough that all alone addresses a long challenging set of business issues. Big Data is however a “big idea” which has galvanized widespread interest and attention, resonating with a large non-specialist audience. It should be acknowledged as having moved “data” from obscurity to centrality and relevance. Largely because of Big Data, data as a subject area has been transformed from a field for specialists and technologists, to a topic of interest among the general population, from CEOs to casual observers. While Big Data may represent varying things to different audiences and constituencies (e.g. social media data, sensor data, unstructured data, massive volumes of data, all data), no previous term or characterization has more effectively captured the power, the opportunity, or the fascination that the emergence of data as a business science (e.g. data scientist) has attained in recent years.

Why is the topic of data of broad general interest now? Managing data is not new. Organizations have been capturing, organizing, analyzing, and reporting on data for decades. It would appear that Big Data has captured the imagination of technologists, executives, media, and the public as data has become more available, accessible, integral, and relevant to our professional, personal, and consumer lives. Data



has become part of the cultural conversation, from Money Ball, to widely popularized data breaches, to the data capture activities of the NSA.

The impact of Big Data will emerge over time. Looking ahead, what should we expect? Most importantly, we should expect to be patient, realizing that the exact shape and form of the most compelling benefits of new capabilities tend to unfold over time. We cannot yet see or fully appreciate where Big Data will be most impactful. The practical benefits of the Internet have played out in ways sometimes more powerful, yet different, than many of the earliest forecasts. Customer Relationship Management (CRM) has enabled us to understand (“360 degree view”) and serve our customers better in many regards (e.g. “get, keep, grow”), but not always as originally anticipated.

Many years ago, I asked the CIO of a leading financial institution how long he expected it would take for his company to adopt a series of new capabilities. I was surprised when he responded “10 years.” To me, that seemed to be a lifetime in business. With the benefit of experience and hindsight, I can now appreciate the wisdom of his comment. Adoption implies change, and change rarely happens overnight. Many companies are staffed with organizations filled with data experts, but Big Data implies new skills and approaches. Universities are now graduating a next generation of technologists and business executives who will have been born of the Big Data time. Only as new skills, approaches, and expertise supersede and meld with traditional approaches will the practical impact of Big Data be felt in full.

To my colleague’s question over lunch, I am not sure what we will be writing about in 2015. As Big Data enters its adoption phase and the focus moves from concept to execution and implementation, we will find new topics and challenges that warrant our interest and attention. The poet Carl Sandburg, once noted, “I don’t know where I am going, but I am on my way.” Stay tuned in 2015.

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# WALL STREET JOURNAL



## Companies Bet Big on Big Data, Despite Doubts

By Randy Bean | Contributor | November 4, 2014

Big companies are betting big on Big Data. That is the main takeaway from NewVantage Partners 3rd annual Big Data Executive Survey, conducted last month. The survey was launched in 2012 at the request of C-suite executives participating in an executive roundtable breakfast I host in my capacity as managing partner for NewVantage Partners.

Understand that this is not a Nate Silver operation here. My methodology is informal, but dogged. I was asked to undertake the survey in the belief that I could tap into senior business and technology executives to get the “top view” of what senior leaders were planning to do with Big Data. My methodology is high-touch. I personally reach out to each executive, and through a combination of enticement, cajoling, persistence, begging, and pleading, manage to elicit ample participation.

This year, I contacted over 300 executives, heavily skewed to financial services and life science firms, mostly for the reason that these firms either traditionally invested heavily in data and analytics (financial services) or were just beginning to (life sciences). One hundred twenty five executives participated, representing 59 leading firms, including major banks (Bank of America, CitiGroup, JP Morgan Chase, Morgan Stanley, UBS, Wells Fargo), money management firms (Capital Group/American Funds, Charles Schwab, Fidelity Investments), credit card issuers (American Express , Capital One, MasterCard), insurance firms (Aetna , MetLife, New York Life Insurance), health and life science leaders (CVS Pharmacy, GlaxoSmithKline, Johnson & Johnson, Kaiser Permanente, Pfizer), and media, manufacturing, retail, and defense firms (Gannett , General Electric, Raytheon). Forty-two percent of the executives held positions with C-executive responsibilities or were business line presidents/chiefs. Twelve percent were CIO's, 12% chief data officers, and 8% CTO's.

So, what did these executives have to say about the progress of Big Data in the corporate world?





**Big Data Investment is Growing.** Thirty-five percent of executives report their firms will invest \$10 million in Big Data initiatives in 2014, yet a much larger 75% forecast that their firms will invest this much by 2017. While a modest 6% of executives report investments of \$50 million in 2014, a dramatically larger 28% project investments of this magnitude by 2017.

**Executive Sponsorship is Critical.** Executives report that sponsorship for Big Data initiatives starts at the top — 26% of initiatives were sponsored by the CEO, COO, or business line chief, 16% by the CIO, 13% by the CFO or chief risk officer, 11% by the chief data officer, and 8% by the chief marketing officer.

**Business-IT Partnership is Essential.** 88% of executives cited the importance of strong business-IT partnership — 77% citing business leadership and sponsorship, and partnership and organizational alignment, as being the most critical factors in ensuring successful adoption of Big Data initiatives within the corporation.

**No Silver Bullets.** Although 82% of executives characterized Big Data as highly important or mission-critical to their firms in the years ahead, I detected a note of caution. In speaking with a number of these executives privately, many expressed anxiety and uncertainty about the path forward.

Nearly all executives now view data and analytics as being necessary to the competitive development of their business, but executives remain divided on the path to take. Many firms are consolidating their data initiatives under the newly established chief data officer (CDO) role, with 43% of executives reporting that their organization has established a CDO function — up from 19% in 2012.

Yet, many executives express concern about the extent to which Big Data will deliver on the hope and promise that has prompted interest and investment. While organizations are putting Big Data into production (67% of executives reported a Big Data initiative in production), a number of executives have noted that the value metrics are still not fully evident. These executives note cultural challenges and gaps between technology promise and technology delivery, and question how significant the resulting time savings and cost savings from Big Data will really be. For these folks, the jury is still out.

Big Data will be a journey for corporations in the years ahead. What is clear is that big companies are making the commitment, and are down the path. Now, they will look for hard results. The legendary Satchel Paige said it best: “Don’t look back; something might be gaining on you.”

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# WALL STREET JOURNAL



## How Business Culture Defines Data Success

By Randy Bean | Contributor | October 7, 2014

Few business executives would dispute the notion that having good data is a key competitive advantage and a critical component to business success. Yet, these same executives likely can recount funding requests for data initiatives that were long on promise and short on results. I have heard more than a few executives exclaim over the years, “Oh no! Not another data project!”

When I began advising [Fortune](#) 1000 companies on data and information strategy issues over a decade ago, I was operating under the assumption that 95% of my time would be spent on issues pertaining to technology. It didn’t take long, however, to realize how mistaken I was. My experience in the intervening years has been that technology is a very small component of the equation when all is said and done. Rather, I have found that 95% of the decisions that are essential to business adoption, and the success of corporate data initiatives, are related to organizational alignment and business process.

This is another way of saying that the leading barriers to successful data adoption are almost always cultural and not technological. Technologically speaking, there are many ways to skin a cat. My experience on the technology front is that it is more important that an organization select the right technology *partner* than it is that they select the right technology *solution*. Partnerships are for the long haul, while solutions come and go, and change and evolve.

The biggest issues that I hear time and again revolve around factors including sponsorship and ownership of data-driven initiatives, alignment of business and technology functions so that technology capabilities are effectively mapped to business objectives, and the establishment of standard processes and practices that enable firms to develop a discipline around the use and management of data.

A few years back, I was hosting a group of corporate CIO’s for an executive thought-leadership breakfast roundtable. The discussion was centered on how effective organizations were in leveraging their data assets to support their key corporate objectives. A number of executives cited the recent usage of the term “Big Data” and noted that, for the first time, board members were asking the executive team, “What is our data strategy?” and “What will Big Data mean to our company?”



In an effort to help executive teams respond to these questions, and shed some light on the current state of data initiatives within the Fortune 1000, we embarked on an informal survey designed to take the pulse of top business and technology executives to understand the state of data in the large corporate world. The survey was more anecdotal than scientific, and was skewed toward heavy users of data, notably large financial services firms.

First published in the Fall of 2012, this executive survey of senior business and technology leaders is now in its third iteration, and here are a few of the preliminary findings of the 2014 survey, to be published next month, as they relate to the subject of business adoption:

- 65% of the 100+ executive respondents characterized themselves as a C-executive, or as chief of the data or analytics function for their company.
- Nearly 30% of the executives identified the CEO, COO, or CFO as the primary executive sponsor and primary executive owner for their data and Big Data initiatives.
- Nearly 87% of executives cited organizational issues as the most critical factor in successful adoption and data success – executive sponsorship, executive/business leadership, business and technology partnership, organizational alignment.
- Notably, only 4% cited choosing and implementing the right technologies as being the key to business adoption.

What is the takeaway from these preliminary findings? Organizations will continue to be flooded with a series of technology options in the years ahead. Many of these technology options will require deep and specialized expertise to evaluate their merits and their fit with the organizations environments and needs. Some of these technology solutions will provide meaningful breakthroughs in the ways in which they help companies ingest, parse, organize, report, and analyze the data at their disposal.

However, when the day is done, the ability of corporations to take full advantage of the technology options available to them will depend more on the corporate culture that has been forged to enable the usage of data and analytics, and the partnership and alignment of business and technology teams, than on any specific tool or technology. To paraphrase Einstein, getting the human things done right is always what is most important.

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# WALL STREET JOURNAL



## The Legacy of Big Data

By Randy Bean | Contributor | September 9, 2014

A few years ago, I was invited to attend a one-day Big Data Conference held at Stanford University under the sponsorship of Accel Partners. This event represented a milestone in the history of Big Data. Accel Partners had emerged as the hottest venture firm in Silicon Valley on the heels of their successful investment in Facebook Inc. The event heralded a who's who of the tech elite. Among the notable speakers extolling the "revolutionary" potential of Big Data were Andy Bechtolsheim, co-founder of Sun Microsystems, and Doug Cutting, originator of Hadoop and chief architect at Cloudera, the latest red-hot Accel investment.

During the course of a picture-perfect May morning and afternoon in Palo Alto, one speaker after another set forth bold claims for Big Data. "Big Data was the next wave in technology innovation." "Big Data would change how the world made use of information." "Big Data would enable insights that would change society." It sounded like 1995 and the rise of the World Wide Web all over again. But one proposition caught my attention. Each speaker spoke about the technological underpinning that made Big Data truly compelling, which was the notion that you could just take your data and "load and go." The radical implication of the "load and go" notion was that data users would no longer have to go through the long and arduous processes of data engineering that had long thwarted the ambitions of data analysts.

Anyone who has ever worked in the corporate world knows the painful refrain to how long it takes to answer a new business question which requires adding a new data source: "Fifteen months and five million dollars." Senior business executives were resigned to a state of affairs where getting value out of data quickly was not something that they could expect to see in their business lifetimes. Then, out of the blue, a cadre of engineers, data experts, and venture investors were heralding a new day which promised freedom from the tyranny of the data gate-keepers. It was the data world's equivalent of the fall of the Berlin Wall. The oft-maligned edifice known as the Data Warehouse was under assault.

With the benefit of hindsight, and a few years' experience under our collective belts, we are seeing that Big Data is in some ways more than was hoped for. Long saddled with disparate sources of legacy data, corporations are for the first time able to successfully integrate these sources as a result of the cost and



speed advantages resulting from Big Data technologies. Corporations also are able to integrate new sources of information, such as unstructured data sources including documents, text, and pictures, and behavioral data that is captured through social media channels. The result is a growing sophistication in the data and analytics capabilities of mainstream companies.

Jonathan Bennett is chief financial officer for commercial markets with The Hartford, a \$26 billion insurance and investment firm founded in 1810. With a long history of actuarial analysis, data has always mattered. Mr. Bennett possesses a clear-eyed view of both the opportunity and the challenge represented by Big Data, cautioning, that keeping a focus on cost and the benefits of better managing data “is just as important as breaking into new Big Data opportunities. If we can figure it out, cost reductions from the former will help fund expansion in the latter.”

Big Data is not making the Data Warehouse obsolete overnight. The apostles of the Data Warehouse have fought back and demonstrated that it is not always as simple as “load and go.” Although some data engineering has been eliminated or reduced, and Big Data approaches are reducing the costs of data management, data still needs to be standardized, data quality maintained, and access provided to constituent communities. Data management will continue to be an evolutionary process.

Today, it is hard to imagine life before the Internet. I suspect that we will look back a decade from now and view Big Data the same way. In the future, “the availability and analysis of data will become the competitive lifeblood for businesses,” says Richard Mucci, president of Group Protection at Lincoln Financial. “The promise of Big Data is that when the winners and losers are sorted out, businesses find themselves on the right side of the ledger. Data-driven business models are not just nice to have, they are essential.”

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# WALL STREET JOURNAL



## Politics and Dirty Data

By Randy Bean | Contributor | August 12, 2014

A highly esteemed long-time colleague of mine tells the story of his coming out of MIT after completing a PhD program in computer science in the early 1990's. Dr. Luminary, as I'll refer to him, had worked in the MIT labs on parallel processing techniques for managing massively large amounts of data. This was Big Data in the laboratory stage 25 years ago. Dr. Luminary's first job was as a senior software engineer with Thinking Machines, the early pioneer in massively parallel processing systems. The company was so hot that Al Gore conducted a much publicized visit in 1987 – this may have been the genesis of his claim to having invented the Internet. At the very least, we should credit Mr. Gore for being onto the information super highway early on.

Dr. Luminary was very excited to use revolutionary new technology to help large Fortune 1000 companies extract key business insights from massive volumes of information. But it became clear that the large corporate world follows its own rules. The real obstacle to breakthrough innovation and success was due not so much to a lack of powerful new technology, but to "politics and dirty data." As he puts it, "We spent six months trying to reach agreement on a definition of what is a customer." As a former database marketer, my experience is that's more typical than unusual.

This apocryphal story highlights some well-documented challenges when it comes to making meaningful use of data and analytics. The first challenge is often organizational ("politics"). Data typically is a shared asset that cuts across the organization from production to consumption, with many touch points and derivations along the way. Many organizations have been actively engaged in tracing the lineage of their data and establishing data governance processes and standards so that there are some "rules of the road" that guide how organizations manage data. These rules include who "owns" the data; who has ultimate responsibility; and what is the process by which decisions governing data definition and usage are made. However well-intentioned all parties may be, reaching consensus on issues surrounding data is frequently a thorny process.

The second challenge is often referred to as data's "dirty little secret." This specifically pertains to the tremendous time and effort required to transform data ("dirty data") into a usable asset that has meaningful business value. Whole companies and an entire industry have been built to respond to this



need. It is the ongoing lament of many a data analyst who complains that they spend “20% of our time on data analysis, but 80% of our time on accessing and preparing the data.” And, herein lies the big attraction and promise of Big Data for many a corporation – the ability to bypass the hundreds of hours of up-front data engineering to access the data much sooner and more easily, for purposes of analysis and putting this information to good use. This is the state of affairs today, as firms make the transition from traditional data environments to accelerated Big Data “lakes” and “hubs.”

Lynda Applegate is the long-tenured Sarofim-Rock Professor of Business Administration at Harvard Business School, where for over 25 years, she has been teaching executives about innovation and entrepreneurship. Prof. Applegate has seen firsthand how critical and central data has become to the modern corporation, as well as to the innovative new startup. “The emergence of data and analytics in general management practices over the past decades has significantly influenced how businesses operate. Innovative firms have developed deep and rich data and analytical capabilities to distinguish themselves from their competitors,” Prof. Applegate notes.

There is no question that access to insightful and timely data is enabling businesses, government agencies, medical researchers, and professional sports teams to spot opportunities and to act with greater agility. The biggest challenges are still human. To paraphrase the 911 Commission, “We had all of the data. We just didn’t share it effectively and put the picture together”.

Alas, Thinking Machines was ahead of its time, and filed for bankruptcy in 1994. Its assets were later acquired by Sun Microsystems. Al Gore ascended to the vice presidency of the United States in 1992, but fell short in his bid for the Presidency in 2000. He is now a venture capitalist. And Dr. Luminary still counsels organizations on how to navigate organizational politics and dirty data. Sometimes, progress comes gradually.

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# WALL STREET JOURNAL



## The Culture of Data

By Randy Bean | Contributor | July 22, 2014

We live in a time when data is ascendant. It wasn't always this way though. Before there was a Google Inc., before terms like Big Data came into vogue, and before jobs like data scientist and chief data officer became sought after positions, data and analytics were considered to be something of a niche relegated to back office practitioners in market research, statistical analysis, and actuarial groups. The processing of electronically maintained data was referred to by the quaint moniker of electronic data processing.

For the better part of a generation, even as data progressively became more prevalent, and as firms wrestled with how to wring insight and benefit out of the accumulating hordes of new data that was being captured and maintained electronically, data and analytics remained largely a backwater for all but a few leading edge innovators. The technology community progressed through an evolution of terms used to describe fresh capabilities that would enable business executives to derive insight and value from their data assets – decision support systems, executive information systems, and ultimately, database marketing which evolved into customer relationship management and business intelligence.

There was a time when I would go to cocktail parties, and could not comfortably confess to working with data and analytics without driving other revelers to the far corners of the room. I often diverted the subject to discussion of travel, food, sports, the world financial markets, art or anything else that had more general appeal. That all changed with the release of the book and subsequent movie, Money Ball, starring Brad Pitt. When asked what line of work I was in, I could now proclaim, "I do Money Ball for Business!" It was around this juncture that I detected that data and analytics had now become fashionable.

The predominant applications of data and analytics have varied by industry over the years. In the early days of database marketing, I was engaged with clients who were attempting to enhance their cross-sell ratios, and increase the marketing propensity of the next-product-to-buy. My wife, working in the health-care field, was using data to analyze weekly morbidity and mortality rates. That put things into greater perspective for me.





A few years ago, I had the opportunity to visit the Pentagon. I had been thumbing through my university alumni magazine when I noted that a former college housemate of mine had recently been confirmed as the Assistant Secretary of Defense and Chief Technology Officer for Research and Development. When I contacted my old roomie, to my surprise I received an invitation to travel to the Pentagon to speak to an august assemblage on the topic of Big Data. Coming from private industry, and observing the dozen or so meeting participants attired in an assortment of full business suits, military uniforms with many stars and bars, and combat fatigues, I simply had no idea who in the room was the decision makers.

The fascination of this meeting for me was that I gained a greater appreciation for new facets of data and analytics as these military leaders discussed the criticality of capturing and analyzing sensor and others form of GPS data and military intelligence (e.g. chatter) to calibrate military actions and strikes in the field. Talk about getting your data quality and analysis correct. About a year later, I went to see the film Zero Dark Thirty about the Bin Laden raid. The film depicted the advanced levels of sophisticated data analysis required to track the Al Qaeda leader to his hideout in Pakistan.

We operate in a culture today where data and analytic practices have been acclimated into the mainstream. Whether this proliferation of data and analytics capabilities will yield sharper insight, engender greater social benefit, or enhance human wisdom, remains to be seen. Before we get too enthralled with the expectation that data and analytics will solve all of our problems and challenges, perhaps it's worth recalling the humble observation of the late Albert Einstein: "It's not that I'm so smart, it's just that I stay with problems longer."

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# WALL STREET JOURNAL



## A Tale of Two Banks: Gold Rush to Digital Revolution

By Randy Bean | Contributor | July 7, 2014

Bank of America Corp. and Wells Fargo & Co., two banking giants with roots on the West Coast, both recognize data and analytics as core to their expansion and growth and central to their plans and vision.

Bank of America traces its roots to 1904, when Amadeo Giannini created the Bank of Italy in San Francisco to cater to immigrants. Wells Fargo was founded a half century earlier, also in San Francisco, when the demands of a budding gold rush port called for express and banking services between the New York financial markets and the new state of California.

During the banking consolidations of the past two decades, each bank was a leader in the use of sophisticated data warehousing and database marketing capabilities to facilitate rapid acquisitions and consolidation -- Wells Fargo with Norwest and Wachovia; Bank of America with NationsBank -- as they established national banking services.

Having long been sophisticated practitioners of data warehousing and advanced consumer analytics techniques, I was interested in understanding how each firm viewed the evolution of data and analytics, and the arrival of Big Data, in shaping their future strategies.

Cathy Bessant is the global technology and operations executive for Bank of America, and sits on the bank's executive management committee. "Data is one of our most valued assets at Bank of America," she said. For Bank of America, the goal is to develop "great data," which is "timely, accurate, and complete" and "accessible to all who need to use it."

A. Charles Thomas is Wells Fargo's recently appointed executive vice president of enterprise data and analytics and the firm's chief data officer. Mr. Thomas notes, "Transformational change will come not just from collecting data, but from putting it to use in ways that create real value."

Bank of America's Ms. Bessant echoes this sentiment, "I draw a bright line between what is interesting and what is impactful." She cautions against "an overly theoretical focus." To illustrate her point, Ms. Bessant cites the recent success of Bank of America's new ATM program which can perform 80% of teller transactions and provide the ability for customers to speak to a bank employee live via video chat.



“We analyzed data to determine how our customers want to use ATMs and whether proposed features would decrease or increase customer satisfaction,” she said.

Wells Fargo’s Mr. Thomas points to several initiatives that his firm is undertaking: “The first opportunity is – believe it or not – small data.” Mr. Thomas cites the example of credit risk where “we use analytics to monitor our concentration risk to ensure that no single exposure will have adverse effects on our business or our customers’ business.”

Mr. Thomas notes that “while there is a lot of conversation about ‘Big Data,’ we need to have the discipline to not drop the ball on the 80% of our analytics that don’t need petabytes of data.” Ms. Bessant agrees, saying “I’d vote we all stop using the term ‘Big Data.’ It makes a black box out of something that may not be easy to execute, but is conceptually simple”.

Mr. Thomas anticipates a bright and evolving future for data and analytics in banking, citing the example of the Analytics Leadership Council that Wells Fargo has established to “uncover the next innovative product or service. We’re now able to answer questions we didn’t even think to ask 10 years ago” and then combine transaction data with new data types like voice, email and online. Mr. Thomas looks ahead to a time when “in the next few years, you’ll see us evolve in ways that customers are accustomed to seeing from retailers like Netflix and Amazon”.

Ms. Bessant sees a future where data and analytics “enable us to improve the experience for our customers and align our products and services to their preferences and behaviors.”

Bank of America and Wells Fargo: two American banking institutions that have evolved far from their roots and for whom data and analytics will be core to the future. “What the assembly line was to the industrial revolution, data will be to the digital revolution,” Mr. Thomas said. Well, it’s a long way from the Gold Rush.

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# WALL STREET JOURNAL



## Health Care Plays Catch-Up with Big Data

By Randy Bean | Contributor | June 17, 2014

My wife has spent her entire career in health-care management and when she talks about it, my brain tends to go numb. When I speak about Big Data and analytics, my wife tells her colleagues that she thinks I am in the CIA. I think she means NSA.

When it comes to data and health care, what I've never understood is why I must repeat my medical history every time I see a medical professional. Don't they keep this stuff on file? So, it surprises me when I am told by many very smart people that health care and life sciences are the next frontier for Big Data. While financial service firms have been collecting, organizing, analyzing, and acting on data for decades now, health-care firms are trying to leap from the Stone Age to the Information Age in real time.

To understand the Big Data opportunity, as well as the challenges, confronting the health-care system, I sought out two executives who have spent long careers in the financial services industry before coming to health care. I also spoke with a senior clinician and professor at Harvard Medical School, to elicit the perspective of a practicing physician.

**Phil Fasano**, executive vice president and chief information officer for Kaiser-Permanente, was previously chief business information officer at CapitalOne and CIO at JP Morgan Chase, so he knows a bit about data and information in financial services. "In health care, we have an enormous amount and variety of data—ranging from how long it takes a nurse to complete rounding and infection rates in a given area to genomic data."

Health care is still trying to get a handle of all this data and, in many ways, the business is a "discovery" business, said Mr. Fasano, which lends itself to the use of data for discovery that lies at the heart of the promise of Big Data. "We believe that the greatest value comes from leveraging Big Data to identify clinical protocols that improve patient access to information, clinical outcomes, and health care affordability," he said. "The future of Big Data lies in its ability to support the safest, highest quality, most individualized care without constraint of borders and boundaries."



But there are challenges; health care, if you haven't already guessed, is a highly regulated industry with "significant sensitivities about security and privacy of information," said Mr. Fasano, who is also co-author of the recent book, Transforming Health Care: The Financial Impact of Technology, Electronic Tools and Data Mining.

Another challenge is learning how to develop insights from "often incomplete data sets," said Blue Cross Blue Shield of Rhode Island COO **Bill Wray**. Mr. Wray notes that influencing the behaviors of providers and patients "requires that we focus on outcomes, working with 'pretty good' 80/20 information, versus seeking multiple 9s precision before we act. Getting people aligned to think this way is the critical first step that precedes any technological decisions."

"Health care has been late to the game," but it is catching up fast, says **Dr. Daniel Talmor**, professor of anesthesia at Harvard Medical School and interim chairman of the Department of Anesthesia, Critical Care, and Pain Medicine at Beth Israel Deaconess Medical Center in Boston.

Dr. Talmor cites the example of the intensive care unit, where understanding the risks facing patients means using data to establish risk profiles for individual patients and entire hospital units. He notes, "We capture thousands of data points on the ICU patient, from blood pressure to oxygen levels, labs results, and ventilation parameters. We have the ability to capture all of these data points every 15 seconds, then store and analyze these in a real-time clinical context. This enables us to understand the at-risk population and to treat the patient proactively, preventing complications with a resulting benefit to both the individual patient and to the health care system as a whole".

Big Data and analytics initiatives are beginning to change the face and practices of patient care. Mr. Fasano sums up the benefit nicely, "Big Data allows us to study larger populations at a lower cost and more nimbly than ever. The ability to analyze data more rapidly allows us to implement treatment changes quickly, improving—and in some cases saving—lives."

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# WALL STREET JOURNAL



## Big Data and the Visionary Power of Change

By Randy Bean | Contributor | May 20, 2014

Percy Bysshe Shelley, the 19th century English romantic poet, is best known for his poem Ozymandius: "And on the pedestal these words appear: My name is Ozymandias, King of Kings: Look on my works, ye Mighty, and despair! Nothing beside remains...The lone and level sands stretch far away." Mr. Shelley's sonnet is a metaphor for change, and the impermanence of all things.

Change is a constant dynamic in the world of business. Periodically, change comes along that manages to do to existing business structures what centuries in the desert did to that "shattered visage" of Ozymandius. Is it too bold and hyperbolic to suggest that Big Data represents one of these transformational changes?

For the past decade, I have been organizing a series of thought-leadership roundtable discussions that bring together senior industry executives, academics, and authors to exchange perspectives on topics of common interest. I reached out to several of these thought-leaders to get their perspective on Big Data as a transformational change.

Tom Davenport in his new book [Big Data @ Work: Dispelling the Myths, Uncovering the Opportunities](#), makes the point, "Big Data is such a broad business resource that it is sometimes difficult to envision all the ways that it can affect an organization and an industry." Let's consider just a few possibilities.

**Geoffrey Moore, author of the landmark book [Crossing the Chasm](#).** Mr. Moore sees Big Data as altering the landscape of how firms approach the use of data and analytics: "It is a mindset issue...People raised on traditional analytics impose a schema on how they collect and store data. The new crowd throws it into a Hadoop store and imposes a schema upon reading. It is much less computer efficient, of course, which is why it was not an alternative until recently. But given 'Deep Blue' resources, eventually you too can be Gary Kasparov."

**Wayne Eckerson, author of [Secrets of Analytical Leaders](#).** Mr. Eckerson says that Big Data is disrupting the traditional paradigm of data management within the enterprise: "Big Data is changing the landscape for data management. The traditional data warehouse was about getting the data. Business Intelligence



was about using the data. Big Data now offers an opportunity to leverage the power of data to drive the business in new ways.”

**Jeff Bussgang, venture investor and general partner with Flybridge Capital Partners.** “What would you do differently if you had 1000x more information available to you? Managers around the world are thinking hard about this question, whether they want to or not, because the theory is becoming a reality. The “big idea” that is beginning to develop out of Startup Land is to use machine learning techniques to help parse through the data, apply business rules and make better – and higher ROI – decisions.”

Mr. Bussgang sites an example from the world of advertising where “major brands are using software platforms like DataXu and Turn to analyze millions of data points in order to put the exact right advertisement in front of the exact right customer at the exact right time – all without human intervention.” He sees a future where “we will wonder how it was that media plans were developed by humans. In industry after industry, this combination of Big Data and Machine Learning is proving to be a powerful, transformative force.”

**Sandy Pentland, professor at MIT’s Media Lab.** Mr. Pentland has studied and spoken widely on Big Data in the public and private sectors: “Data about human behavior, such as census data, have always been essential for both government and industry to function. In recent years, however, we have developed a ‘social physics’ that allows us to analyze the ‘digital breadcrumbs’ that we all leave behind us as we move through the world (e.g., call records, credit card transactions, and GPS location fixes.”

Mr. Pentland goes on to note: “Scientists are discovering that we can begin to explain many things— financial crashes, revolutions, panics—that previously appeared to be random events. Insights obtained by using social physics to analyze digital breadcrumbs has the potential to revolutionize many fields.”

Business leaders, academics, and pundits will continue to debate the capacity of Big Data to change our view of the future and what is possible. Hyperbole or not, Big Data is opening up new visions of opportunity. To paraphrase the poet Shelley, nothing is permanent. Change is a constant dynamic.

Today, Big Data is sweeping away established practices, existing paradigms and structures, long standing edifices and ways of doing business, and replacing them with something new and different. Change is the constant. What is new today will be surpassed by what is new tomorrow. “The lone and level sands stretch far away.”

And, whatever became of the visionary apostle of change, Percy Bysshe Shelley? He drowned in a shipwreck off the coast of Italy in 1822, one month shy of his 30th birthday.

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# WALL STREET JOURNAL



## Chief Data Officers Blaze Uncharted Corporate Frontier

By Randy Bean | Contributor | April 21, 2014

John Fremont is largely forgotten today, but in the history of the 19<sup>th</sup> century American West, Mr. Fremont was known as “The Pathfinder” for his westward expeditions and his role in establishing California as a state.

Today, emerging from the frontiers of Big Data and advanced analytics and the rapidly accelerating proliferation of data, comes a 21<sup>st</sup> century pathfinder: the chief data officer.

This past month, I had the occasion to moderate a panel of financial services CDOs at the Annual MIT Chief Data Officer Forum. The event, now in its fourth year, has grown from a handful of CDO’s to a group of nearly 100 executives representing a “who’s who” of the Fortune 1000.

Professor Yang Lee, of Northeastern University’s D’Amore-McKim School of Business and co-director for MIT’s Chief Data Officer Research Program, helps organize the program, and has conducted extensive research on the emerging CDO role. She notes: “The roles of CDOs are diverse and evolving. Yet, a noteworthy commonality is that these roles are well aligned with strategic business directions. Traditionally, data practices were led by middle managers, lacking executive collaboration. The emerging CDO practices are executive-led, accountable, and sustainable.”

This perspective is corroborated by my discussions with a number of CDOs, all of whom have assumed their roles in recent years. Derek Strauss, chief data officer for TD Ameritrade, says that he has “peer relationships with the CIO, CTO and the Head of Application Development, as well as various business functions and operating units.” This centrality helps him implement “an enterprise data and analytics program that cuts across the entire business and IT ecosystem.” This speaks volumes about the centrality that corporations now place on data and data strategy.

Venkat Varadachary, chief data officer at American Express Co., echoes this observation: “The CDO at American Express provides leadership and governance across the organization to continually nurture, enhance and fully leverage our data assets in order to drive value for our customers. This role reports to the chief risk officer and also has accountability to a broader set of senior leaders in the company.”





Terms used by CDOs to characterize their role include “ambassador”, “reporter”, “experimenter”, and “coordinator.” The complexity of the CDO role is underscored by the recognition that data is an enterprise asset that crosses all lines-of-business and corporate functions.

“I sometimes say that CDO stands for chief diplomacy officer,” said Jennifer Ippoliti, chief data officer for Raymond James Financial. “The CDO functions as a conduit among business, technology, and operations to ensure that the solutions we build are aligned with business strategies.”

The evolution and flux of the CDO role is reflected in preliminary data assembled from my interviews with a couple dozen CDOs and data gathered by Professor Lee in her research:

- 65% of CDO positions have been established within only the past 3 years
- 64% of CDO’s report to a business executive – CEO, COO, CRO, or CMO
- 36% of CDO’s report to a technology executive – CIO or CTO.

A common thread, regardless of structure, is that firms expect the CDO role to have a vision of the power of data within the enterprise.

David Gleason, Head of Data Strategy for Bank of New York Mellon observes: “We have an opportunity to leverage advances in data management technology to transform the business. We must continually educate the business leadership on the potential of data to transform and disrupt the business, and train the IT organization to embrace the disruptive powers of new technology -- which are often contrary to mandates to minimize operational risk.”

Ultimately, for each CDO, the impact of their role will be measured by their effectiveness in transforming the organization through the use of data.

“Democratization of Big Data involves ensuring transparency and access to data, but also a cultural transformation for our people to embed data in their daily thinking,” said Mr. Varadachary. “We seek to continue to evolve our culture where data and information are foundational.”

Ms. Ippoliti adds “By creating channels through which we can share information to offer optimum investment advice, we empower our financial advisors, which in turn improves the end customer experience.”

Charting an uncharted corporate frontier, chief data officers are 21<sup>st</sup> century “pathfinders” forging the information and enterprise data frontier. Westward ho!

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# WALL STREET JOURNAL



## Marketing Leaders Use Big Data to Enhance the Customer Experience

By Randy Bean | Contributor | March 24, 2014

Mainstream corporations are leveraging their Big Data and analytics capabilities to more effectively connect with customers and respond to their needs.

Businesses are aided in this quest by the growing availability of what MIT Professor Sandy Pentland calls ‘digital breadcrumbs,’ or customer-generated data from call records, credit card transactions, GPS location fixes.

For corporations focused on ways to enhance the customer experience, this ability to link behavioral, transaction, and customer interaction data provides vital insight into “always connected” consumers. “Data is the marketer’s new best friend” comments Jive Software Chief Marketing Officer Elisa Steele. “Marketers must create a strategy centered on data and insights”.

I had the opportunity this month to discuss the growing impact of Big Data in enhancing customer experience with **Jonathan Craig, executive vice president and chief marketing officer for Charles Schwab Corp.**, the San Francisco-based brokerage and banking firm.

I posed a series of questions to Mr. Craig on the topic of how Big Data is changing the organizations internal and external processes, and how as the chief marketing officer, he anticipates collaborating with the CIO to enhance customer experience.

### **How is Big Data changing your *internal* processes for delivering customer value?**

At Schwab, we’ve always used data analysis to continually get a better understanding of what our customers – and investors in general – want and need. Then we’re able to use those insights to develop and evolve products and services that put the needs of investors first.

One of the biggest changes for us, though, is that in the past we would often start with a hypothesis and then look at the data to refute or validate. With big data, we are able to start in a more agnostic fashion and let the data drive us to the insights. This can lead to unexpected and powerful insights.



### **How is Big Data changing how you *externally* serve and deliver value to your customers?**

We've always used data to provide timely, relevant and personalized communications to our customers. That can take the form of communicating to new clients to get them up and running with Schwab, or ensuring that existing clients are aware and engaged with the tools and services we offer, such as portfolio performance reporting.

We also use big data to keep clients on top of their investing strategy. For example, we alert clients when CDs and bonds are hitting maturity or when stock options are set to expire along with a summary of the actions they can consider taking.

But big data is also enabling firms to get a more holistic view of each client to serve them better. For instance, we have clients who work with Schwab both as individual investors and 401(k) plan participants through their employer. By seeing the 360-degree picture of how a client works with us, we're able to deliver the right content at the right time through the right channel – enhancing the customer experience and providing more value to our customers.

### **How do you anticipate collaborating with the CIO to deliver on the potential of Big Data?**

For firms like Schwab, it used to be that the key imperative for collaboration was sales and marketing. To be sure that is still critical. That said, with the emergence of big data, the need for CIO/CMO integration is as strong or even stronger. At Schwab we acknowledge that and have prioritized strong partnership between technology and marketing. We meet regularly to share ideas, understand emerging investor needs and industry trends, and align on what we want to accomplish. We also look for marketers with technology acumen and technology team members who understand the power of marketing.

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Corporations like Charles Schwab, among others undertaking similar initiatives, are leveraging Big Data capabilities to formulate new ways for serving their customers, aligning their organizations, and enabling collaboration between the CIO and Chief Marketing functions to enhance customer experience. This provides further illustration of the tangible ways corporations are employing Big Data capabilities and approaches to deliver business value.

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# WALL STREET JOURNAL



## Big Data Innovation: Fail Faster. Execute Smarter.

By Randy Bean | Contributor | February 18, 2014

I happened to be watching the Australian Open Men's Tennis Final last month when I noticed a long and intriguing tattoo on the forearm of the eventual champion, Stanislas Wawrinka of Switzerland. It read: "Ever tried. Ever failed. No matter. Try again. Fail again. Fail better." This quote, from the 20th century Irish novelist, poet, and avant-garde playwright, Samuel Beckett, offers an apt metaphor for the disruption and resulting innovation that Big Data is bringing to traditional data and analytics approaches.

[NewVantage Partners 2013 Big Data survey](#) of senior corporate executives reported that 64% of executives cited "new product development and innovation" as a leading driver of corporate investment in Big Data initiatives. By disrupting the established data and analytics practices of the past several decades, Big Data is transforming how corporations are organizing, engineering, managing and storing data. In so doing, Big Data is delivering innovation through greater data agility, rapid trial and error, and faster learning, resulting in accelerated speed to market, and in new forms of customer disintermediation and tailored customer experiences.

**Deriving value from imperfect data.** Paul Saffo, technology forecaster and managing director of San Francisco-based Discern Analytics, observes "failure is the foundation of innovation." In the world of data and analytics, corporations have been long bound by approaches that are costly and time-consuming, and which have hamstrung some of the more innovative ambitions of marketers and product developers.

While data must always be pristine and meet the highest standards of data integrity to support regulatory reporting and customer accounting, the standards for data discovery and research and development can be less rigorous. No customer wants to receive their 401K or credit card statement with incorrect information, but these same customers may welcome product recommendations and product offers based on indicative information. Not all data has to be perfect, and not all business functions require equal levels of data rigor.

At a recent roundtable of senior financial service executives that I hosted, several executives noted how Big Data is enabling organizations to rethink how they do business.



John Bottega has been one of the first executives to assume the emerging role of chief data officer, holding this position at CitiGroup Inc., The Federal Reserve Bank of New York, and Bank of America Corp. Mr. Bottega observes that the CDO role was “initially established to respond to regulatory demands, but this is changing. The CDO is now expected to spearhead ‘offensive’ data-driven initiatives to better understand customer behavior, develop innovative new products, improve wallet-share, and increase revenue.”

Research and discover-based business functions like marketing and new product development generally have a greater tolerance for imperfect data, usually not requiring fully reconciled data. More important is currency of data, faster cycle times, the ability to operate on “cheap hunches” and the ability to access data faster without developing formalized requirements. For marketers, this can mean the ability to analyze vaster amounts of disparate data to divine new correlations and uncover new connections within customer sub-segments.

Big Data enables innovation by putting imperfect data into the hands of marketers, product developers, researchers, and strategic planners fast and easy, and enabling data scientists and business analysts to accelerate the speed at which they test-and-learn and iterate through new hypotheses.

As one executive put it, “unreconciled data meets 80% of our needs.” Mr. Bottega observes: “Failure is informative. Even with imperfect data, business analysts can gain insight and knowledge with respect to the viability of an approach or hypothesis.”

**Learning faster means customer success.** I noted in a [recent column for the CIO Journal](#) that Big Data is enabling a changing time and cost paradigm by enabling corporations to load the data they need when they need it, and in a cost-effective fashion. The emerging concept of the “data lake” means that companies can create pools of raw data and partially reconciled data that suffices for 80% of most analyses, particularly for discovery activities like marketing and product design. Organizations can more easily access the data they need when they need it, and deliver superior results to their customers because of this.

Here’s Jim Smith, executive vice president for Wells Fargo, and head of the firm’s Enterprise Data and Analytics and Digital Channels groups: “We’re focused on not just Big Data, but using our data faster and more effectively. Our customers interact with us in many different channels and there has been tremendous data growth with the surge of online and mobile banking. Each of these interactions provides us with an opportunity to more accurately identify a customer’s specific needs and interests. From there, we can evolve or improve how we provide a service or develop a new one.”

Mr. Smith goes on to add that “we are looking at how customers interact with us across all touch points – digital, phone, ATM and inside the store. This activity allows us to see new patterns to help improve our service or help a customer find the right product or identify fraudulent behaviors. Big Data technologies will allow us to become more proactive on behalf of our customers.”



With worldwide data volumes projected to grow at a rate of 40% per year, marketing and sales leaders will need to process data faster and more simply, and undertake more rapid trial and error. As Mr. Saffo comments, “failure is essential because even the cleverest of innovations fail a few times before they ultimately succeed”.

“Ever tried. Ever failed. No matter. Try again. Fail again. Fail better.” An apt metaphor for Big Data innovation.

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# WALL STREET JOURNAL



## Financial Services Firms See Results from Big Data Push

By Randy Bean | Contributor | January 27, 2014

Large financial service firms are starting to see concrete results from their Big Data initiatives. In an executive survey of c-executives from leading Wall Street firms conducted by NewVantage Partners in 2013, 96% of executives reported having a Big Data initiative planned or in progress, with 80% reporting having at least one initiative completed.

For the first time, Wall Street is seeing that Big Data could have an even greater impact on how they do business than initially imagined. Early adopters within the financial services world are seeing initial benefits that may exceed some of the more ambitious prophecies – though in ways not originally expected, and full enterprise adoption is likely to evolve over a decade and not overnight.

**Faster time from analysis to decision means quicker time to market.** The time which it takes to generate a critical business answer is moving from months or weeks to hours and minutes – many firms report a 100:1 time advantage – as a result of the incorporation of Big Data processes. In our survey, 87% of executives cited both accelerating time-to-answer (TTA) and the need for better analytics as the most common driver of Big Data investment for their firms.

Now, these Wall Street firms have results to report from initial proof of value pilot projects that have been launched in as condensed a period as 60-90 days, reducing the time it takes to move from analysis to decision:

- analyzing risk data in 3 hours versus 3 months
- pricing calculations performed in 20 minutes versus 48 hours
- behavioral analytics in 20 minutes versus 72 hours
- modeling automation from 150 models per year to 15,000 models per year.

Financial services leaders are seeing that they can load all of their raw data into Big Data environments, put this data into the hands of business analysts immediately, allowing business analysts to directly



identify that data which yields the greatest correlations and integrate the most compelling data into operational production environments quickly.

By putting data into the hands of business analysts faster, financial service early adopters are eliminating the need for many traditional IT data management roles, and enabling greater self-service for their business analyst communities. Business gets the data quicker. Business decides which data is important. In the same way that the Internet has enabled customer self-service over the past decade and a half, Big Data enables business analyst self-service within the corporation.

**Generating usable data at much lower cost structures.** Financial service firms have traditionally spent vast sums on gathering, organizing, storing, analyzing, and reporting on data. In spite of these levels of investment, the state of corporate data is typically inadequate – slow to access, of questionable quality, inconsistent, restricted to expert users, expensive to manage and maintain. Ask most financial industry executives and they will tell you that to incorporate new data into a report, the standard response is that it will take “15 months and \$5MM”.

In our survey, 75% of executives cited the need for improved cost performance as the most important driver of Big Data investment. For these firms, the challenge is not one of managing large volumes of data. Rather, the challenge is integrating lots of sources of data.

Leveraging lower cost Big Data technology platforms, financial firms are seeing dramatic cost reductions:

- operational data store built for \$300,000 in Hadoop versus \$4,000,000 using relational database
- trading warehouse build for \$200,000 in Hadoop versus \$4,000,000 with a database appliance.

Big Data costs are lower because the technology of Big Data is radically less expensive (50:1 typically), the expert labor required to manage traditional data processes decreases, and the amount of critical data that must be maintained is ultimately much smaller. Wall Street is recognizing the benefits of migrating expensive data processes from high-cost computer mainframes to low-cost processing platforms.

**Changing paradigm for financial service leaders.** Financial services firms are seeing meaningful results from their Big Data forays. By obtaining answers to critical business questions more rapidly and more cost-effectively, these firms are making faster business decisions, and accelerating their ability to get to market with new services quickly. The on-the-ground reality for leaders in financial services is that by transforming their end-to-end data management processes, they can lower costs, increase business value, and go-to-market faster with new customer-facing products and services.

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