

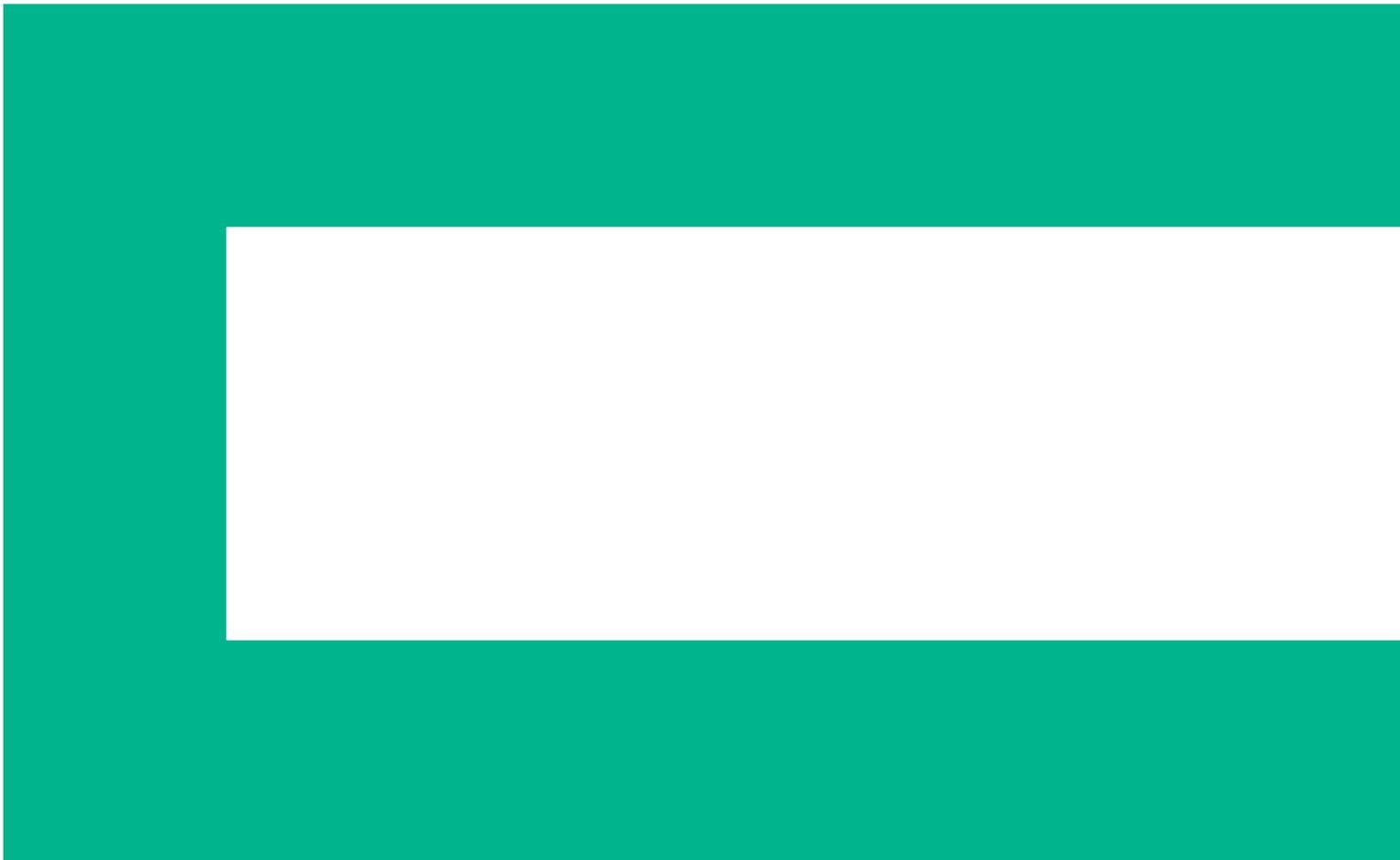


Hewlett Packard
Enterprise

Business white paper

Capitalizing on Big Data analytics in the C-suite

How to mobilize a data-driven organization



Introduction

Big Data isn't new. In the 1990s, businesses were analyzing significantly smaller amounts of data, which was collected in real-time from sensors, imaging, and the like. The raw data was analyzed, visualized, and sent to storage for more in-depth offline processing. However, the solutions were handcrafted in a research environment. Commercial enterprises were limited to "rear-view" snapshots of traditional business data, delivered in spreadsheet reports.

Fast-forward a few decades and the term "Big Data" has become a powerhouse of growing implications. New systems and tools are paving the way for it to undergo a rapid valuation and dissemination to the point of action at every level of business. The 4 Vs of Big Data: volume, velocity, variety, and veracity will drastically alter the 21st century landscape, changing how businesses function at their cores.

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VOLUME

IDC projects that by 2020, the digital universe will contain as many bits of data as there are stars in our physical universe.¹



VARIETY

Human and machine data pour in as text, photos, videos, audio, Web traffic, system logs, sensor information, social media activity, and more.



VELOCITY

Every minute, we send **204 million emails**, conduct **4 million Google™ searches**, and share 2.4 million pieces of content on Facebook, just to name a few.²



VERACITY

Gartner found that the annual financial impact of poor data quality on surveyed organizations averaged **\$8.8 million USD**.³

¹ IDC, The Digital Universe of Opportunities: **Rich Data and the Increasing Value of the Internet of Things, April 2014.**

² Domo, **Data Never Sleeps 2.0, April 2014**

³ Gartner, **Magic Quadrant for Data Quality Tools, Saul Judah and Ted Friedman, November 2015**



Analytics are at an inflection point. Big Data can now be collected in real-time from more sources like social media and the Internet of Things. It can then be applied in far more use cases by a much broader set of people with a range of skills and backgrounds, which gives us unprecedented insight into how the world interacts with our brands, spurs innovation, and alters our perspective.

With the right tools, businesses can scale, integrate, and understand their data while harnessing predictive insights from analytics to achieve breakout growth. Vineeth Ram, VP of HPC & Big Data Segment Marketing at HPE, explains: “Data is the fuel of the Idea Economy. Companies that are data-driven in the right sense can have tremendously impactful business outcomes. They can drive new business models, have more differentiated products and services, and improve customer experiences, operational efficiency, and workforce productivity.”

In order to excel at leveraging all of the data available, a data-driven culture throughout an organization is essential. The most successful companies have enacted enterprise-wide changes, from creating new roles to re-inventing their business model. These companies have actively embraced the idea economy while their business evolves alongside it.

Big Data’s big changes in the C-suite

As the need to be data-driven is even more paramount in the Idea Economy, businesses must build an effective strategy from the ground-up. However, there are ambiguities about how to implement systems for Big Data analytics and derive value from them, coupled with apprehension for making radical structural changes to an existing business. “Hype” surrounding the term compounds misconceptions about how organizations can achieve tangible results.

“The Big Data market as we know it today is still in its infancy. A lot of companies are hesitating to implement these types of solutions right now, but the next one-to-two years will be critical. Early adopters are going to have an advantage as they can show results, especially around very specific vertical market segments,” explains Senior Big Data Solutions Manager for HPE Servers, Mario D’Cruz.



Fostering a data-driven culture

Leveraging data can't be an afterthought. It must be identified within each of the organization's key projects. Big Data analytics is more than just technology; it's a cultural shift with strategies built upon pragmatism and persistence.

The first step in a data-driven culture is identifying an organization's goals and how Big Data will be mapped to its real-world projects. An efficient and scalable data collection platform can then be established accordingly, which may involve technologies like server-based storage, software-defined storage, and object storage.

The next step is optimizing the infrastructure to support the right software, applications models, and human expertise to analyze the data. This is how data is turned into insights at the point of action for the specific business-level project, at the speed, scale, and performance needed to maximize value.

To accomplish this cultural shift, companies need collaborative manpower in the appropriate places and with the proper governance. This may involve hiring experts, training existing team members, or both. These specialists will need budgetary support, but also need channels of communication to decision makers and strategists at the executive level in order to achieve high ROI down the road.

Expanding the title hierarchy

We've continued to watch the C-suite adapt to evolving business environments. The CFO role became more prominent in the 1980s to meet increasing demands for transparent investor relations and value management. With the turn of the century's complexity of global operations, distribution and sales, and the need to absorb acquisitions, the COO has also become more prominent, often taking the place of or being replaced by the CFO as a dual role. Most recently, the CMO role was introduced to harness the complexity of customer engagement in the face of new media and communication channels.

Similarly, in the Idea Economy, a variety of new roles are emerging to meet the resource and expertise demands of the data-driven culture. Chief Data Officers (CDO) and Chief Analytics Officers (CAO) bring needed expertise into the C-suite, while data scientists are helping to extrapolate data and maximize ROI. Success in these roles requires collaboration and the ability to evangelize a new data-driven style: one based on iterative, evolving real-time analytics at the point of action, used and consumed by the masses.



Chief Data Officer

Emerging roughly three-to-four years ago, the CDO title was developed for organizations that are truly dedicated to building a data-driven culture. In partnership with other roles such as the Chief Information Security Officer (CISO) and Chief Learning Officer (CLO), CDOs establish data policies and standards, leverage existing data to find new uses and insights, identify new revenue sources, ensure security and privacy, and maintain governance.

Chief Analytics Officer

Generally speaking, the CAO title is seen as a variant of the CDO, with many businesses choosing one or the other. This role works in tandem with the Chief Information Officer (CIO), with CIO managing responsibility for infrastructure and CAO/CDO managing responsibility for data. Some experts project that today's CDOs will evolve into the broader role of CAOs.

Data Scientist

The U.S. Bureau of Labor Statistics projects that from 2014 to 2024, this niche will grow 11 percent, which is faster than the projected average for all occupations.⁴ While individual experts may come from a wide variety of backgrounds, what they all have in common is a coveted combination of technical skills and industry-focused mindsets. They know how to ask the right questions—or extract them from others—and apply the right statistical techniques to make meaningful use out of an organization's data.

Traditional roles, innovative strategies

Before delving into the data itself, organizations need to define their problems and identify specific, actionable goals for improvement. The best place to start this process is to look at corporate goals as expressed in annual and quarterly reports, as well as the operational business unit level that is meant to execute these goals for the next fiscal year. It's no surprise therefore that the **C-suite executives are instrumental in sparking imagination and defining the high-level strategy needed to manifest goals, while ensuring that the right resources are allocated.**

⁴ U.S. Bureau of Labor Statistics, Computer and Information Research Scientists, December 2015

Overcoming challenges

Companies preparing to incorporate Big Data analytics can learn valuable lessons from the pitfalls of early adopters. One of the most common challenges is inspiring the leadership, communication, and transparency needed to engender a data-driven culture. Without strategy, understanding, and solidarity across even peripherally-involved departments and positions, companies will make little progress. To prepare the groundwork for bringing on less-involved departments at a later date, leaders can utilize early and persistent “marketing” of quick wins with the departments that successfully pilot Big Data analytics projects.

Companies may also suffer when expectations aren’t managed or defined realistically. In an age of instant-gratification, it’s easy for end users to underestimate the workload or resources needed to accomplish a particular goal. For example, the ability to deploy a server in a week’s time doesn’t necessarily mean that re-organizing data can be accomplished at the same rate. On the other hand, discovering the value of your data can sometimes be surprisingly quick in a POC mode leveraging the cloud. Once the value of the interpretation is made, investment in scaling it up is far more justifiable.

Data breach can have disastrous business consequences. With more personal data like customers’ account information, Web browsing history and social media activity, it’s imperative to manage data security and privacy through an enterprise-wide set of governance policies. Proper governance policies cannot be set without executive management stakeholder support from the C-level, most notably the CEO, CLO, and CDO/CDA.

CEO: Strategize and mobilize

As a pivotal decision-maker in any company, the CEO is always looking for innovative ways to accelerate their brands, innovate products and services, and streamline operations. Radical or disruptive business decisions made by other team members will make their way to the CEO’s desk without fail. Furthermore, it can be devastating to underestimate what the competition does or can be anticipated to do.

CEOs have a unique opportunity to inspire change from the inside-out. The CEO can collaborate with interdepartmental stakeholders across the organization to evaluate current strengths and weaknesses, delineate key business goals, and mobilize Big Data efforts.

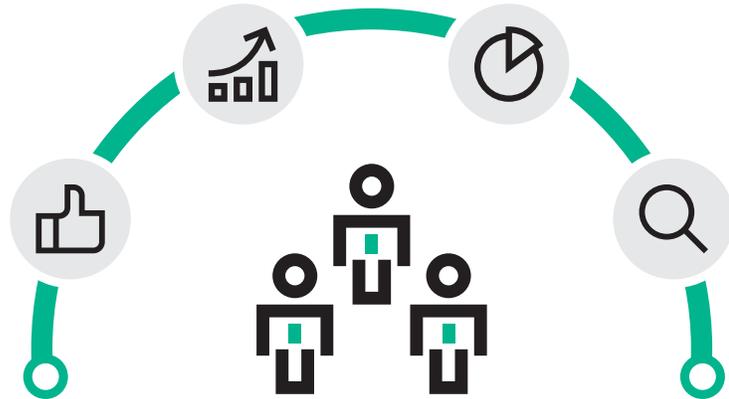
According to Sanjeet Singh, Big Data Ecosystem Product Manager at HPE, “Many of the companies that haven’t been able to keep up in the Big Data analytics space are the ones in which the C-suite hasn’t been pushing for change. Those operating on legacy systems are being threatened by new competitors coming into the market. For initiative on these complex projects, the CEO becomes extremely influential.”

Being data-driven enables innovation and re-invention of the business, but the risk of not being data-driven quickly leads to disruption from competition. We have seen this in many industries over the past decade and the trend will continue. With the CEO involved in setting the Big Data analytics strategy and direction, the business has a greater opportunity for transformation to disrupt the status quo and drive sustainable growth.

Conceptual application examples

A study conducted by the Economist Intelligence Unit revealed that across 516 senior level executives spanning 21 countries, 58 percent of surveyed companies reported higher profitability over competitors when the CEO took charge of customer experience.⁵ Big Data analytics provide CEOs with opportunities to spearhead cyber security efforts, which prove exceptionally valuable for industries like healthcare and financial services.

⁵ **The Economist Business Intelligence Unit Limited, The value of experience: How the C-suite values customer experience in the digital age, June 2015.**



According to McKinsey & Company, executive teams that make extensive use of customer Big Data analytics across all business decisions see a **126 percent profit improvement** over companies that don't. And those that champion customer analytics "broadly and intensively" as a whole company see **6.5 times more customer retention, 7.4 times more outperformance of competitors** and almost **19 times more above-average profitability**.⁶

Use case: Enhancing customer experience in the auto industry

The auto industry offers a number of data opportunities for a CEO to improve customer experience and value proposition. On the surface, consumer shopping and purchasing behaviors provide significant insight into what customers want, such as buying preferences and special offers pursued. Business leaders can visualize trends by looking at factors like the time of year certain vehicles are purchased, which types of features are included, by whom, and whether there are any trends based on seasonality.

Companies can also analyze safety records, in addition to sales, support, and warranty information. Social media sites such as Twitter feeds can be used to monitor a brand's reputation and see what the public is saying about them while directly engaging customers in conversation. This proves especially helpful when customers have questions, concerns, or complaints that are voiced on their public profiles.

The birth of the "connected car" has skyrocketed the auto industry's ability to tap into consumer behaviors. Sensors inside vehicles can send real-time information back to manufacturers, showing exactly how, when, and where customers drive. These technologies can inform manufacturers of certain glitches or mechanical issues while providing intelligence into their potential causes or solutions.

With the help of HPE's Vertica portfolio, these massive amounts of data can be efficiently scaled and interpreted in a fraction of the time of legacy applications. Predictive analytics functionality can spot patterns in data that aren't discernible using traditional business analytics.

⁶ [McKinsey & Company, Using customer analytics to boost corporate performance, January 2014](#)



CIO: The brawn of the operation

You would be hard-pressed to find a Chief Information Officer (CIO) who doesn't regularly encounter Big Data analytics. As one of the key roles in managing an organization's IT infrastructure, this leader will need to have a hand in the selection and implementation of the right mix of hardware, software, and services solutions.

Ideally, the CIO will have a full grasp of the intricacies of the strategy, so that he or she can help assemble the right tools, technology, and people for the job. The CIO should help to ensure that other members of the C-suite understand the upcoming process and goals, and are prepared for launch. Legal, regulatory, and reputational risk assessments should be conducted and integrated before implementation begins.

What the CIO fears the most is being seen as—or worse, becoming—the roadblock to rapid deployment of new ideas that require Big Data analytics. Oftentimes, Line of Business (LOB) partners fear that the IT department will move at the speed and cost outlays they have historically taken to bring major updates of enterprise resource planning (ERP) and traditional enterprise data warehouse (EDW) systems online. It's imperative to build the right relationship with LOB partners. This helps to ensure that Big Data analytics are handled by the IT organization, while avoiding any ungoverned efforts that could lead to fragmented results.

Asking the right questions

A costly mistake by a number of companies making their first foray into Big Data analytics is failing to conduct an "inventory" of their current data and how it's being captured and stored. For many, diverse and valuable data streams are stored in abundance but using methods that are inefficient for analysis and application.

In some cases, terabytes or petabytes of data are stored, but never accessed or analyzed at all. When this occurs, it may be most beneficial for these organizations to emphasize the analytics of Big Data as opposed to investing additional resources into data collection.

This is an opportunity for the CIO to commission a professional evaluation of the company's current data landscape. What works, and what can be improved? Is infrastructure poised to facilitate a smooth long-term transition to the proposed analytics strategy, or is it time for something new?

Conceptual application examples

One of the main tasks for the CIO is streamlining and potentially re-engineering business processes while maintaining budgets. New applications should be evaluated to determine compatibility, as well as potential cost savings for the organization. Additionally, data governance remains an ever-important task: standardizing existing data definitions while managing privacy and security issues.

CIOs can spearhead the incorporation of technologies to protect critical business data. For example, high-speed encryption “on a chip” and role-based authentication can provide security to “data-at-rest” and “data-in-motion.” It is also critical to survey, catalog, and clean up all corporate data associated with its various applications.

Use case: Data organization to reduce retail shrinkage

Consider a retail company that experiences significant shrinkage, or loss of store inventory through various events such as theft, vendor fraud, administrative error, damage during transit, and the like. The CIO’s goal is to reduce this shrinkage by 0.2 percent—a figure that may seem insignificant, but translates to tens of millions of dollars in lost revenue each year.

This company currently harbors an exhaustive amount of structured, semi-structured, unstructured, and multi-structured data ranging from sales logs to video surveillance footage. However, this data is housed via traditional, proprietary storage systems in a legacy data warehouse. It’s continuously collected, but it’s not part of a scalable, interconnected system like the server-based approaches taken by today’s Big Data analytics leaders. As a result, this valuable information is siloed, isolated from other organizational units.

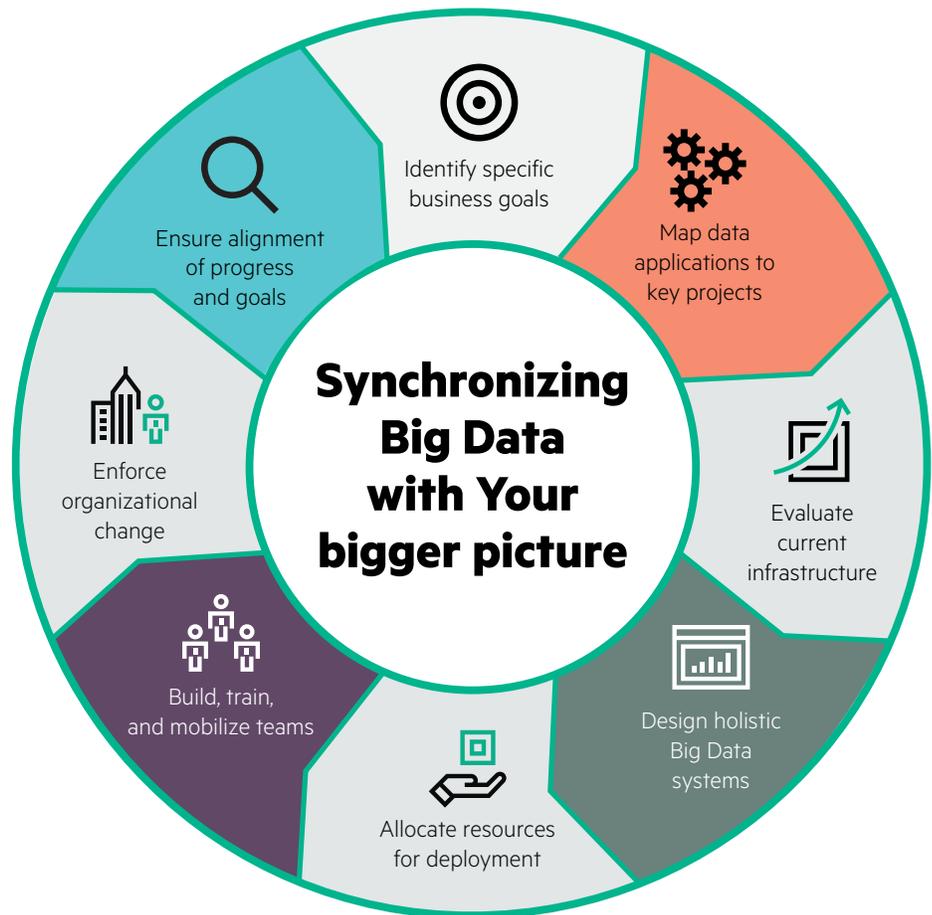
In order for data to be analyzed smoothly, it needs to be cross-functionally accessible. Siloed data is functionally wasted data. To further complicate the issue, traditional storage systems create linear cost growth to maintain the volumes of data generated each second. As is so often the case, there is a technical issue here tied up with a cost-control problem.

Intelligent Data Operating Layer (**IDOL**), HPE’s next-generation enterprise search and data analytics platform, helped the retailer above accomplish its goals. The platform eliminated data silos, allowing full access to all information forms, which were then analyzed to pinpoint where shrinkage occurred from manufacturing to the point of loss. This advanced insight allowed key decision makers to adjust operations as needed moving forward.

CSO: Manifesting the bigger picture

The powerful strategic assets of Big Data analytics lends itself to the agenda of the Chief Strategy Officer (CSO). An experienced, cultured, and forward-thinking individual, the CSO has the “bigger picture” mentality that’s so strongly demanded by any Big Data analytics undertaking, coupled with in-depth knowledge of where the company, its competitors, and its industry are heading.

The ability to influence and work with various roles and personalities within an organization proves an asset for assembling, educating, and mobilizing the teams needed for a Big Data analytics project. The CSO has the focus and discipline to allocate resources appropriately, sustain organizational change, and align progress with goals.



A 21st century task for a 21st century role

While many traditional companies are organized with other C-suite and executive level roles making the most important strategic decisions, the CSO's role has become more prominent within the past decade, and with good reason.

With a surge of competition, companies must think smarter, more creatively, and with clearer focus. The need for ingenuity and organized deployment of manpower has been intensified by the global shift to all things digital. Roles like the CSO have helped brands to stay ahead by keeping their ears on the ground and soldiers on the front line monitoring popular trends and anticipating changes.

Companies with designated roles like CSO are often more equipped to stay competitive within their industries. The complexity of Big Data analytics requires significant time and resources that hybrid roles may find difficult to provide.

Conceptual application examples

McKinsey identifies five CSO archetypes, including the architect, mobilizer, visionary, surveyor, and fund manager.⁷ The role of Big Data analytics will vary depending on the core assets that the CSO brings to his or her organization. For example, the architect can utilize Big Data analytics to monitor industry trends and spot shifts before competitors. The visionary can harness Big Data analytics to help predict growth pockets in certain markets and what processes or tools may serve it.

⁷ McKinsey & Company, Rethinking the role of the strategist, Michael Birshan, Emma Gibbs, and Kurt Strovink, November 2014.

**Use case: Predictive operations for oil and gas industry**

The lifeline of oil and gas exploration is the ability to strategically determine where to drill. High operational costs mean that predictive errors can have catastrophic financial consequences. In order to determine which locations are most likely to produce value, an oil and gas company requires analysis of enormous amounts of comprehensive data.

HPE works with a shale oil extraction company to assess potential drilling sites well before a drilling expedition launches. The company runs a series of models to help simulate oil reservoirs and visualize where sub-surface oil may lie. During the extraction process, the company uses fiber-optic cable sensors to monitor seismic waves created by tectonic activity and machinery, using the data like sonar to predict where wells should be positioned.

After this data is collected, computing-intensive software applications turn billions of complex, unstructured data points into interpretable 2D, 3D, and now 4D simulations. Even after these visualizations are rendered, further analytics are needed to help make adjustments to current models and create detailed operational guidelines for the drilling process.

This data helps to not only determine the most lucrative drilling locations and techniques, but also provides the CSO with the ability to interpret trends and patterns for long-term strategic decisions. These patterns, which are often unperceivable using traditional analytics, can unveil competitive advantages, growth opportunities in difficult markets, and profitable business development strategies.

Conclusion

Even in this fledgling era of adoption, overwhelming evidence supports the promise that Big Data offers a wide range of businesses across the globe. HPE's analyses of data-driven organizations show that the more an organization characterizes itself as data-driven, the better it performs on objective measures of operational and financial success. **McKinsey found that initial Big Data investments yielded an average of 6 percent in increased profits, which grew to 9 percent after five years.**⁸

Despite the evidence that Big Data analytics facilitate business growth, 85 percent of companies cite uncoordinated efforts and inadequate funding for these efforts.⁹ Why so? An integral piece of the puzzle is how different roles within a company measure success, as well as what data they use, where they get it from, and how quickly and often they can use it.

For example, technology infrastructure executives may focus on coordination and implementation of the necessary hardware, software, and services. Meanwhile, LOB stakeholders often examine the bottom-line business value derived from the data: a radically different approach and a complex goal. A critical component of success in an idea economy is the ability of a data-driven foundation that can collect, fuse, analyze, and generate outcomes that can be visualized by all these parties.

Brian Ng, Senior Manager for the HPE Empower Transformation Program, says: "Big Data permeates many aspects of industries across the board. It's pervasive, but at the same time, a number of industries aren't yet thoroughly identifying and leveraging their opportunities to extract the potential business value. There's a lot more that we can do to help close the Big Data gap for our customers."

No matter the industry, business goals, or operational capabilities, organizations must collaborate and embrace change if they want their Big Data efforts to succeed. When it comes to optimizing opportunities and customizing initiatives, Hewlett Packard Enterprise has the compute, as well as the tools, resources and expertise, to unearth the results you seek.

Learn more at
hpe.com/info/bigdata
hpe.com/info/apollo

⁸ **McKinsey & Company, Big Data: Getting a better read on performance, Jacques Bughin, February 2016.**

Gartner, Best Practices for Successfully Leveraging Enterprise Architecture in Big Data Initiatives, Mike Walker, July 2014.



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