Big Data Challenges and Opportunities

As the age of digital transformation marches on, even the smallest business has a rather large challenge facing it: dealing with Big Data. The days of trying to glean insights “when possible” from a local database application or strategic decision making based on often incomplete data are long gone. In many ways, the global economy has entered what might be called “the Big Data era,” and without an effective strategy for overcoming Big Data challenges (and leveraging opportunities it provides), organizations may be sacrificing not just invaluable business intelligence, but their ability to compete effectively.

Understanding how to mitigate or circumvent Big Data challenges, how to spot Big Data opportunities, and the best places to begin Big Data in your organization is essential to transforming the mountains of information at your fingertips into actionable insights and value.

Why Understanding Big Data Challenges and Opportunities Matters

Like a lot of popular business buzzwords, “Big Data” tends to be thrown around in a very casual way whenever the discussion turns to topics like data science, digital disruption, digital transformation, and business intelligence. Big Data technologies absolutely have an important part to play in contemporary strategic planning, but before you can start turning data into demonstrable value, you need to understand what Big Data actually is—and what it isn’t.

Big Data as we know it was originally defined in 2010 within the context of Apache Hadoop, a software framework designed for “distributed processing of large data sets across clusters of computers using simple programming models.” In a nutshell, Hadoop’s original goal was to take data sets so immense that single computers of the time literally could not analyze or process them in a reasonable span of time.

In its raw form, this “Big Data” was unstructured, immense, and, while high in potential value, remained relatively useless without analysis. As today, it ranged in size from gigabytes to terabytes to exabytes and zettabytes (for reference, an exabyte is roughly 285 million DVDs’ worth of data, while a zettabyte is equal to about 281 trillion songs in .MP3 format), and it was difficult to wrangle.

Solutions at the time included a technology data scientists call grid computing, a kind of proto-cloud that used hundreds or even thousands of computers to complete tasks a single computer would find difficult or impossible to complete, such as advanced calculations, large-scale data processing, or data mining.

Flash forward to the 2020s, where the Internet alone is approaching two zettabytes in size (it took nearly four decades for it to reach a single zettabyte, but Big Data’s unique properties include an exponential, rather than linear,
growth scale). Grid computing is still in use, but the cloud—a series of distributed computers processing and storing data remotely while serving results to thin clients on PCs, mobile devices, etc.—is increasingly taking its place.

Why? Because Big Data operates on the “Six Vs:”

- **Volume:** Storage capacities are growing faster than ever, and data that used to be sacrificed to the virtual ether is now just another stream of information flowing into the ocean of Big Data. In the future, when storage capacities reach truly staggering volumes, it may become possible to capture and record incredibly complex data, such as sensory perceptions or holographic projections of live events, in real time.

- **Velocity:** In an always-on, increasingly interconnected world where the digital sphere and the physical realm are both constantly generating massive amounts of data, Big Data grows larger and more complex with every passing moment. Just as the Internet’s data volume took less than ten years to reach double the amount it previously accumulated in 40, the ever-growing number of data streams from smartphones and other mobile devices, the Internet of Things (IoT), and advanced machine learning algorithms creating new data as they analyze existing information have created an ever-expanding sphere of information rich in potential value for businesses.

- **Variety:** Big Data comes from numerous sources. Beyond the data businesses generate simply in the course of doing business, companies now have access to new sources of unstructured, semi-structured, and structured data, including:
  - Social networks (e.g., Facebook posts, tweets, Instagram posts, etc.).
  - Sensor data from IoT devices.
  - Video and audio data from user-created content sites.
  - Specialized application data from different sources, such as health

records, vendor compliance and performance, eCommerce performance date, etc.

- Feeds from commercial and government resources.

Consequently, Big Data analytics will only grow in importance as we move forward.

- **Veracity**: Big Data’s utility is limited by its accuracy and completeness. Inconsistent and incorrect data will yield questionable results due to errors, but veracity also applies to “soft” data coming from places like social media, where analysis of consumer behaviors to measure things like popular sentiment can be hit-or-miss even with advanced algorithms.

Using Big Data effectively means having a firm grip on data that’s reliable, and optimizing substandard data where possible.

- **Variability**: Along with its handmaiden, complexity, variability of Big Data refers to the inconsistency with which data may be available based on the need to collect, organize, manage, and analyze data streams from multiple sources to ensure they are high-quality and of maximum utility.

As the number of data sources increases and the amount of data captured from each grows in both volume and complexity, it’s crucial that companies have a way to streamline data collection, management, and analysis to achieve and maintain competitive advantage.

- **(Low) Value Density**: Like metal ore or sugarcane, Big Data must be refined to be useful. The challenge is to optimize the workflows used to analyze this data, and extract maximum insights and value for an optimal return on investment (ROI) as well as peak efficiency.

Companies of all sizes need to have a firm grasp of these six factors, and the challenges they create, when developing their data management strategy. Without such understanding, they may struggle to seize the opportunities buried within the ever-expanding mass.
You may not be dealing with exabytes of information, but chances are your company has access to a lot of unstructured, unrefined data you could be transforming into value in numerous ways—e.g. cost savings, process optimization, and a healthier bottom line, just to name a few.

**Turning Big Data Challenges into Big Data Opportunities**

The primary challenge that comes with Big Data is finding ways to swiftly, accurately, and completely extract insights and value. You may not be dealing with exabytes of information, but chances are your company has access to a lot of unstructured, unrefined data you could be transforming into value in numerous ways—e.g. cost savings, process optimization, and a healthier bottom line, just to name a few.

It’s possible to consider the challenges that come with Big Data as both Big Data problems and Big Data opportunities. The primary difference lies in taking advantage of digital technologies that support Big Data management and analysis.

**1. Big Data Challenge:** Lack of Awareness, Understanding, and Education

**1. Big Data Opportunity:** Invest in Needs Analysis, Education and C-Suite Support

Change is as difficult for organizations as it is for individuals—moreso, in fact, when the organization is large, has a traditionalist or conservative culture, or has not yet begun to explore digital transformation.

Take the time to do an honest evaluation of your current data management capabilities, your data needs, and the volume of Big Data you’re using as compared to the data volume you could be mining for actionable insights. Formalize and document your goals for putting your information to work, and
decide how you want to proceed—and the tools you want to use to reach your destination.

By engaging your IT department and choosing software tools that provide advanced support, training, and education along with their products, you can bring your C-Suite up to speed and leverage their support in helping the rest of your team get on board with Big Data technologies and ensure everyone’s working toward the same goals.

2. Big Data Challenge: The Abundance of Available Big Data Applications

2. Big Data Opportunity: Starting with Essential Processes to Demonstrate Value

How you choose to manage your data can be as important as selecting the data you want to use. For large and small businesses alike, trying to navigate the seemingly endless number of options can be paralyzing rather than empowering.

One of the most effective ways to begin managing Big Data effectively is by optimizing your procure-to-pay (P2P) process. Connecting procurement with accounts payable, the P2P process is the perfect place to begin taking control of large amounts of data because it covers effectively all of your spend data, and connects to every other business process in your organization. Choosing a cloud-based, centralized procurement solution like PLANERGY gives companies immediate benefits such as total spend transparency, immediate, leveled, and mobile-friendly access to data for all stakeholders, and advanced artificial intelligence tools that make it easy to automate workflows and analyze data in real time.

Beyond optimizing your P2P process, integrating such a solution allows teams to create a centralized data storage and management tool for their existing software environment, connecting diverse data sources for easier data cleaning, organization, and analysis—and setting the stage for a more advanced digital
transformation as time, budget, and overall organizational goals dictate.

3. **Big Data Challenge:** Digital Disruption Sounds Expensive

3. **Big Data Opportunity:** Digital Tools Create Value and Savings on Day One

Change isn’t just hard; it can be pricey. But as with most business processes, tapping into the power of Big Data has not just a price, but a value. Going “whole hog” with an organization-wide conversion might indeed be a bank-breaker for some businesses, but one of the greatest opportunities presented by effective Big Data management is its modularity.

To return to our P2P example, the up-front cost of selecting and integrating a cloud-based procurement software solution can quickly be recouped in several ways, including but not limited to:

- Efficiency, accuracy, and speed improvements to all workflows.
- Offloading of large-scale, repetitive tasks such as approval workflows or data processing to robotic process automation algorithms (“bots”).
- Elimination of rogue spend and invoice fraud through guided buying and total spend transparency.
- Greater strategic value from improved data-driven insights as well as staff members focusing their skills on innovation and vendor relationship management rather than low-value, tedious tasks.

The gains in cost savings will be substantial, but they’ll also be accompanied by “soft savings” such as improved employee morale, improved relationships with suppliers, and more effective process management that improves everything from cash flow to contract management.

Demonstrable value and savings makes it much easier to bring the rest of your organization “into the fold,” and connect even more data sources for even richer, more strategically valuable, Big Data to analyze.

And better still, choosing a modular and “future-friendly” solution will also make it easier to scale your actual Big Data analyses through native support for continuous improvement through iterative machine learning.

4. **Big Data Challenge:** Ensuring Data Security and Quality Management Can Be Tough

4. **Big Data Opportunity:** The Right Tools Ease the Pain

The two most important factors for any successful Big Data analytics and management plan are data security and data quality. Without the former, you’re exposing your organization to risk from bad decision making, potential cyberattacks, or reputational and financial ruin through data leaks of intellectual property, customers’ personal data, or classified third-party information. Without the latter, you’re setting yourself up for reduced efficiency, sub-par financial forecasts and reporting, or budgetary and cash flow woes.

Make sure you choose data management tools with strong cybersecurity features, compatibility with your existing applications, and advanced big data analytics tools that will help ensure your data is clean, complete, and reliable. Revisiting our P2P scenario, PLANERGY (for example) includes automatic three-way matching of all transaction data to minimize the need for additional data cleaning and ensure your data is complete and accurate while guarding against risk exposure due to rogue spend or fraud.

5. **Big Data Challenge:** Separating the Wheat from the Big Data Chaff

5. **Big Data Opportunity:** Combine Process Optimization with Intelligent Software Tools

Whether you’re dealing with exabytes of data from multiple sources to harvest reliable business intelligence or upgrading from a simple relational database for better spend and vendor management, you need reliable and accessible tools your
whole team can use in order to make optimal use of Big Data. Look for software solutions with intuitive control panels, support for mobile access, and a focus on ongoing education and training to ensure your team has what they need to collect, organize, clean, and analyze your data.

**You Can Extract Big Value from Big Data**

In today’s digital, globalized economy, every day seems to bring new sources of potentially valuable data that can go to waste if they’re not properly managed. But by creating a centralized, robust, and diverse data environment—and investing in the tools you need to both organize, manage, and analyze data effectively—you can mine the mountains of Big Data for nuggets of lasting value via actionable insights, more strategic decision-making, and stronger competitive performance.

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