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Using Big-Data Analytics to Manage Data Deluge and Unlock Real-Time Business Insights

By Venkatachalam Narayanan

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By Venkatachalam Narayanan

"Big data" is both an entity and a process. For the equipment finance industry, it can reveal consumer buying patterns and potential markets, and identify potential products, not to mention solve specific business issues. Here are steps for effectively adopting a big-data program.

Editor's note: This article is based on the February 2014 Foundation study by Genpact titled Big Data: A Study for the Equipment Finance Industry. *The study is available at www.leasefoundation.org.*

By collecting and analyzing vast amounts of relevant data stemming from a variety of sources, equipment leasing and finance firms can unlock valuable marketing and operations intelligence that can make them more competitive and able to exploit newly identified market and product opportunities. Consumer buying patterns, potential markets, and identification of potential new products are among the revelations big data can deliver to companies looking to better understand markets, customer segments, and their own operations.

This article defines big data and examines its potential within the equipment finance industry. The article also briefly compares big data to traditional data with emphasis on infrastructure and personnel. Finally, the article provides a specific framework for adoption of a big-data program and steps toward effective implementation.

BIG DATA DEFINED

"Big data" is both an entity and a process. As an entity, big data comprises volumes of information so vast that they usually cannot be processed using traditional database and software techniques. Gleaned from a variety of sources, many of them internal, but some external as well, big data typically includes:

- ***structured data*** – organized information lifted from relational databases, spreadsheets, and machines),
- ***unstructured data*** – free-form information not residing in a fixed place, such as emails, texts, and voicemails, and
- ***semi-structured data*** – data that does not reside in fixed fields but uses tags or other markers to capture elements of the data. XML- and HTML-tagged text are examples.

As a process, big data refers to the infrastructure and technologies companies use to collect, store, and analyze these various types of data.

Whether the aim is to finance medical equipment, evaluate new markets, or devise new financial products to reach an underserved market, companies can use big data to gain insights and make sound business decisions more quickly. Findings from big data can be used to transform sales or back-room operations, adjust a business model, or grow in new directions. Specifically, big data can enable equipment leasing and finance firms to excel in a variety of ways, including these:

- Increase shareholder value
- Increase customer satisfaction
- Evaluate new market opportunities
- Develop new products and services
- Stay ahead of competition

The potential of big data – as well as its achievements in certain industries and individual companies – has created such strong interest worldwide that big data itself has become an industry, spawning new businesses dedicated to furthering the understanding and manipulation of vast amounts of information.

Institutions can integrate big-data analytics with their "manage and grow" strategy. Using big data, lending organizations can determine factors such as portfolio value at risk, exposure, and funding liquidity risk. These elements help to determine the feasibility of

Analysis of big data can also contribute significantly to achieving such key metrics as targeted revenue, costs, margins, cash flow and compliance.

taking products to the market. Big data also significantly reduces the time taken to execute some processes. By adopting big data, a large U.S. bank was able to reduce the time taken to estimate loan default rate for a mortgage book of $10 million loans from 96 hours to just four. Early detection of high-risk accounts is crucial to determining the likelihood of defaults and loss forecasting, and how to hedge risks most effectively.

BIG DATA VERSUS TRADITIONAL DATA

Compared to traditional data, the use of big data presents several challenges. At firms considering embarking on a big-data implementation, executives and IT professionals must first work together to identify the business objective they want to achieve. They must then tailor the technological infrastructure, data sources, and quantitative analysis necessary to support that business objective. Many organizations require additional investment in IT hardware, software, and services before they can capture, store, organize, and analyze large data sets.

The level of investment will vary considerably, depending on the current state of IT capability and expertise. Yet at all firms contemplating the use of big data, the firm's IT leaders are required to work with the organization's business leaders to develop business cases for new investments – and then to prioritize that spending.

Financial institutions know and understand the differential factor big data can deliver to their business. Yet most organizations believe they are not ready to join the big-data revolution because they still view big data as a technology rather than a business opportunity. Big-data policies are evolving in many institutions, with executives trying to figure out what it will take to translate the flood of information to useful and applicable business insights. Analysts estimate that approximately 80% of the data that financial institutions have is in unstructured form – that is, in documents and text form. Technologies like big data enable businesses to integrate this data with structured content and present enormous growth and improvement opportunities.

Figure 1 compares several characteristics of big data and traditional data across three common activities.

Analysis of big data can also contribute significantly to achieving such key metrics as targeted revenue, costs, margins, cash flow and compliance.

These contributions can result from improved functional delivery needs, such as the cost-efficient and timely processing of customer or transaction data, or from improved decisionmaking that leads to new business growth and increased or additional revenue streams.

PRELIMINARY ELEMENTS OF EFFECTIVE IMPLEMENTATION OF BIG DATA

There are five preliminary elements of effective implementation of big data.

Regularly inventorying all types of data assets: proprietary, public, and purchased.

Data is mainly available in three forms: proprietary, public, and purchased. A company must understand the types of data assets it holds or can access before moving further.

The firm must inventory its own data and then catalog other data (which may be available at no charge or for a fee) that would be useful to achieve business requirements. The firm should next contemplate or accelerate any existing data-sharing between the firm and relevant third-party resources. This process could also require the firm to create a strong value proposition, which is essential to convince third parties to share or sell the data the company wants to obtain.

Technological challenges, such as standardizing data and implementing data feeds, must

Figure 1. Comparing Big Data and Traditional Data

Activity	Traditional data	Big data
Standardization of data	Static, slow-changing, and adaptable to a single data mode	Changes rapidly and cannot use just one data model for collection or analysis
Physical centralization of data	Is defined, accessible, and manageable	Is high-volume, highly varied, and high-velocity, all of which can affect performance of networks
Data retention and storage	Can be retained at a granular level	Cannot be retained at a granular level and often defeats traditional storage capacities

Source: Genpact.

also be addressed to ensure consistent, reliable, and timely access to any external data that is required. Access to third-party data sources and integration of their data with that of the company is essential for success.

From a talent perspective, best-practice, big-data companies have built a talent pool that includes system administrators, developers, data scientists, and data stewards in a core group of deep analytical talent.

Identifying potential value-creating opportunities.
A company must create a process for identifying and prioritizing big-data opportunities. This process must identify business-line and function leaders who can kick-start processes in their respective zones of responsibility. To validate these opportunities, a process of purposeful experimentation should be created that serves as a reliable path toward becoming an organization that fully leverages and benefits from big data.

Constructing internal capabilities that create a data-driven organization.
From a talent perspective, best-practice, big-data companies have built a talent pool that includes system administrators, developers, data scientists, and data stewards in a core group of deep analytical talent. Given the potential competition for this talent, organizations recruit such talent aggressively. This is done by sourcing talent from other geographies or procuring some analytical services from vendors. However, despite such sourcing strategies, there is still a shortage of resources in the data scientists category, which is the most crucial talent required for effective implementation of big-data analytics.

Developing an enterprise information strategy to implement technology.
Organizations must consider holistic data models and architectures. An effective enterprise-wide data strategy includes:

- interoperable data models
- integration architecture
- transactional data architecture
- analytical architecture
- security and compliance features
- frontline services

Addressing data policy issues.
In developing or strengthening a privacy policy, a company should consider the types of legal agreements and trust expectations it wishes to establish with its stakeholders. The firm will then need to communicate its policies clearly to stakeholders and customers. Firms will need to review and likely strengthen policies that comply with privacy laws and government regulations, such as HIPAA (Health Insurance Portability and Accountability Act) standards.

High volumes of data, high speeds, and the diversity of formats that characterize data make for an array of challenges regarding collection, storage, search, analysis, security, and use. Because new data is created every moment, traditional IT infrastructures are inadequate to manage it and can cause serious data management problems. Data storage – or the use of technologies that scan data and collect only those data strings containing key words or elements specified by a firm – is critical to the success of a big-data implementation. Key challenges faced by organizations of all sizes relate to capacity growth and application performance as they affect analytics environments.

Performance and cost are two drivers essential to the selection of storage architecture or data-scanning technologies. But due to the growing success of big-data analytics around the world, organizations ranging in size from large to small are planning to collect and use at least one form of big data to lower risk, heighten profitability, or improve competitive positioning.

Businesses need to make sure their partnering contracts allow for use if not ownership of data so that all relevant data is available. If 50% of financing business comes from vendors that could own the customers, too, and data, then the program agreement must at least allow the business and its partner similar rights with the lessee.

AN ADOPTION FRAMEWORK

Big data acts as a platform to find problems or omissions in data management that require attention, unlike traditional data-management technologies currently available that streamline the data inventory management process.

Thus, any big-data adoption program should be viewed as holistic, and to be driven iteratively over a period of time. Each iteration should critically examine assumptions made in earlier iterations and weigh the business benefits derived from the results, as well as the level of progress achieved with respect to broader business strategic objectives. Figure 2 shows critical and iterative components of the adoption framework.

DATA TYPES USED FOR BIG-DATA APPLICATION

Industries use various types of data for big-data applications. Most of these types can be broadly organized under the categories shown in Figure 3.

Operational data is generated by machines and auto-

Figure 2. The Adoption Framework

Data discovery	Data discovery defines the subsequent solution design and development. Types of data gathered are structured, unstructured, and semi-structured.
Analytics discovery	Analytics discovery creates an analytics landscape, establishing the relationship between different data sources. It also creates analytics modeling that meshes with the organization's goals.
Tools and technology discovery	Because multiple big-data tools, solutions, and frameworks exist, selection of a tool is dependent on the outcome of the first two steps.
Infrastructure discovery	Identifying and defining infrastructural requirements now prevents further complications to the IT landscape and accompanying capital and operational expenses.
Implementation	Implementation is iterative, with each iteration addressing a specific business area and becoming part of a comprehensive platform that caters to the analytics requirements of the organization.

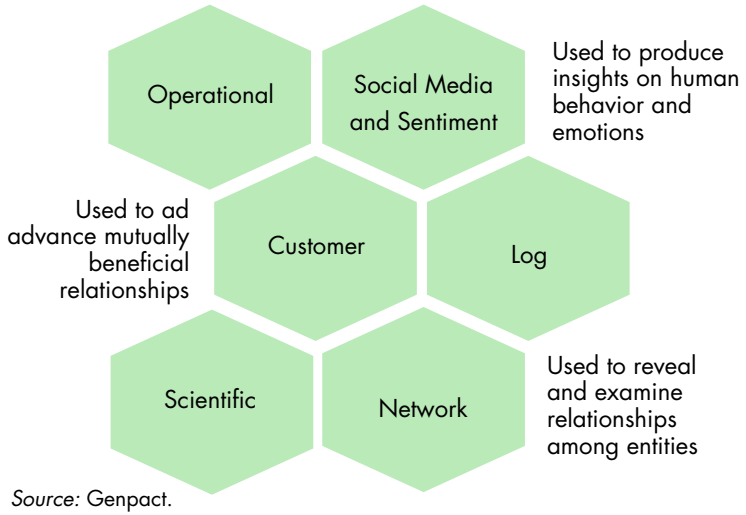
Source: Genpact.

mated processes. It can be analyzed to help meet customer service agreements, to uncover hardware problems, and to help manage data centers or manufacturing facilities.

Social and media sentiment data, such as Facebook posts or online chats via a company's website, can be subjected to customer behavioral analysis that extracts patterns and provides insights into customer behaviors. These patterns and insights can help companies provide maximum value for customers through improved service, new products and services, and development of other opportunities to grow relationships between the firm and its customers, vendors, and partners.

Financial institutions can leverage cross-sell and up-sell potential and introduce new products and services using social media. Analysis of text and speech in a near real-time environment presents organizations with new opportunities to convert the call center from a cost center to an investment center. Marketing teams of a few banking, financial services, and insurance organizations are moving away from capital-intensive, traditional television and standard Internet promotions. They have begun to use social media as a cost-efficient and effective alternative to introduce new products and services and to target customers in specific regions.

Figure 3. Types of Data Used in Big-Data Applications



Source: Genpact.

Customer data, which includes application information and payment history, can be analyzed to determine geographic and demographic trends, to narrow or broaden marketing strategies, and to test-market and launch new products.

Log data, from click-streams, web logs, machines or automated processes, is often analyzed to understand compliance issues or to troubleshoot machine and process errors. Log data is also analyzed to optimize websites and deflect security incidents.

Analysis of ***scientific data*** involves techniques used to investigate phenomena, acquire new knowledge, and correct or integrate previously discovered information. Examples of scientific data analysis include genome sequencing, climate prediction, geological exploration, and detection of disease outbreaks.

Operational data is generated by machines and automated processes. It can be analyzed to help meet customer service agreements, to uncover hardware problems, and to help manage data centers or manufacturing facilities.

Network data can be analyzed to reveal and examine relationships among various entities, such as those being served by the network.

PREVALENT TECHNOLOGIES AND TECHNIQUES

Broadly, three key technologies handle big-data assignments and extract meaningful business value from the data. These technologies are:

Information management. With an ongoing process control in place, Information Management can manage data as a strategic, core asset for big-data analytics.

High-performance analytics. This advanced technology is deployed to reveal patterns and gain rapid insights in various types of data. High-performance analytics can often solve increasingly complex objectives by using still more data.

Flexible deployment options. This technology includes options that can be chosen for on-premises approaches or hosted, software-as-a-service (SaaS) approaches for big data and big-data analytics.

With more organizations recognizing the benefits of using big data, adoption of Hadoop software is growing. Hadoop is a generic processing framework developed to execute queries and other batch-read operations against massive data sets. Accompanied by tools from service providers such as Oracle or IBM, Hadoop can provide a complete big-data package that features powerful performance optimization, sophisticated analytic functions, ease of use, and rich declarative features that allow complex analysis to be done by nonprogrammers. These packages can also include enterprise-class features for security, auditing, maximum availability, and disaster r ecovery.

NoSQL is a type of software platform designed to execute very large volumes of simple updates and reads against a single, very large data set. NoSQL platforms are designed to handle the processing volume needed to support millions and potentially even hundreds of millions of online users. The data sets involved, although typically not as large as those Hadoop is designed for, can exceed tens or hundreds of terabytes in size.

Many NoSQL databases are currently being developed, but the most prominent include Apache Cassandra, MongoDB, Voldemort, Apache HBase, SimpleDB, and BigTable. Because most of these technologies are in the early stages of development, most firms that are early adopters employ programming staffs that participate in the software's development.

BIG DATA'S EVOLUTION AND FUTURE PROSPECTS

The harnessing of big data is a global trend. According to a survey conducted by Gartner,[1] more than 63% of companies worldwide report having already invested in some aspect of big data or say they plan to invest by June 2015. In the United States, 38% of businesses say they are considering using at least some elements of big data. Yet the glamor of this still-evolving science and technology must be viewed against the realities of working with and using big data. If programmers and analysts do not understand the basics of the business for which they are programming, the data uncovered may be irrelevant, resulting in a waste of resources.

Critics charge that generally, the use of big data tools is not taught in many universities; that these tools have limited vendor support; and that they require advanced levels of user flexibility than more mature, traditional data tools.

Critics also point out that while a firm's bottom line might benefit from insights gained from big data, company executives must still be ready to manage the internal politics resulting from changed decisionmaking. No longer will the executive suite be solely responsible for business decisions, and patterns, trends, and other facts gleaned from big data will be difficult to dispute. Nevertheless, given the abundance of information that could be retrieved from big data, executives will need to choose the right data wisely to ensure they are in alignment with the end business objective.

This is not to imply that equipment leasing and finance firms cannot benefit from big data. To do so, however, they must move carefully and not get lost in the noise that can obscure basic business forces represented by customers, value, and execution. One way to remain focused is to insist on the basics of sound analytical practice, no matter the business objective. After all, numbers can reveal answers to questions that no one asks – but they never speak for themselves.

If programmers and analysts do not understand the basics of the business for which they are programming, the data uncovered may be irrelevant, resulting in a waste of resources.

This is why many firms are creating the business case for implementing big data to do the following:

- Focus on sales and service efforts that provide true market differentiation.
- Improve the quality of company decisionmaking by leveraging new or underused sources of data.
- Enable more real-time data capture and analysis to support decisionmaking at the point of impact, such as when a customer is navigating a firm's website or is on the telephone with a customer service representative.

As with other evolving technologies, a company contemplating the use of big data would be wise to first conduct small-scale pilot projects, such as the capturing and analysis of real-time customer data, to better understand the technology and business areas that may benefit from it.

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Such projects serve as a good starting point, but the mainstream adoption of big data requires a structured framework. The solution space comprises not only large, isolated, and varied data sets but also a rapidly evolving technology landscape. Attempting to define all the requirements at once, and selecting the technology of choice at the outset, can potentially derail the entire program and leave a company with a dead investment.

Retail finance and mortgage institutes assess and implement big data to solve specific business issues. With this background, firms are looking to build analytical models using proprietary data. The type of data used is primarily information related to transactions and risk management, with no focus on the market or social media.

From a talent perspective, these companies would already have a good pool of technical and functional talent in house to perform look-back analytics. Also, few organizations have a technology research group that continuously evaluates new technologies from operational, technical, and value perspectives. However, to bring in the required big-data and predictive analytics expertise, companies would need to enter into partnership agreements with vendors.

Clearly, for a leasing company to get the most out of big data, it must have effective processes in place to monitor costs and ROI as well as have the mechanisms for feedback and improvement. Leadership has to be committed to converting big data into useful knowledge. In other words, the potential is there – but is the commitment?

Endnotes

1. "Gartner Survey Reveals that 64% of Organizations Have Invested or Plan to Invest in Big Data in 2013," press release, Sept. 23, 2013, Stamford, Conn. www.gartner.com

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