Advanced Analytics Enhances Business Intelligence

Robust New Technology Enables Better Decision-Making

White Paper

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Advanced Analytics Complements BI

Today the need to process and analyze the ever larger volumes of data being generated is causing many businesses to consider expanding the capabilities of their business intelligence (BI) systems. Being able to do so can be a competitive differentiator. For example, to deliver satisfying experiences, customer service organizations need more than ever to understand their customers and identify root causes of their problems. A next-generation BI system that utilizes multiple data sources and also offers predictive analytics can provide the needed guidance.

In response to the explosion of big data sources and customer demand for forward-looking analysis, some vendors are adding advanced analytics to their business intelligence systems. These capabilities include descriptive analysis, predictive modeling, machine learning, simulation and rules-based optimization. The capabilities combine statistical algorithms with business rules and the ability to learn progressively. One challenge these vendors face is that despite the technical advances, it is most important that the systems be easy for users to understand and use to make decisions. Our research into next-generation business intelligence shows that usability is the buying criteria most participants (64%) said is very important when it comes to business intelligence.

Of these new capabilities, the one most participants in our research into big data analytics identified as important is predictive analytics (78%). Organizations also told us they realize significant business benefits from applying these analytics. The benefits they cited most often are gaining competitive advantage (68%), creating new revenue opportunities (55%) and increasing profitability (52%).

Analysis of the research shows that organizations have a range of desired uses for advanced analytics applied to big data. Topping the list are to focus cross-selling and up-selling (for 38% of organizations),
better understand individual customers (32%), analyze all data rather than a sample (30%) and optimize pricing (28%).

Managing the Analytic Workload

Much of the increased volume of data that businesses today must collect, store and analyze is unstructured, including documents and text and content from websites and social media. Dealing with this sort of data poses challenges in the areas of management and integration with conventionally structured data from transaction systems. Big data systems, such as Hadoop and other NoSQL approaches, are designed to handle this variety of data as well as the enormous volumes of it and to prepare it all for analysis. However, there are many different distributions of Hadoop, and most are not readily accessible from the business intelligence systems available to business users.

These established BI systems provide users with consistent and well-defined views of their data. Typically they are built on an architecture that scales to support many concurrent users. However, they can be overwhelmed by the complex and unpredictable workloads generated by today’s flood of data. Thus there is a need to develop BI systems in conjunction with big data systems to enable advanced analytics as well as to process data.

Configuring BI to work with big data and advanced analytic applications is a challenge, but one that is being addressed. In such an integrated big data analytics environment, analysts using sandboxes can work with different data sources in the same production database environment or outside it. Increasingly, these sandboxes are deployed in cloud-based systems because the cloud can provide scalability and on-demand capacity readily. Today, cloud-based environments account for more than one-quarter (27%) of big data analytics deployments.
There are two primary uses today for such a sandbox. One is data integration and preparation. According to our research in information management, the most challenging issues associated with managing information and preparing analytic data sets for predictive analytics are rooted in the explosion of data types and sources: data spread across too many systems (67%), multiple versions of the truth (64%) and data cleanliness (58%). Advanced analytic processes can help profile and prepare structured data from internal transaction and database systems as well as less structured data such as text, documents and XML or JSON files. Some can conduct entity analytics, which automatically maps records based on their fundamental properties, helping those responsible for data integration and quality resolve conflicts in the data.

The other main use of a sandbox is statistical modeling of data. Sandboxes typically take a sample of a larger data set and use statistical inference to apply the results to the full set. This approach suits most but not all advanced analytic situations. For example, it may not work for understanding data at an individual level and to determine patterns that cannot be identified by using a random sample. Moreover, certain analytic techniques benefit from being able to model using large data sets. These include recommendation engines, unsupervised anomaly detection, some classification and regression problems and some clustering problems. For such approaches, it sometimes is necessary to integrate with big data systems.

**Adding Power through Business Analytics**

Big data systems and advanced analytics applied to underlying data can deliver capabilities – automated data preparation and model building, for example – needed to deal with the explosion of data volume and diversity. Ultimately, however, users need the insights delivered through their business intelligence systems.
Thus, to truly benefit from the power of advanced analytics, organizations must enable business people to use the analysis. This is the true purpose of business analytics. While a sandbox enables analytic flexibility with respect to data preparation and modeling, unless the insights developed within it are inserted into decision-making processes, its value is minimal.

Simplifying information for easier consumption and use is a discipline we call information optimization. Our research in this area reveals that the ability to integrate and deploy information is important or very important to 97 percent of participating organizations. The capability is driven by IT departments, which hold responsibility for information optimization in 80 percent of organizations.

Combined with forward-looking insights information optimization facilitates decision-making. Advanced BI products now include such capabilities, but many organizations still perceive it as challenging to make them work with existing systems. Our research shows that the most widespread obstacle to enterprise use of predictive analytics is integration with the current architecture (for 55%).

Solutions that help address and overcome the integration challenge offer organizations the opportunity to increase their analytic capabilities. We recommend looking for each of the following features in evaluating next-generation products.

**Scoring of records at the point of impact.** Our research shows that timely scoring is a key aspect of successful predictive analytics. 88 percent of those that use real-time scoring regularly said that they are satisfied or very satisfied with their predictive analytics, as did 73 percent that use it occasionally. When real-time scoring is used infrequently or not at all, satisfaction rates drop below 50 percent. Scoring an algorithm in real time can, for example, help sales people make appropriate product recommendations during customer meetings.
by showing the rep the product most likely to meet the customer’s immediate needs.

**Applying business rules to produce analytic results.** Scoring alone is not enough. Rules, administered through the business intelligence system itself, can speed decision-making and provide recommendations that are of higher quality or conform to regulatory requirements. If this capability is integrated and automated, the results enable business users or consumers to make better decisions even more quickly. For example, a statistical algorithm may recommend a particular product to an individual customer, but a business rule can prevent the recommendation if this product is in a durable goods category (such as a car or a major appliance) and the person has purchased one within a specified period of time.

**Integration with other systems.** Our information optimization research shows that those responsible for integrating and optimizing enterprise information primarily need to integrate it into user and security access frameworks (37%), to define, model and lay out information in applications (33%), to integrate it with operational systems (31%) and to integrate it with data management and content systems (27%). To address these concerns, advanced analytic systems should be integrated with the data models and information quality control systems that are already part of the business intelligence application.

In addition, the business intelligence system should be seamlessly connected to other applications. When it is, the information it contains can be used in the context of the other application. Technological approaches such as iframes and Web services (including RESTful approaches) allow content and capabilities to be integrated with line-of-business applications.

**System usability.** Regardless of the technology used to integrate the applications, though, it is critical that users be able work with it easily. Our research on next-generation business intelligence shows that
usability is a key buying requirement for two out of three (64%) organizations.

Attaining Action-Oriented Insights

Business intelligence is a key technology for organizations trying to use advanced analytics to enable insightful decision-making. Our research shows that three out of four organizations use BI to implement analytics on big data. The combination of business intelligence and advanced analytics provides them with a tool they can use to deal with new information types that are less structured and larger in volume.

Such a system of advanced analytics can deliver to business users capabilities such as:

- recommendation, which uses an individual customer’s behavior to provide a next best action for a company or representative;
- anomaly detection, which identifies outliers representing such things as fraud or cybercrime;
- classification and regression, which can arrange information according to historical characteristics for use in areas such as pricing, forecasting and root-cause analysis;
- and clustering, which groups data based on common characteristics for use in areas such as market segmentation and portfolio optimization.

Multiple techniques can be used in conjunction to resolve a complex issue.

Advanced analytics has potential uses for every area of the organization, including finance, human resources, operations, customer service, marketing and sales. A modern business intelligence tool set that includes big data capabilities and advanced analytics can empower businesses by providing them with not only past and present but also future views of their business.
About Ventana Research

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