

All About Analytics

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ABSTRACT

To understand and be successful with analytics, it is important to be precise in understanding what analytics means, the different targets or approaches that companies can take to using analytics, and the drivers that lead to the use of analytics. For companies that use advanced analytics, the keys to success include a clear business need; strong, committed sponsorship; a fact-based decision making culture; a strong data infrastructure; the right analytic tools; and strong analytical personnel in an appropriate organizational structure. These are the same factors for success for business intelligence in general, but there are important nuances when implementing advanced analytics, such as with the data infrastructure, analytical tools, and personnel. Companies like Amazon.com, Overstock.com, Harrah's Entertainment, and First American Corporation are exemplars that illustrate concepts and best practices.

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INTRODUCTION

There is considerable “buzz” about analytics. It is the topic of numerous articles, books, web seminars, white papers, and research reports. Many academic and practitioner conferences are focusing on analytics. There is growing evidence that analytics is becoming an important component of organizational success. Despite the attention, it is difficult to get a holistic understanding of how analytics can and should be used in organizations. Of particular interest is what organizations need to do in order to be successful with advanced analytics.

A good starting point is to explore how the analytics term is used and its relationship to business intelligence (BI). We will see that analytics is an umbrella term that includes several kinds of analytics. There are also different approaches that organizations can take to analytics. For example, some are developing a

single or a few applications while others have business models that are dependent on the use of analytics. Some companies are more analytics-based than others, because of, for example, the nature of the industry.

Most of our attention is focused on what is necessary to succeed with advanced analytics. While many of the factors are similar to those for BI in general, there are considerations within the factors that are critically different, such as the technology and people needed.

BEING PRECISE ABOUT ANALYTICS

The analytics term is used imprecisely. Sometimes it is employed interchangeably with business intelligence. Another interpretation is that if you view BI as “getting data in” (to the warehouse) and “getting data out” (data access and analysis), analytics is the analysis part of

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BI. Or finally, analytics is the “rocket science” algorithms (e.g., neural networks) and methods used to find patterns in data (e.g., customer segmentation analysis) or to optimize performance (e.g., revenue management).

It is useful to think of descriptive, predictive, and prescriptive analytics. With *descriptive analytics*, the objective is to describe *what has occurred*. With this view, reporting, OLAP, dashboards/scorecards, and data visualization are all examples of descriptive analytics. These are the core and most common BI applications.

Predictive analytics focuses on *what will occur* in the future. The algorithms and methods for prescriptive analytics include regression analysis, machine learning, and neural networks. These techniques have been around for some time and have traditionally been called data mining. While these methods continue to evolve, the most significant development is their inclusion in analytical workbenches and applications that make them much easier to use.

Prescriptive analytics is intended to show *what should occur*. It is used to optimize system performance. Revenue management, which strives to optimize the revenue from perishable goods, such as hotel rooms and airline seats, is a good example. Through a combination of forecasting and mathematical programming, prices are dynamically set for the good over time to optimize revenues.

Another perspective is that the progression from descriptive to predictive to prescriptive analytics is a movement from *hindsight to insight to foresight* (Barnes et al., 2012). First companies want to understand the past, then they want to predict the future, and then they want to optimize what they do.

In most cases, imprecise use of the analytics term does not cause difficulties. There is a problem, however, when discussing the requirements for success with analytics. The requirements for descriptive analytics are different in important ways to predictive and prescriptive analytics. We will refer to predictive and prescriptive analytics as *advanced analytics*.

Returning to the issue of the different interpretations of the analytics term, this article

uses analytics to describe the analysis of data and advanced analytics as the “rocket science” algorithms and methods of predictive and prescriptive analytics. With this interpretation, analytics is a subset of BI rather than an alternative term.

DIFFERENT TARGETS FOR ANALYTICS

Companies can have different “targets” or approaches to analytics. No one target is better for all firms, and each target can be best for a particular company depending on its situation. All of the targets can potentially deliver significant business value. These are the same targets as for BI (Wixom & Watson, 2010).

One target is to develop a *single or a few analytic applications*. These applications are typically departmental solutions and satisfy specific business needs. For example, a company may use analytics to identify customer segments for more targeted marketing campaigns. These applications are not necessarily developed in-house. There are a growing number of analytic applications and services that are offered by third parties, either as a service over the Internet or on a consulting basis. The services approach is an especially appealing option for smaller companies that do not have the necessary in-house resources for advanced analytics.

A single or a few applications is a common starting point for analytics in most companies. While satisfying a business need, the initial applications can also serve as a proof of concept for analytics. Over time, there are more point solutions and management becomes aware of the need to take a more holistic approach.

With *enterprise-wide analytics*, a company puts resources, organizational structures, and processes around analytics. The infrastructure (e.g., data, software) is created to do analytics on a company-wide basis. Given this infrastructure, analytics is used throughout the organization and is often a key to business success. Later we will discuss the various component parts of this infrastructure. From a BI maturity curve

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