Business Intelligence: Attribute and Feature Demand

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ABSTRACT

Data mining and business intelligence tools have been adding features and gaining uses, and statistical tools developed for data mining tasks often require advanced knowledge and training to apply. Development of these selected tools requires tradeoffs in ease of use and power. This study asks users to evaluate the various tools and attributes to identify the relative value of the various components and provide direction for improvements and new tools. Evaluating multi-attribute software is a challenging task, and this study provides a method of evaluating the data and analyzing tradeoffs. A structured equation model (SEM) is applied to the process. Each of the existing tools evaluated have different relative strengths, so it is important to match the organization’s primary tasks to the relative strengths of the tool.

Keywords: Business Intelligence, Data Mining, Multi-Attribute Software, Product Features, Structured Equation Model (SEM)

INTRODUCTION

Business Intelligence (BI) or data mining tools appear to have become more popular in business. Yet, BI tools are unlike most other information technology (IT) tools because they typically require someone with statistical training to configure the systems and interpret the results. Although some BI tools run semi-autonomously, users still require training and statistical knowledge to interpret and apply the results. BI tools are also relatively young, offering a highly diverse set of functions and analyses. In fact, there is probably little agreement on what techniques and tools constitute a BI collection.

The overarching goal of this study is to see if businesses have identified a standard set of functions and features that are needed in a BI tool. The methodology presented here is generalizable to other types of multi-attribute software to evaluate tradeoffs. The method requires participants who actually use the software to identify features they use. The analysis then shows which features are the most important, evaluates how well existing tools support the features, and reveals how the tools are being used.

Considerable research has been conducted in terms of defining tools and computational methods. Hand, Blunt, Kelly, and Adams (2000) present a general introduction along with examples and potential problems. Hastie, Tibshirani, and Friedman (2009) present an ex-
Excellent coverage of the primary techniques and the computational methods. Many writers have discussed applications of the tools to various projects and categories of problems. Although several vendors sell data mining (DM) and BI tools, little work appears to have been done on comparing specific tools and evaluating the features. Some basic work has been done similar to King et al. (1998) who compared various DM tools by having novices test them against standard datasets. Similarly, although several case studies exist, limited research has been conducted to determine how businesses are applying the tools or to identify which features and elements are important to BI users.

Mathie (1998) argues that engineering and design processes within a business environment are oftentimes not evaluated due to the complex nature of the process and the lack of identifiable critical success factors by management. Furthermore, this research indicates that firms implementing data warehouse (DW) applications fail to recognize the need for real-time data access within the context of facilitating data from numerous sources in an effort to perform the complex analysis necessary to build a DW process.

Hayes (2006) identified certain basic tools and features of the BI tool set. Some generic marketing-based comparisons have been made, but researchers have seldom reported evaluations conducted from actual users. Wixom and Watson (2001) have examined various factors affecting the adoption and implementation of data warehousing and BI tools. Many of the prior studies tend to be oriented towards internal issues—particularly since data-cleaning is a critical element in any BI project.

Folinas (2007) proposes a conceptual BI framework model along a Business Activity Monitoring (BAM) systems paradigm. The BAM approach was developed to alleviate certain constraints associated with the BI architecture. The primary constraints mentioned are the cost and complexity of establishing a data warehouse environment (extensive training and deployment). Heterogeneity of the data sources cause data conversion and extraction challenges that are time-consuming to resolve. Typical BI tools are not designed for business end users or managers (technical users are better served). Database design and conversion tools based on the specific implementation can become a factor in an indirect data conversion as well. Other researchers have identified similar BI challenges particularly pertaining to data warehousing (Lau & Yen, 2001; Wixom & Watson, 2001). Corral, Griffin, and Jennex (2005) discuss the design aspects of DM from the concept of integrating knowledge management with data warehousing. Typically firms tend to treat information sources within data silos as opposed to integrating the information acquisition and refinement process.

Data mining and the BI tool approach has been applied to many business applications ranging from banking and financial applications, customer resource management (CRM) processes, insurance, credit card programs, business services and information technology and web service applications (Sung, Chang, & Lee, 1999; Smith, Willis, & Brooks, 2000; Adams, Hand, & Till, 2001; Drew, Mani, & Datta, 2001; Cowan, 2002; Garver, 2002; Hui & Weigand, 2004; Hou & Yang, 2006; Kusiak, 2006; Olson, 2007). In each application the DM design has introduced a rapid method of complex data analysis to mitigate ongoing business concerns.

Integrating the concepts of Web-based data mining tools and business models to enhance the capability of knowledge workers improves the strategic performance of the firm. This approach supports the implementation of a strategic direction for BI processes. Tools of this type can provide a sustained competitive position for the firm if a business cannot rely on BI tools without proper design and knowledge worker acceptance of the toolkit array. Heinrichs and Lim (2003) reports that for business intelligence tools to be useful for complex business decision-making, collaboration with business and information integration must be put into operation. Support for development and control are critical.

Business firms that apply knowledge management and business intelligent tools must...
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