Overview of Business Analytics

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INTRODUCTION

Focus on business analytics has increased steadily over the past decade as evidenced by the continuously growing business analytics software market. Business analytics is reaching more organizations and extends to a wider range of users, from executives and line of business managers to analysts and other knowledge workers, within organizations. In an environment of increasingly faster growing data volumes where operating on intuition is no longer an option, business analytics provide the means to both optimize the organization internally and at the same time maintain flexibility to face unexpected external forces.

DEFINITION OF BUSINESS ANALYTICS

Business analytics includes software and business processes that enable organizations to apply metrics-based decision making to all functions ranging from supply chain and financial management to workforce and customer relationship management. Business analytics software comprises tools and applications for tracking, storing, analyzing, and modeling data in support of decision-making processes. This software market includes both application development tools and packaged analytic applications. The tools segments of the market include data warehouse generation, data warehouse management, business intelligence, technical data analysis, and spatial information management tools. The applications segments of the market include CRM, operations, financial and business performance management analytic applications. In 2002 the worldwide business analytics software market stood at $12 billion and is expected to grow at a compound annual growth rate of 6.0% over the next 5 years.

BENEFITS OF BUSINESS ANALYTICS

By implementing transaction-processing systems ranging from ERP, CRM, SCM, and eCommerce applications, organizations have taken a big step towards automating business processes. Business analytics software enables organizations to monitor, capture and analyze the vast amounts of data generated by these applications and provide management and staff at all levels with tools necessary to optimize these processes through strategic and tactical decisions.

“Financial Impact of Business Analytics” – an ROI study conducted by IDC in 2002 evaluated return on investment of business analytics projects at organizations throughout North American and Western Europe. The results showed that the median overall return on investment from business analytics projects was 112% with 49% of the organizations deriving benefits within one year. However, the ROI of business analytics projects impacts also return from other enterprise application projects. A CRM analytic application, for example, has direct ROI implications for the analytic and operational CRM components and is the engine that drives return beyond the productivity gains achieved from initial automation of marketing, sales or customer service processes.
In this series IDC will present a value chain of business analytics processes and software drawing on industry best practices. These processes span project planning and implementation, data integration, data warehouse management, business intelligence and advanced analytics. Each section will focus on one step in the value chain as depicted in the IDC's closed-loop model.

CLOSED-LOOP MODEL

Increasingly companies are looking for technology that will help them move beyond the automation of transaction processing functions and production processes. The objective is to increase the level of intelligence across the organization through historical insight and the ability to anticipate adverse events. To this end, companies are enhancing the efficiency gains of ERP, CRM, SCM, and eCommerce applications by monitoring, analyzing, and optimizing these processes via business analytics. Business analytics software helps organizations answer questions such as:

- Who are our best suppliers or most profitable customers?
- Should we extend credit to a particular customer?
- Which customers are likely to become profitable, when and to what extent?
- How do we optimally allocate resources to ensure profitability and growth targets?
- What are the root causes of quality issues and can we cost-effectively minimize them?
- What factors or combinations of factors are directly impacting marketing campaigns?
- How do we maximize learning from repeated processes for continuous improvement?

These questions require analysis of data from internal transactions as well as external sources. By implementing business analytics software, organizations are able to leverage their existing investment in transactional applications, while avoiding costly mistakes due to "gut feel" decisions made without solid information.

Combining transactional and analytic processes results in a closed-loop model as shown in Figure 1. This model displays the relationship among tasks in a business process supported by transaction processing applications ("Adjust/Act" and "Track") and analytic applications ("Analyze" and "Model"). The policy hub ("Decide") represents the decision-making process, the critical link from analytics to operations.
The five major steps of the closed-loop model include:

1. **Track.** Extracting, transforming, loading, and integrating data into a data warehouse as well as monitoring data in a real-time or near real-time environment.

2. **Analyze.** Analyzing the data using business intelligence tools such as query and reporting, multi-dimensional analysis, and data mining.

3. **Model.** Formulating models for forecasting, optimization, and scenario planning utilizing advanced analytics tools. Descriptive and predictive statistical methods are used to scores and other models used in decision making.

4. **Decide.** Arriving at a decision based on analysis and pre-existing or newly developed models that combine individual and group input facilitated by collaboration tools or personal interaction.

5. **Act.** Acting on the decision based on the particular business process being addressed. Examples include launching a new marketing campaign based on the analysis of previous campaign results, customer behavior, new promotional plan or inventory levels. Approving or denying a request for credit based on past financial activity. Re-negotiating sourcing contracts based on supplier delivery trends, product quality, and warranty activity trends, adjusting the type of data being tracked for analysis, etc.
BUSINESS ANALYTICS SOFTWARE

The closed-loop model is supported by several software components, which act as building blocks in creating an enterprise wide analytics infrastructure. While the components vary in their functionality, they depend on each other. The extent to which the building blocks are integrated has a direct impact on the implementation and subsequent ROI of the business analytics solution.

In a typical system, data created and managed by the ERP, SCM, CRM or other transactional applications is extracted, transformed and loaded using ETL tools into a data warehouse. At this stage, data quality tools are applied to improve the accuracy of the data. Once in the data warehouse, the data is available for analysis using business intelligence tools such as query, reporting and multi-dimensional analysis or OLAP. Although this analysis provides decision makers and other information consumers with a view into ‘what happened’, it neglects to provide insight into what decision to make and what impact that decision will have. To address these questions, organizations rely on decision modeling. In this step advanced analytic techniques are employed to create rules, scores or other models that will guide the decision making process.

These techniques include forecasting, scenario planning, optimization and risk analysis. Without the modeling process, the impact of decisions is difficult if not impossible to quantify. The results of advanced analytics are then made available to other users and applications through reporting and multi-dimensional analysis tools and presented in various process specific analytic applications. While the closed-loop model is sequential in principle, individual steps don’t always follow a strictly sequential pattern.

Another example, of this is real-time event monitoring and alerting, where data captured from transactional systems is matched against pre-existing rules and then presented to appropriate end-users through alerts. In this case the ‘Analyze’ step as described above is skipped while reporting tools are used to deliver alerts to users desktops or PDAs in real-time.

When implementing a business analytics infrastructure, organizations need to consider the interactions among the various software components. While in some circles arguments persist about the benefits of one type of software over another, the market reality today dictates that the value chain is a set of complementary building blocks with data warehouse generation and management tools forming the foundation of the business analytics architecture. For example, data mining tools are not better or worse than OLAP or reporting tools. They serve different functions and cater to different end user groups.

Successful business analytics projects are based on a plan that balances an iterative approach to implementation with a long-term view towards meeting increasingly demanding requests from a growing end user population.

COMPETITIVE ADVANTAGE

The closed-loop model can be applied to all decision-making processes. These include:

- Strategic decision on whether to:
  - Acquire another company.
  - Enter a new geographic area.
- Launch or discontinue a product line.
- Tactical decisions on whether to:
  - Shut down a production line due to product quality issues.
  - Close someone’s credit card account due to suspected fraudulent activity.
  - Target a set of prospects with a new marketing campaign.

The time it takes the decision maker to traverse the closed-loop will differ from instantaneous (automatic closure of a credit card account based on pre-existing rules) to lengthy collaborative decision-making meetings in the case of strategy formulation. However, in all cases the goal is for organizations to develop an environment which reduces the time it takes to traverse the closed-loop, enabling more timely, insightful, and accurate decisions in light of changing business conditions.

Compression of the track-analyze-decide-act timeframe has always been the basis for competitive advantage. However, speed without insight and accuracy may lead to faster but erroneous decisions and actions. Therefore, advanced analytics and data quality are critical success factors, and when combined with speed, create competitive advantage. Insight, speed and accuracy must converge to create opportunities for competitive advantage. This can take the form of lower manufacturing costs, ability to under-price competition, to retain most profitable customers, to increase product quality and decrease service costs. However, today this convergence is by no means a given in most organizations. In fact, a ‘Learning Gap’ exists that inhibits the realization of the full potential of the benefits of business analytics in the closed-loop systems.

**LEARNING GAP**

The “Learning Gap”, as shown in Figure 2, manifests itself in the disconnect between the steps involved in data analysis utilizing traditional BI tools, and the advanced analytics and collaboration tools that drive modeling and decision making functions. In this case ‘Learning’ refers to both learning from past actions and decision, and the ability to gain insight from data by using advanced analytics.

Traditional BI steps are concerned with answering the question “What happened?” through the use of ETL tools for extracting data from the transactional systems and analyzing it with query, reporting, and OLAP tools. On the other hand advanced analytics are concerned with answering the questions such as ‘Why did something happen?’ and ‘What will happen?’. The tools employed in advanced analytics are data mining and statistical software used for forecasting, scenario analysis, and optimization.
The two steps should coexist and complement each other as two adjacent building blocks of the whole business analytics value chain. Furthermore, they must create cross-referencing processes that build on each other’s strengths all the while capitalizing on the strengths of the underlying ETL and data warehousing architecture. This forms the basis of successful implementations of business analytics.

To make each step in the process more intelligent organizations must cross the “Learning Gap” by linking basic business intelligence capabilities with advanced analytics and back to transaction processing systems. To do so, organizations need to focus on each step of the closed-loop model and the software associated with it, while considering the benefits of integration among these technologies.