

Business Analytics IN AN ACTIVE WORLD

Strategic and operational intelligence combine to form the business DNA.

by Arlene Zaima and Dave Schrader

For many businesses, making fast, smart, consistent decisions across the enterprise requires more than a traditional data warehouse or data mart. It requires an approach that converts information into insights and drives insights into actions. Active strategic intelligence can help identify the building blocks of a successful business model while active operational intelligence brings them to life in front-line decision making. (See figure, page 26.)

The goal of active strategic intelligence is to use data to glean insights. These insights help organizations understand and predict customer behavior, improve business process flows, and spot business trends.



Traditional data warehouse users such as executives and marketing, financial and supply chain analysts leverage a range of analytic techniques in the back office to create reports, analyze data, predict behaviors with modeling tools and drive plans. As fresher data from across the enterprise becomes available, these processes become more active, resulting in more up-to-date corporate reports and online scoreboards, quicker insights and predictions—and, if needed, alerts that plans are incorrect and need to be revised.

Active operational intelligence, on the other hand, is about taking action. This involves sensing the need for front-line decisions, applying strategic analytics discovered by the back office to the situation and responding in a consistent way that achieves the corporate goals. It's about the operational procedures of front-line employees such as call center agents, cashiers, bank tellers, airline check-in agents and dock workers and can also be applied to improve the processes of automated systems, such as Web sites, self-checkout systems and bank ATMs.

Today, putting operational and strategic intelligence together is difficult for most companies. For example, a call center agent fielding an inbound call probably does not see on her screen what a caller was just doing on the corporate Web site, and she likely will not be able to benefit from a strategic insight like the next-best-offer recommendation for that customer based on the Web-browsing activity—but she could!

Active strategic intelligence

Building a system to drive insights into actions (e.g., convert strategic intelligence into operational intelligence) is not easy. Many businesses struggle to achieve even basic strategic intelligence because of challenges imposed by their current environment such as:

- Data marts that provide different views of the business

- Processes that prevent analysts from accessing valuable details behind summary reports
- Tools that are simply not suitable for business analysts

Many businesses address these issues by placing a heavy burden on IT workers to be the gatekeepers of the data, where it's their responsibility to identify, gather and supply integrated data for each business user request from numerous information sources. The alternative is integrating business data in one centralized data warehouse, which allows businesses to leverage business analytic tools together with the data warehouse and provides the foundation for high-quality, accurate and timely strategic intelligence to drive business operations.

State-of-the-art active strategic intelligence includes advances in the following techniques

for reports, analysis and predictive analytics to create actionable plans:

Report

Typically, businesses start with reports to track the state of business and uncover business challenges and areas that need further analysis. Over the years, reporting processes have become sophisticated, moving from traditional hard-copy reports available at the end of the day or week to online reports that allow business users to analyze key performance indicators (KPIs) and drill down for instant analysis. Reports can be integrated into dashboards so business executives can keep their fingers on the pulse of their businesses. Active data loading, often in intra-day batches or trickle-feed mode, drives active reports with alerting capabilities, linking strategic report insights to actions. For example, if the sale

Highmark Inc. case in point

Active strategic intelligence: Fraud detection

At Highmark, one of the largest health insurance companies in the United States, the Informatics group helped its special investigations unit discover fraudulent insurance claims and payments by analyzing patterns from previously identified fraud schemes. In one year, this group used Teradata to find and recover more than \$9 million in fraudulent claims that had been reimbursed, roughly a four-fold increase over the previous year. However, recovering funds after the fact is a very costly operation, so the Informatics team developed a predictive model to catch potential fraud while processing claims *before* they are paid, generating a savings of \$25 million.

Active operational intelligence: "Health coaches"

Highmark analysis showed that controlling manageable illnesses such as diabetes and

heart conditions could help control insurance premiums and improve service to customers. The company began identifying members with chronic conditions who are eligible for condition management programs. This led to customer communications—calling customers, mailing reminders and performing intervention—designed to keep members healthy. Over time, through predictive analytics, Highmark eliminated false positives, shrinking the original list of 35,000 potentially diabetic patients by one quarter. Highmark now uses this approach as an operational service to its members. As a member is discharged from a hospital for diabetes complications, a trigger goes off in the system to call the member to get enrolled in a condition management program or to connect the patient with a health coach.

By focusing resources more effectively, Highmark keeps fraud down and ensures that people receive needed care.

—A.Z. and D.S.

rate of a particular retail item like milk suddenly drops well below a forecast, the store manager can investigate to determine whether there's an out-of-stock situation or possibly a spill preventing customer access to the product.

Data visualization is another business analytic technology for quicker reporting and analysis. There's a wide range of data visualization techniques, from simple bar chart graphs to advanced data visualization techniques, that synthesize massive quantities of data in an easily understandable single-screen view. Using these tools, a retail store manager can easily see and understand which products sell well at which times of day or days of the week. With 300 products, a two-week sales interval and sales figure updates 10 times per hour, the manager can animate 500,000 transactions at 15-minute real-time intervals to generate color heat maps that show when and where products are flying (or not flying) off the shelves. As a result, the manager may take action to launch in-store specials and announcements ("Brand X special on Aisle 3!") or modify

this week's newspaper promos ("Let's make banana bread!").

Analyze

Reports provide a snapshot of your business and help you uncover anomalies that require the next level of analysis to understand why things went wrong. Most businesses have incorporated online analytic processing (OLAP) techniques to uncover the reasons behind problems. By drilling into data details based on common business dimensions, business analysts can quickly discover why a product promotion isn't working or why it's attracting non-targeted customers.

OLAP tools are interactive and require query response at the speed of thought. For example, a computer retailer placed a home computer package on promotion. Reports showed an increase in sales; however, one region was out-performing the others by a huge factor. The business analyst quickly used OLAP to drill down into that region's sales data and discovered that success was spectacularly out of the ordinary at one store. She called to find out what this store did differently: Employees

there had opened the box and created a simple display that showed all of the components of the computer, whereas other stores displayed just the box itself. As a result of this insight, the business analyst immediately notified all store managers to arrange a display, which increased sales across the board.

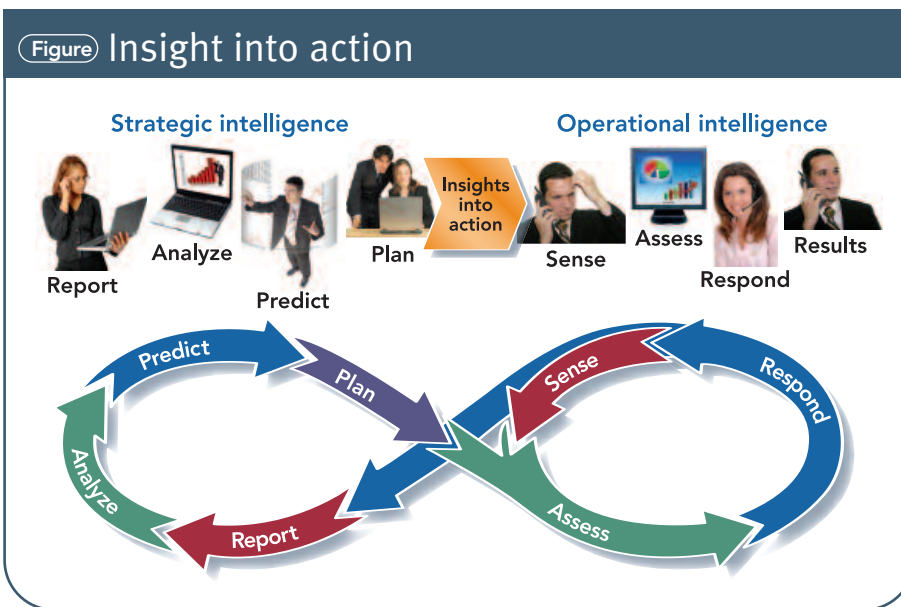
Predict

The next step beyond simple OLAP is predictive, or "what if," analytics. Users are not just analyzing what *has* happened but also predicting what *will* happen by searching for patterns in historic data to predict behavior and trends. For example, descriptive techniques such as clustering are used to group customers into segments based on similar buying patterns and behavior. Predictive techniques can determine who is most likely to purchase a product or service or even cancel service. These techniques help businesses maximize their marketing dollars and also minimize loss.

Predictive analytics are used in strategic applications such as forecasting and customer relationship management, but the same intelligence can often be integrated into an active environment. Fraud detection is a great example of an active application of predictive intelligence. It requires complex analysis of historical data to establish fraud patterns against which to compare current claims. In the insurance industry, incorrectly identifying behavior as fraudulent can cost an insurer a high-value customer. To prevent this, a savvy analyst can use historical data to refine general-purpose models with each customer's normal behavior, which can avoid embarrassing and costly mistakes.

Library of reusable strategic insights

The final part of active strategic intelligence is considering how to create a library of your insights so that others can use them. Have you thought about all of the insights your knowledge workers could create, and



Techniques such as reporting, analysis and predictive analytics are used to derive insight that is put into a plan of action. During the operational phase, an event is sensed, allowing the front-line employee using the insight to respond to maximize the value of the interaction. The result is a higher business value and better customer relationships.

how making those available to your front-line workers and systems could improve decision making?

Most industries can benefit from customer interaction detail such as a next-best-product recommendation or customer-complaint index, or deeper insights such as churn probability, risk of payment default or fraud alert. Similarly, marketing and financial analysts can benefit from instant access to existing customer equity scores and lifetime value predictions, loyalty to brand and churn probability scores, as well as product price elasticity information. Supply chain managers have their own sets of needed insights, including expected shipment duration for product delivery.

Depending on your business, you can build an insight library that captures strategic insights in one place, easily accessible and well-described so everyone in your company can benefit.

Your business processes will determine how up to date the insights need to be. For example, you may want to re-compute the next best product for a customer after each market basket lands in the data warehouse. Some metrics, such as customer equity, are slower-moving and can be computed periodically, maybe monthly. In other cases, it might make sense to bring information up to date continuously. If someone who just bought your product an hour ago is on your Web site, four levels deep, trying to figure out how to install the product and failing, you may want current information in the database so if that person calls your help desk your call screens are up to date with the purchase information and some insights on how to help him or her.

Use the library in operational processes

It takes discipline to build an insight library, but once it's in place, you are ready for the payoff: seeing those insights used by a wide variety of groups in your company. Some users may be other strategic knowledge

workers. For example, finance or corporate employees may want to use your insights in dashboards to virtually close the books at any point in a quarter before the real close or as part of business performance management alert rules.

Other users will be front-line people and systems. The cashier at a store may see additional on-screen messages when completing the payment portion of a transaction, directing her to ask additional questions to detect or prevent fraud. Or, a kiosk at a check-in station at the airport may notify you of a new seat assignment

Insight index

The insight library should include points derived from strategic analysis of customer, supplier and financial information in an enterprise data warehouse. A typical list of valuable insights, adapted from "Leveraging Data Integration and BI Services in Service Oriented Architecture," by Mike Ferguson, managing director of Intelligent Business Strategies Limited, might include:

- > Best product for a customer
- > Segment score
- > Churn predictor
- > Risk analyzer
- > Customer loyalty score
- > Relationship price optimizer
- > Credit limit increase approval
- > Best prospect to call next
- > Services workload balancing
- > Supplier scorecard
- > Probable fraud alert
- > Most likely cross-sell deal
- > Risk threshold early alert
- > Cash flow—early warning
- > Key performance indicator dashboard metrics
- > Pick/pack/ship efficiency score
- > Labor shifting recommendation
- > Regulatory compliance alert
- > Repair-returns rate
- > Credit limit exposure

because of a change of plane type for your connecting flight.

To deploy insights, you'll need to build plans of action with the owners of the operational systems. Business owners and application programmers will need to decide how and when to incorporate insights into their business workflows. You'll also need to work with architects and systems programmers. If your systems are old, or "closed," custom modifications may be needed to take advantage of strategic insights. Newer call center, Web, teller and cashier systems built using service-oriented architecture principles can easily be modified to invoke Web service insights as part of process workflows.

It's likely you will face new service level agreements for performance (e.g., 99.5% of the customized queries must come back in less than one second). As such, you will need to architect the system to achieve these performance goals. In some cases you may pre-compute the analytics and cache them in the front-end systems. In other cases, you may find it easier to do a round-trip to the data warehouse to either retrieve a pre-computed score or even make the computation part of the application flow so that the information is absolutely up to date. It depends on the business need for insight freshness.

Converting information into insights and insights into action involves using up-to-date data and strategic analytical tools to derive many useful business nuggets of insight from your data warehouse. Building a library of these, then using and re-using them to improve front-line operational decision making, is the essence of active enterprise intelligence. **T**

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