



Forecasting the future

Business intelligence software and predictive analytics are more effective than a crystal ball when it comes to demand forecasting

Knowing how many transactions took place is not the same as understanding why they took place and how to use that information in the future

Today's shoppers have more retail choices and more detailed product information than ever before. Any business that sells tangible goods must address a burgeoning online marketplace while attending to other, traditional channels such as bricks-and-mortar stores, tracking inventory, managing supply chains, and staying on top of the latest buying trends so that they can develop effective merchandising plans.

Business intelligence (BI) software can help you overcome these challenges by synthesising information and making strategic use of corporate data. In conjunction with predictive modelling capabilities, BI solutions can not only provide a clear picture of past occurrences but shed light on the future as well.

Leading retailers use BI to determine where to place retail outlets, how many of each size or colour of an item to put in each store, how much square footage to allocate to each category, when and how much to discount slow-moving inventory, and many other issues. They use predictive models to exploit patterns found in historical and transactional data so that they can identify risks and opportunities, such as how to forecast demand and which prospects to target with new marketing campaigns.

As business management guru Peter Drucker famously said, what cannot be measured cannot be managed. In addition to what happened yesterday or last week, managers are anxious to know what will happen tomorrow. What will be the demand for a new product or service? How much revenue can we expect from our various channels? Which customers will be interested in our new line? Retailers intent on answering these questions are partially responsible for the increasing adoption of business analytics software.

BI solutions work by consolidating information from a variety of sources, including point of sale, inventory, and customer relationship management (CRM) systems, then leveraging it to inform vital activities, from inventory tracking and sales analysis to vendor performance monitoring and demand forecasting. Predictive analytics, also called forecasting, is a branch of BI that provides the foundation for demand planning, inventory

planning, budgeting, and many other forward-looking activities.

Until recently BI tools were used primarily by power users and skilled systems analysts, but today's BI solutions deliver actionable information to employees in a broad range of departments. For example, merchandising personnel use BI to optimise the selection, placement, and promotion of merchandise among sales channels and locations. Warehouse managers use BI to help stores stock high-selling items and determine how long it will take to replenish inventory. Executives use BI to monitor key performance indicators such as return on invested capital, same-store sales, margin, sell-through, turnover, customer satisfaction, and shareholder value.

Knowing the score

Correctly forecasting sales—also known as demand planning—is the holy grail of BI for retailers. Forecasting is one of the trickiest aspects of running a retail operation, and it's also one of the most important, since it affects so many facets of the business. When popular items are out of stock, a company loses money and annoys customers. Conversely, overstocking items raises inventory-carrying costs and puts an unnecessary strain on production and distribution partners.

Before a business can make predictive modelling applications available to merchandisers, it needs to eliminate their complexity—and given the multitude of variables, parameters, and rules, modelling tools can be very complex indeed. You can simplify them, however, by giving merchandisers and buyers intuitive scoring applications, which allow them to generate predictions simply by selecting parameters from a web form.

The accuracy of these predictions is based on three variables:

1) **the quantity of detailed historical data available.** Incorporating large amounts of historical data into the assessment process increases the precision and accuracy of the decision—or to put it in the most basic terms, the more information you have about past purchases, the better you can determine whether a person is likely to buy a specific product in the future. Consider an electronics



retailer that sells a wide variety of products. If it runs a loyalty-card programme, it can capture members' transaction data and then use the data to model which consumers are likely to buy computers or home theatre equipment or handheld devices.

2) the correct assessment of the importance of each factor within those historical data. This involves using mathematical algorithms to assign weights to each factor that affects a particular outcome. The more variables that influence an outcome, the more difficult it is to decide which factors are more important than others. Assess the relative weight of the factors correctly, and you have a highly effective modelling and scoring tool.

3) the automation of data collection, forecasting, and risk assessment. As you no doubt know, processing large amounts of data and assessing the relative importance of each variable is not an easy task. It takes time and requires special skills. Merchandisers and other operational users don't have the time, the know-how, or the functional responsibility to analyse data in such a manner. They need to make decisions quickly to do their jobs. This is where the latest software tools come into play.

Pulling it all together

Because they are built upon highly specialised technologies, statistical software and predictive modelling tools have historically been quite expensive. This is no longer the case. The rising popularity of open-source software such as the R modelling language has created affordable alternatives to commercial packages. A BI environment that supports the R language lets retailers create models and distribute them to end users as they would any other BI function—through a familiar interface that uses forms, charts, maps, and dashboards.

Businesses have invested in many types of information systems, from supply chain and inventory management to transportation management, planning, and merchandising. But knowing how many transactions took place is not the same as understanding why they took place, what factors influenced the outcome, and how to use that information in the future. It's no wonder that nearly 60 percent of retailers surveyed by AMR Research last year said they wished to expand, improve, or replace their existing BI capabilities to obtain centralised information for timely decision-making.

An integrated BI platform extracts information from multiple sources and transforms it into forward-looking insights that can increase revenue, profitability, and effectiveness. When used within a predictive modelling environment, that information can help managers formulate a comprehensive

picture of future business trends. Having timely and accurate forecasts can lead to better decisions based on sound predictions of the future.

While spreadsheets provide a rudimentary understanding of these variables, they can't provide reliable answers from a multitude of systems, let alone create predictive models and deliver them to all pertinent users.

If managers can assemble accurate information about the future, they can proactively structure workflows and allocate resources to maximise productivity and profits. The more precise the projections, the greater the profits. Without predictive modelling, managers can only guess at what will happen based on past experience.

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By Dr Rado Kotorov

BI in brief

Business Intelligence solutions enable retailers to conduct the following types of analysis:

- customer profitability—projecting the initial sales curve and lifetime value of a customer relationship
- channel usage and profitability—assessing and predicting the most suitable and efficient channels for each contact activity and each customer
- product preference and profitability—assessing value and return on investment on a product basis across customer groups and channels
- bundling/cross-selling/upselling—identifying products that complement each other or will sell well together
- customer loyalty and churn—monitoring which customers are loyal, which are likely to leave, when they are likely to leave, and what factors influence their decisions
- demand forecasting—generating reliable estimates of short-, medium-, and long-term demand
- market-basket analysis—assessing links and patterns in the choices customers make to maximise conversions on websites
- customer segmentation—dividing the customer base into groups that share common characteristics
- event-trigger analysis—discovering correlations between events, such as demographic changes or holidays
- marketing optimisation—incorporating information about customers, offers, and channels to devise campaigns that pull well
- buyer preference analysis—conducting thorough analysis of market baskets, shopping patterns, and lifecycle purchase histories
- demand planning—using detailed planning and forecasting scenarios to anticipate demand across stores and channels for each item sold.—RK