



Data mining and statistics

Gain a competitive advantage

How do you uncover patterns and trends in the mountains of data your organization accumulates? Today, more than ever, advanced analytical methods are the secret weapons of many successful businesses. By employing advanced analytical methods in data mining, businesses increase revenues, maximize operating efficiency, cut costs and improve customer satisfaction.

Applying advanced analytical methods is the most effective way your organization can get a return on its investment on the large amounts of data you have collected. Managing your business effectively requires more than warehousing data and mining it with queries and reports. You need data mining tools and techniques that are capable of uncovering patterns and trends.

The scope and depth of SPSS' analytical capabilities is complementary to the access and summary capabilities of query and reporting tools. SPSS offers advanced analytical capabilities in those areas where the software must go beyond a polished summary presentation of the data, such as predictive modeling and segmentation. To understand your numbers in context and make the most of your data, you must use advanced analytical methods, such as statistics. There is no way around it.

Statistics make it possible for you to build predictive models or develop classifications that impact your bottom line. For example,

- a leading telecommunications company saved \$1 million last year in phone repairs by finding a trend in the type of repair problems and making a process shift to address this.
- a chain of bath and beauty products increased its direct mail response rate by an estimated 250 percent and grew its chain from 18 to 165 stores by finding groups of customers.
- an industrial components supplier saved \$80,000 in sales expenses by finding patterns in clients' needs and predicting purchase habits.
- a financial institution developed a credit-scoring model that forecasted a decrease in loan defaults of \$2 million to \$2.5 million on \$10 million of loans per month.

In this white paper, we explore how an advanced analytical tool helps you mine your increasing volumes of data and help you get a return on your data warehousing investment.

What value can you get from doing better analyses?

With advanced analytical methods, you can answer the questions that make a difference. A summary report can answer, "Which region sold the most last month?" Advanced analytical methods can answer "Why did they sell the most last month?"

Answering "why" tells you what factors caused the region to sell the most, empowering you to make changes so you can increase your organization's competitiveness. For example, one software company uses statistics to help manage its sales force productivity. The company used to produce standard reports that only showed the average transaction value.

If their analysis stopped there, they would draw the conclusion that they have an average transaction value of just over \$1,000 and would build their business plans accordingly and miss the opportunity to increase sales by \$2.1 million.

By using statistics to take their analysis one step further, they gain a better understanding of their data. The boxplot shown in Figure 1 displays the average, minimum, maximum and distribution of the data for each sales person on one chart.

After reviewing the boxplot, the company realized there were two distinct patterns:

- One group of sales representatives had relatively small revenues per transaction and little variability between the size of their deals.
- Another group of sales representatives had higher revenue and wide variability between deals.

This insight led the company to further analyze their data because they suspected that length of time to close a sale could also be an important factor to consider. Therefore, they investigated the relationship between length of time to close a sale and the revenue per transaction by sales representative.

The scatterplot shown in Figure 2 illustrates that the company has two different types of sales occurring: small transaction value and short sales cycle as well as large transaction value and long sales cycle. Consequently, they reorganized the sales force into two groups. The new group consists of junior representatives who handle immediate, lower-value sales. The second group includes more experienced sales representatives.

These representatives focus on the longer, higher-value opportunities. This shift has increased sales by \$2.1 million and improved the close ratio for the senior representatives.

With advanced analytical methods such as statistics, you can develop hypotheses about your business and test them, create predictive models, find clusters in your database, discover associations between activities and review deviations.

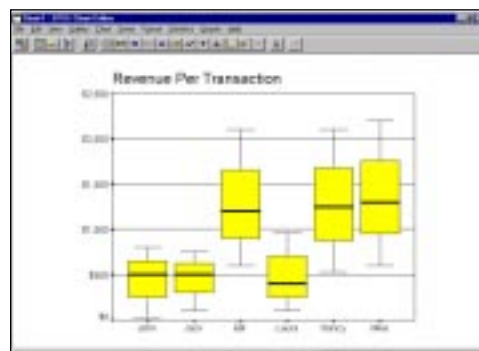


Figure 1. This is one of several boxplots illustrating a subset of sales representatives. As described in the text, it shows there are two distinct patterns occurring when reviewing revenue per transaction by sales representative.

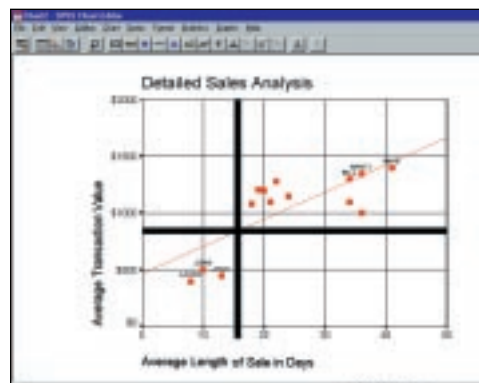


Figure 2. This chart clearly shows there are two different types of sales occurring: small transaction/short sales cycle and large transaction/long sales cycle.

Without statistics, there is no effective analysis. Without effective analysis, there is no business intelligence. Without business intelligence, how can you hope to assimilate gigabytes of data and consistently make decisions that will keep you ahead of your competition? With statistics, you can transform your data into knowledge about your business processes.

Data mining with statistics benefits every aspect of your business

Using statistics in data mining can significantly impact all areas of your organization.

Statistical software can improve your competitiveness from the shop floor to the sales floor to the executive floor. Some applications where statistical analysis is having a significant impact in organizations today are:

- Relationship marketing and mass customization techniques increase revenue
- Credit scoring develops more effective risk management
- Database analysis creates predictive models yielding more effective marketing programs
- Customer attrition analysis leads to more effective revenue planning
- Customer value analysis increases repeat business at a lower cost
- Sales forecasting results in more efficient manufacturing planning
- Sales territory evaluations create better coverage of sales opportunities
- Payable analysis leads to more effective cash management
- Product line performance rationalizes or expands product offerings
- Employee success analysis makes recruiting personnel more effective
- Customer service analysis eliminates sources of errors and complaints
- Customer support analysis results in most effective staffing levels to meet demand

If you are comfortable with statistics, you can use SPSS for interactive analysis right out of the box. If you are less familiar with statistics, the front-end of SPSS can be customized so all you have to do is click on a menu choice, such as market analysis, and SPSS will do the analysis in the background for you.

How companies benefit from mining with statistics

A leading telecommunications company uses statistical analysis to produce results for high-level executives that impact company-wide decisions. They use statistics almost daily on issues with the potential to affect nearly 10,000 employees in five states.

By analyzing data, they find ways to improve processes that reduce costs, increase overall customer satisfaction and strengthen their position in the market. For example, they wanted to reduce the number of repeat visits their repair technicians made.

They used SPSS to analyze data to determine what variables had the most impact on repair repeats. In the end, changes to the repeat repair process significantly reduced expenses and increased customer satisfaction: the telecommunications company will save about 15,000 dispatches annually.

A chain of bath and beauty specialty stores wanted to gain a stronger presence in the market with more stores and a larger customer base. Specifically, it wanted to increase its customer database to attract more customers through direct mail.

It investigated opportunities by overlaying its customer database with purchased census information as shown in Figure 3. They built a statistical model that classified their best customers.

After testing lists of prospective clients against this model, the chain increased its direct mail response rate by an estimated 250 percent. This effective targeting helped the chain grow from 18 to 165 stores.



Figure 3. This scatterplot is one of many charts illustrating the overlay between characteristics of current customers and the census population data.

An industrial components supplier planned to attack a new sector of their target market but needed to ensure they didn't waste their telesales effort on unprofitable prospects.

To find the best prospects, the sales force used statistics to help them analyze and order every possible combination of attributes. By applying this information they determined which prospects weren't worth a telemarketing call. This alone saved the company \$80,000.

Prospects who were called produced a success rate close to the anticipated 15 percent. This is a better rate than achieved prior to using statistics. The company was so encouraged by the process, they continue to use statistics for profiling and segmenting the customer base. Today, SPSS is a vital element of their database marketing analysis.

A large financial institution has found a unique target market in its loans division: offering car loans to high-risk applicants. To offset this risk, the bank uses statistics to develop a credit-scoring model that evaluates prospects and charges them interest based on their potential risk.

By performing credit-risk analysis, this bank forecasts a decrease in loan defaults of \$2 million to \$2.5 million on \$10 million of loans per month. They have also reduced their uncertainty because they are making decisions with the right kind of analysis.

You can't afford not to use statistics in data mining

In today's business arena, it's a constant challenge to keep up with market trends and predict future outcomes. To increase market share and operate more efficiently, you can't afford not to use statistics in data mining. You must capitalize on opportunities and manage processes that impact your bottom line.

Statistics help you react faster to market changes. SPSS gives you fast, easy access to data mining tools on your desktop. These tools help you react quickly and confidently to key changes in your business, such as customer satisfaction, product quality and credit risk analysis.

Empower knowledge workers. Statistical tools help you empower your employees to perform more extensive data analysis, making your organization more productive and competitive. Who better to explore customer characteristics than marketing and sales professionals? Who better to investigate process improvement opportunities than the plant floor manager? When employees have the right analytical tools, they can give you new insight and help you manage your business more effectively.

More confidence in decisions. The ability to create ad hoc analyses and customized reports at your fingertips with statistical tools means you can quickly and confidently make decisions based on fact.

Summary

Powerful, flexible, advanced analytical methods, such as statistics, are must-haves in a data warehousing environment. Statistics give you the return on your data warehousing investment by uncovering critical information, helping you manage your business more effectively.

Today's climate of increased competition and leaner organizations makes it imperative to mine data using advanced analytical methods. Savvy business professionals understand only too well that organizations need to make the most of their data and their employees' knowledge to be able to compete successfully.

About SPSS

SPSS is the best analytical software for “best of breed” data mining solutions to uncover hidden relationships in information stored in databases. SPSS’ products have helped customers solve problems in a variety of fields from customer classification and profiling to credit risk analysis, quality management and sales force productivity. As the leading desktop statistical software company, SPSS has developed and distributed analytical software for nearly three decades and has over two million customers worldwide.

SPSS complements popular query and reporting tools with its ability to link directly to them, enabling end-users to move data easily. In addition, SPSS can access data directly via ODBC and it includes a basic, easy-to-use query facility and the ability to read many types of files. End-users can also enter and read data into SPSS from sources other than your warehouse.

To help you get the most out of your data, SPSS also offers a full complement of training and consulting services. SPSS can help you train your staff to explore and find information hidden in your data and develop standardized reports and graphs answering your key business questions. SPSS can also create customized programs to simplify and automate your most common data mining tasks.

Chicago-based SPSS has sales and support offices and distributors worldwide. In 1995, SPSS completed the best year in its 28-year history with total revenues of \$63 million. SPSS software operates on most models of all major computers. It is widely used on personal computers running Microsoft[®] Windows,[™] Windows NT[™] and Windows 95.[™] Versions for the Power Macintosh[®] and many UNIX[®] platforms are also available. In addition, many products are offered in Catalan, French, German, Italian, Japanese, Spanish and traditional Chinese.

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