Dun & Bradstreet: Using SAS® Software to Solve Customer Purchasing Problems

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Abstract

Dun & Bradstreet (D & B), the world's leading provider of business-to-business purchasing information, is helping many customers understand their purchasing practices with the use of a universal purchasing code developed by D&B: Standard Product and Services Codes (SPSC)™. It empowers customers to effectively identify existing and potential suppliers, as well as the products and services these suppliers provide. This knowledge is crucial to any procurement process and supplier analysis.

But even the SPSC codes could not solve one fundamental problem: how to get the raw customer data from purchasing applications into the SPSC codes and deliver the information to business users easily.

This paper will discuss the joint efforts of Dun & Bradstreet and SAS Institute in taking real customer data… applying Data Warehousing, Data Mining, and OLAP tools…and creating a full-function business application.

Introduction

Today, many organizations are trying to streamline their purchasing operations. Consolidating all purchases with a select number of vendors provides tremendous leverage in future negotiations. Depending on the size of the firm, savings are normally in the range of 5 to 10% of an organization's total purchases.

When a company tries to make strategic decisions about purchasing practices, often they encounter the following obstacles:

- Who am I buying from?

  Many times, information on one supplier cannot be determined since supplier names are spelled differently in the data base. A recent article demonstrates how widespread this problem really is:

  "It had 113 separate entries for AT&T alone because different people would enter it as A.T.T. or ATT or A T and T.
  It took 1,000 hours to weed through it. Using typical wages to determine that one aspect of data quality cost the project about $100,000."[1]

- How much am I spending with a supplier?

  Often, you are purchasing more products from a supplier than you are aware of. It is very hard to try to re-negotiate a contract with a supplier if you don't have the total picture of what you spend with them.

- What is my risk with this supplier?

  Is your supplier financially secure? What would be the impact on your business if the supplier could not deliver your order in full … or on time?

- What am I actually buying from a given supplier?

  Suppose you buy computers from a given supplier. You may not realize that you are also buying office supplies from a sister company. You may be missing an opportunity to receive a discount with the parent company.

- How are my buying practices changing over time?

  There may be some hidden information in your purchasing data that could give you an accurate commodity or supplier profile. Knowing more about this type of information may make it easier to look for new suppliers.

The first step in any process improvement is to understand where you are at present. Many

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[1] Computerworld Magazine April 21, Unifying Legacy Mix.

organizations simply don't know how much they buy, what they buy or whom they buy from.

Managing the Purchasing Process

In assessing a customer's purchasing practices, Dun & Bradstreet has developed a process to maximize effectiveness, identify new suppliers that offer you the lowest amount of risk, the best price and the quality and service you demand.

They recommend that a company should:

- Determine purchase criteria based on internal standards:
  - Timeliness of delivery
  - Customer service
  - Quality of product or service
  - Total cost
  - Technical support
  - Attitude of personnel
  - Accuracy of delivery quantities
- Determine the demographics of these suppliers and assess them based on the risk of default. Use the following criteria to help shape your assessment:
  - Industry
  - Region
  - Women or minority
  - ISO 9000 registered
  - Risk score
- Rank your potential suppliers to create a list of preferred suppliers based on acceptable risk and internal standards.[2]

The next process is to track performance and analyze your supplier portfolio. Managing existing supplier relationships in today's competitive economy is critical to the success of your business.

Dun & Bradstreet empowers their customers to:

- Analyze a company's entire supplier portfolio:
  - Identify all purchases from the same corporate family
  - Approach the ultimate parent company for a volume purchase discount
  - Consolidate suppliers within a single industry
  - Identify companies in your portfolio who are customers as well as suppliers

- Monitor the performance of your suppliers by tracking changes that may affect their ability to meet your supply needs such as:
  - Changes in their risk score
  - Changes in control
  - Business moves
  - Public filings such as suits, liens, judgments or bankruptcies
  - Disasters such as earthquake, fire or flood[3]

Value Add from Dun & Bradstreet

Dun & Bradstreet's uses standard codes, the D-U-N-S® Number and the SPSC Code, as key business identifiers for monitoring purchasing portfolios. [4]

D-U-N-S Number

Dun & Bradstreet's most recognized business identifier - the D&B D-U-N-S Number – has become an identification standard for world commerce.

The D-U-N-S Number is a distinctive nine-digit identification sequence that D&B assigns to the more than 47 million businesses in its worldwide database. It identifies companies by location, industry, country, and corporate affiliation, including branches, subsidiaries and divisions.

The D&B D-U-N-S Number has become a universal business ID on invoices, requisitions, account receivables and payables, and shipping and custom clearances. It is recognized by the American National Standards Institute, the United Nations, the International Standards Organization and over 50 industry and trade associations as well as the U.S. federal government.[5]

Standard Product and Services Codes (SPSC)™

The SPSC is an open, non-proprietary system of codes and standardized text for classifying all goods and services. Dun & Bradstreet and its related partners through the SPSC Advisory Board maintain the coding structure.

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[2] Excerpts from www.dnbcorp.com

[3] Excerpts from www.dnbcorp.com
[4] Excerpts from www.dnbcorp.com
[5] Excerpts from www.dnbcorp.com

The SPSC system is comprised of approximately 6,000 ten-digit codes and descriptions for both products and services. The coding structure is hierarchical – thus allowing both detailed identification and the ability to consistently combine similar products into standardized product groups. Depending on the level of granularity that is necessary, the SPSC's hierarchical structure allows identification at the 3,4,6,8 or 10-digit level.[6]

Here's an example of hierarchical SPSC code.

SPSC Level	SPSC Code	SPSC Description
3-digit	511	Paper and office products
4-digit	5112	Office products
6-digit	511204	Computer and photocopying supplies
8-digit	51120405	Printer supplies
10-digit	5112040501	Toner cartridges

The SPSC is hierarchical, enabling both strategic and tactical spend analysis. Divisional management may want to know how much is being spent on laptop computers, while corporate wants total expenditures on all computers and software. The SPSC satisfies both needs.

What Dun & Bradstreet Needed

From the raw customer data to the assignment of the D-U-N-S Number and SPSC codes, to the analysis of the purchasing information, Dun and & Bradstreet needed an integrated tool set which would seamlessly take them through these processes in a timely and efficient manner.

Additional requirements included:

- A powerful tool flexible enough to support customers' varied computing platforms and data sources
- A comprehensive computing language which is easy to use and provides all of the data manipulations required to prepare their customer data
- A reporting environment which would allow Dun & Bradstreet consultants an alternative to paper reports and provide an opportunity to analyze a customer's information in a very dynamic and timely manner.

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[6] Dun & Bradstreet's Standard Product and Services Codes (SPSC)™

- An analytical tool for management to consistently analyze and model supplier and commodity performance.

Dun & Bradstreet chose SAS Institute's Data Warehousing, OLAP and Data Mining solutions to help them provide the services they needed for their customers.

Building a Data Warehouse

The first step in building a data warehouse is obtaining the data from customers. Dun & Bradstreet has a history of using the SAS language to help extract and manipulate customer information in the process of assigning the D-U-N-S Numbers and SPSC codes.

Recently, they have begun to utilize SAS/Warehouse Administrator™ software to help them manage the operational data from their customers and deliver a purchasing data warehouse for their customers to utilize. The strength of the tool not only allows for a graphical user interface to piece together the data warehousing building process but also the ability to populate metadata about their customers data which can be used in the exploitation stages to follow.

The typical steps in building a customer's purchasing data warehouse consist of:

- Reading in raw purchasing data which has been extracted by the customer from either their purchasing or general ledger applications. This data is typically provided to Dun & Bradstreet on tapes which they then extract onto their UNIX server.

- Manipulating and cleansing data to identify the company and purchasing information required for the next identification stages.

- Applying artificial intelligent algorithms to assign the unique D-U-N-S numbers to all of the vendor information. Similarly, they have special algorithms to assign the correct SPSC codes to the purchasing information. The algorithms are sophisticated enough to automatically match up to 80% to 90% of the data. Dun & Bradstreet staff does the rest of the matching manually.

- The results of the D-U-N-S Number and SPSC Codes matches are then merged into a central data file. This detail data will be used in the Data Mining process.

- In preparation for the OLAP application, a multidimensional cube is built which summarizes the supplier and commodity information.

The frequency of building the data warehouse varies by customer. Typically customers need to perform monthly or quarterly updates.

At this point, the data warehouse is ready to be exploited using the decision support capabilities of SAS software.

Using OLAP to Answer Business Questions

Online Analytical Processing (OLAP) allows users to look at their data in a very timely manner to answer their business problems. One of the strengths of this type of processing is that the data is kept in a multidimensional structure that allows for very dynamic environment to view their data. This type of processing allows you to have a top to bottom view of your data.

In the case of Dun & Bradstreet, the multidimensional data base (MDDB) built by the SAS/Warehouse Administrator summarized the purchasing data in both supplier and commodity dimensions. Dimensions in an MDDB allow you to look at characteristics of the data grouped in logical hierarchies. The hierarchies include ways to look at the data by:

- SPSC which includes all the levels of the SPSC codes
- VENDOR which allows you to view the suppliers by their different DUNS numbers. This means you have the ability to see only information on a company as wells as the parent company for that supplier.
- TIME which lets you view the purchasing information over time.

The analysis fields that are being tracked include:

- Total Purchasing amounts
- Total Sales which depicts the volume of sales a company had in the previous year.

This is an indication of the size of the company.

The OLAP application, which was customized for Dun & Bradstreet, is a combination of out-of-the-box SAS/EIS® software objects and customizations done with SAS/AF® software. This application is specifically tailored to address the needs of someone trying to understand their purchasing practices.

Once the application is invoked, it is very simple for users to easily see where they spend their purchasing dollars and how this varied over the previous year. Looking at the Commodity view of this application, you can quickly see where your purchasing dollars are spent. Typically, most companies already track some of their commodities, which are crucial to their business, but with the use of the SPSC codes, this is the first time that you can actually track any purchases in a very organized manner.

Using the drill-down capabilities of this OLAP application, you can analyze what you are buying at any level of the SPSC code. Once you pinpoint a particular commodity, you can switch to the Supplier view of the application, which will let you know which vendors were responsible for those commodities and how much you spent with each supplier.

Once in the supplier view, you can utilize the filters to quickly look for at-risk suppliers or any of the typical supplier information that can help you determine if you want to consolidate any of your suppliers. Following the purchasing processes outlined by Dun & Bradstreet, examples of these filters include a company's financial status, if they are minority or women owned, and other important purchasing criteria.

Given these dynamic drill capabilities, this application allows customers to answer many of their critical purchasing questions:

- Who I am buying from?
- How much I am spending with a supplier?
- What is my risk with this supplier?
- What commodity am I buying from a given supplier?

Looking for New Characteristics Using Data Mining

Unlike the summarized data used in OLAP, the data mining process needs to analyze detail information. Instead of a top-to-bottom view of your data, you're actually looking at a bottom-to-top view. Data mining can best be described as the process of discovering patterns and trends in apparently random data, which can lead to more effective business strategies. Many are viewing the use of Data Mining to contribute to the ability for companies to control their costs and contribute to their revenue.

Data Mining is becoming very popular with many of Dun & Bradstreet's customers since it gives them an opportunity to find out characteristics of their data that was difficult to see in an OLAP application. The data has been organized in a way to answer the questions you don't know about your data.

The detail data file in the data warehouse contains historical information regarding the customer's purchases. In Data Mining, you are trying to find relationships, which occur relative to a target variable. In our case, the target variable we have selected is whether purchases were made with a particular supplier in the last year.

Using the Enterprise Miner™software, Dun & Bradstreet followed the SEMMA methodology (Sample, Explore, Modify, Model and Assess) developed by SAS Institute as a road map for data mining. Using this process, D&B has been able to identify characteristics in customer data such as segmenting the suppliers in relation to the total size of employees or segmenting the suppliers in relation to the age of the company. These characteristics were not previously identified in their reporting process, however once identified they could now be incorporated into their analysis process.

Why Dun & Bradstreet Chose SAS Software

Dun & Bradstreet has been a SAS customer for many years, utilizing the software in many of their business applications. Specifically related to this purchasing practice, Dun & Bradstreet chose SAS software for the following reasons:

- The integration of the Data Warehousing product with both the OLAP and Data Mining solutions.

- The strength of the SAS language in accessing data from different platforms and different data base management systems in a timely manner.

- The flexibility of the OLAP environment which provides a very dynamic reporting environment

- The analytic capabilities found in SAS software and the new Data Mining solution provided comprehensive analysis of their customer's information.

Conclusions

The business benefits of the purchasing application, which resulted from the joint work between Dun & Bradstreet and SAS Institute Inc. has been well received by several of Dun & Bradstreet's customers.

It is a testimony of how technology can be applied to a business problem and the resulting solution can be used to achieve immediate return on investment.

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Trademarks

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