CUSTOMER RELATIONSHIP MANAGEMENT

E-MINING MYTH & MAGIC

USING DATA MINING SUCCESSFULLY

Michael Meltzer

An e-Business Approach

Abstract

Many managers have been inundated with information about the benefits of Data Mining and now there is clickstream analysis dropping in from cyberspace but little has been written to help that manager navigate through some rather treacherous waters. What is Business or E-Intelligence, Where and how to start, should you, and what about all the hype. Isn't it all about rocket scientists discovering the meaning to life - we have them and we have the big computers to make the set - so what's the big deal well!?

This article introduces some of the ways to move towards your very own data mining solution / business intelligence solution based on your own data culled from transaction systems both terrestrial and Internet based probably housed in a data mart or data warehouse. It will show you how you can better understand your business and support your decision making with actionable information. I will also look at some of the benefits and pitfalls that other have found before they could move forward successfully. Yes there have been failures but this often helped along by overzealous tool sales people and gullible managers looking for a quick fix – these quick fixes just don't last. You need to understand that data mining is not about tools alone. It is about a way of using intuitive questioning that enables various tools and agents to ferret out what you need. This ferreting accounts for 70-80% of all data mining the rest uses statistical methods, rules engines, and that forever misused term artificial intelligence.

Customer Relationship Management For E-Business

Using Data Mining Successfully

To describe data mining and the effort involved in making it a success is to reduce the hype and destroy some of the myths that exist. The first part of this article will describe the various tools, cyber based applications and techniques. Part two will focus on the application of the techniques and the process.

Given the ever-increasing amount of wrongly targeted direct mail and tele-sales calls we receive, one might think that many banks still believe that customer acquisition is better than retention. Financial Services Providers (FSP's), Retailers and Telecommunication companies (Telco's) know little more about you than their mailing lists or your filled in internet registrations reveal -- they guess at demographics from an address and attempt to formulate psychographic profiles from a person's magazine subscriptions. This same information is available to almost company. There is nothing unique about this data, little which can help one company differentiate their "unique" offer from another. What unique characteristics differentiate one customer from a potential consumer - they don't know? What is a persons preferred method of paying their bills or seeking advice? Is it credit card, or debit card, or is it cash for payment? Is it a shop, branch, call center or Internet for advice? Organizations that can answer questions like this are those that may end up doing the bulk of the customers business. They will know what you buy, and when, where and how you do it. And if they use a data mart / warehouse and have invested in the right tools and people they have an even greater chance of success. They have the opportunity to understand your lifetime value, your potential profitability, potential needs, preferences and, if they are really clever, they can predict your purchase triggers.

IS IT REALLY TARGETED - DIRECT "MAIL"?

"Tomorrow's winners will be those that really know their customers!"

LIFETIME VALUE

PROPENSITY SCORES

PROFILES

LIFE TRIGGERS

The Organizations Unique Differentiators

All businesses have a range of unique differentiators. Arguably their most valuable differentiator and asset is the data they hold on their customers. It then rests on their ability to use that data to create individualized services that are unique to its own customers. They can then extrapolate that understanding to customers that look like their good customers to go on the customer acquisition trail. However, the major problem for businesses understands what they're data means and then turning that meaning into actionable information. The supermarkets introduced the so-called loyalty card for more than just providing a small discount to the consumer. They hoped to get some 'loyalty' and some useful data to analyze purchase profiles and customer characteristics. Telco's are attempting to understand their customers through analysis of the data contained in call detail records (CDR's). These records are created automatically whenever someone

Customer Relationship Management For E-Business

or something uses a phone link and include every aspect of a call. Generated by the millions each day these records are used for billing and other purposes. FSP's continually collect data for regulatory purposes and to use for Customer Relationship Management (CRM). Organizations are often depicted to be awash with data but without the right information available to run their business. Some collect all sorts of data for years and years and across many disparate systems, and then hope that some magical software product can hook them all together (maybe magical middleware that we have been promised for years). Some of these magical tools are often nothing more than glorified report writers or report cubes that enable only the simplest of queries to be answered by the creation of two-dimensional reports.

The different systems an organization uses define and describes transactions, entities and relationships differently. Some have found their systems use multiple naming conventions, and hidden encoding structures, and sometimes-crucial historical data were only retained for a short period. One bank, when putting together its customer information file for its first data warehouse, found it had millions of customers more than it possibly could have. Each disparate system recorded customers as unique entities with specific attributes which created duplicate, triplicate and in some cases even more entries related to the same customer. The customer file had to be cleaned (data cleansing) and merged to reduce the repetition so that one version of the truth could be created.

Millions of customers -- which ones are real?

WHY BOTHER USING DATA MINING – TO MAKE CRM REAL!

Because you need to get closer to your actual and potential customer and today, given the large number of relationships an organization must manage and the readily available technology 'you can'! It has always been good form to have a customer focus. We have been badgered for years by the marketing guru's that understanding the customer and only making goods or providing services they will buy makes good sense. The manifestation of that today is the growth and hype surrounding CRM. It's not about call centers and sales force automation but about building organizations that focus on the customer to enable a potential one to one relationship. For many the concept of mass customization or the segment of one may be enough but the technology today enables organization to move towards one to one. To satisfy the customers and suspects desire for personalization many tools, techniques and physical activities must re-engineered, re-tuned and rebuilt to meet the needs of the arbiter of all profit the consumer.

To make CRM real you need to learn about your current customers and future potential customers – data mining and other tools and technologies enable this. – Go for it but carefully!

To get closer to the consumer and understand what they want, who they are and predict what they might want at the right time, in the right place at the right price requires a little analytical effort – hence data mining.

Customer Relationship Management For E-Business

The Clickstream and Web Traffic Analysis – the new new thing!?

The latest source of large amounts of data is the Internet clickstream. Smart sites record users activity within 'the clickstream' this data includes where visitors went, how they got there, what they did and how long they stayed. As with all data it needs to be captured, cleansed, stored, analyzed and used as the basis of actionable decisions.

Web traffic analysis concentrates on how visitors move through the site. It measures the number of pages delivered to visitors, and determines how often visitors hit their browser stop button, how much of the page was delivered when they hit it and how long they waited before stopping the page. For e-business analysis the clickstream data is used to determine higher-level information, tracking visitors' responses to pages and the content rather than on how they navigated that site.

> "No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be."
>
> Isaac Asimov (1920 - 1992)

You might want to measure clickstream data at this level to assess the effectiveness of the Internet as a channel to or from the market. However to really have value you must understand why people act as they do on your site and is this reflected elsewhere. An example of a simplistic use of this data is the recording label Windham Hill in the US that used traffic analysis to identify patterns among the sampling of artists from their Web site. The artists at the beginning of the alphabet were getting more clicks than those at the end of the alphabet. As a result, Ray Gattinella the marketing director said "…. we're going to rearrange the list -- from alphabetical order to an order that emphasizes whom we want to market."[1]

INTEGRATED CHANNELS ARE WHERE IT'S AT!

One of the first steps any CRM focused company is to attempt to profile and segment their customers. However, little information can be gleaned other than the simplest and very traditional demographic information such as geography, site activity and potentially preferences. Without the user filling in a registration form and then signing in on each visit little can be gleaned from the clickstream activities. A small problem exists however "according to eTrust more than 40 per cent of all users leave a web-site when personal details are asked for. Of those remaining almost 25 per cent leave false details."[2]

Pull that data together and analyze

There is a need where available to match cyber data to terrestrial data. It appears that for those that can then clicks and mortar will be a powerful combination. You will be able to increase retention rates, improve acquisition rates, cross-sell, up sell and potentially reactivate dormant customers. However the clickstream data is beginning to be

---

[1] "Hits that Rate Attention", *Inc.*, September 1995.

[2] The age of E-tail Alex Birch, Philipp Gerbert and Dirk Schneider

Customer Relationship Management For E-Business

measured in the terabytes, and coupled with your earthbound data, the requirement for massive mining power and data warehouses will only grow.

OLAP – MOLAP - ROLAP or the Magic Cubes

To begin the process of understanding your customers, then you must find out whether you actually have the right data. Some questions you might have will require specific data to be available. If that data is not available then you cannot answer the question. An example of this problem could be trying to find out about the channels used by a customer. You find that you have some of the data but have not collected any from other channels used such as the Internet or the call center, so you can only get a partial view. The initial need is to understand just what data you have, how granular it is, its fitness for use and the quality of the validation process. If we assume that you have all the data you need in the right form and it is all correctly validated then you could begin to analyze it.

This process requires the availability of a knowledge worker with in-depth domain knowledge, plus a healthy dose of intuition so that sensible questions related to business need and opportunity can be asked. The business analyst uses intuitive ideas and hypotheses a test for the data, formulating them from a set of business questions related directly to business needs. They look at what is happening in the business and what action can be taken to rectify an issue or create an opportunity. The tools used can consist of, but are not limited to: query languages (SQL is currently the standard), reporting systems, multi-dimensional analysis (OLAP - Online Analytical Processing, MOLAP – multi-relational OLAP and ROLAP – Relational OLAP), Visualization and to some degree statistics. The current batch of powerful vendors of these tools are: Microstrategy, Cognos, Business Objects and of course SAS. OLAP may tell you what happened yesterday but data mining can help you understand what might happen tomorrow. As W.H. Inmon (the father of Data Warehouse) puts it: ***"The holy grail for the end user is insight as to why business has been conducted the way it has been in the past and how the business can be conducted more effectively in the future."***

IT IS CRITICAL TO DEFINE THE OPPORTUNITIES YOU SEEK TO EXPLOIT OR THE POTENTIAL PROBLEMS You Face!!!!

Much of the success of data warehousing / data mining rests on the tools and the process outlined above. Some vendors of OLAP and now e-intelligence tools have started to call their products data mining products. Is it a wonder that both mangers and consultants get confused? They have even begun to refer to large scale (for them) implementations as data warehouses. The need to have OLAP cube-like models stems from the multi-dimensional nature of business itself. However OLAP tools can be seen as verification systems or clever aggregation based reporting systems that enable you to use a subset of a larger data warehouse to drill down, slice, dice and roll up data (very oversimplified). Data is stored in multi-dimensional structures (this in itself is not a data warehouse!) that you can visualize as cubes of data within even more cubes with each side representing a dimension.

Collect the data at a granular level

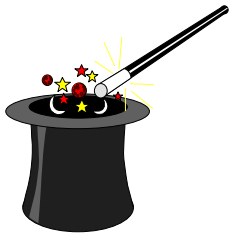
Customer Relationship Management For E-Business

Many use the snowflake schema that is itself an extension of the star schema concept used by some data warehouse consultants. (Religious wars are fought over de-normalization or normalized data and the way granular data should be held in a data warehouse). You can look at how a product within a region within a branch is doing monthly, quarterly etc., The data held is aggregated so a cell would have the total sales of the product for that branch whilst another cell holds the total for the month. Often you will find that these tools are often used for consolidations and dynamic budgeting, as well as for forecasting, sales, customer and general business analysis. These OLAP tools when used for analytical purposes require analysts to prove or disprove a hypotheses (the deductive approach) that produce reports that can be acted upon. Data mining meanwhile is more akin to discovery as a hypothesis is generated rather than verified.

SLICE DICE AND DRILL DOWN IF IT'S THIS WAY UP!

No Magic

For our purposes we can look at data mining as consisting of tools and using processes that try to reveal why things happen. The idea is simple – the best predictor of future behavior is past behavior. Data mining is not part of a sorcerers equipment it's not magic you still need to understand your business in it's economic context and you must continue to learn about marketing. You must also use people that understand your data and understand statistics.



The term knowledge discovery is often used interchangeably with data mining. The process attempts to discover characteristics, relationships and patterns that have not been intuitively grasped by a business analyst. For example, a bank might like to find out if any pattern of activities can predict loan defaults. A Telco wants to understand the churn activity of newly acquired customers. To attempt this by any other means than discovery would require an analyst trying to cope with multiple potential patterns and relationships across hundreds of thousands of transactions and potential relationships. Often the technology itself determines without help (machine based learning) what questions to ask and then keeps on asking questions, delving deeper, to uncover the understanding that the organization needs. The process is not fully automated as it still involves an analyst, but they might not need to be working from any given hypotheses, instead starting from a business problem the business perceives to be important. When an experienced researcher or manager looks at a newly discovered business fact and says "we can use that fact to…" then the process has been a success.

You better understand statistics or employ someone who does

The steps required to begin a **knowledge discovery** process are:

Knowing what data to look at really helps!

1. Make sure the data is well prepared, use as much detailed data as possible, and let the domain experts loose to make sure you choose the right data so that the knowledge content is great.

2. Select the right tools through understanding the potential users, the structure of your data, and the likely job requirements.

Customer Relationship Management For E-Business

3. Use the domain knowledge you and the business analyst have of the business to point the tools at the right data.

4. Once the reports come back, let the business analyst help explain and redirect efforts.

The Tools Available

There are numerous tools and numerous vendors

A number of tools available today apply multiple techniques to sift through the data, yet it is still down to good business / statistical analysts to help choose the best techniques and to finally create the prediction models or clarify the base relationships. They would then explain the results, assumptions and models through clear and easily understood presentations to management. The whole point is to supply succinct business insights to help steer tactics and strategies.

Many of the tools available come in sets (for example algorithms: CART (classification and regression trees), CHAID (chi square automatic interaction detection) and C4.5) on the basis

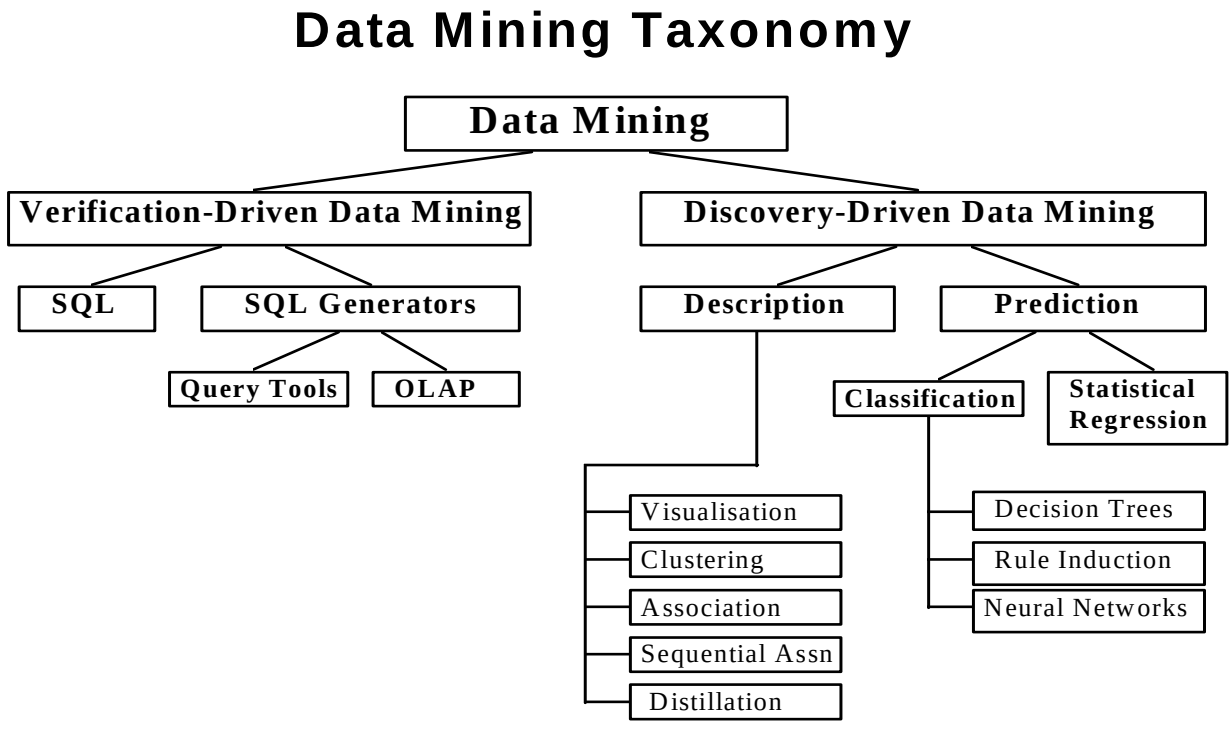


Figure 1 Ken O'Flaherty

If one approach does not produce a valid result then multiple algorithms might. The tools vendors often use the same algorithms that are freely available plus SAS or SPSS as their base. Their added value comes from adding ease of set-up and specific mathematical or domain knowledge.

The potential tools that can be used are:

Customer Relationship Management For E-Business

SEEING IS BELIEVING

Descriptive

How does an event appear happen and can it be described in a way that enables an organization to use the information to make valid management decisions?

Visualization: This process takes the large amounts of data and reduces them into more easily interpreted pictures. Instead of voluminous sets of numbers, a colored picture tells the story with clarity. Different colors, textures and relief are used in combination with various levels of dimensionality and in some instances animation. If, however, you have more than four variables, some believe it is not easily read. This is a fantastic tool when reviewing anything from the spread and concentration of customer activities to real time currency activity monitoring.

Clustering: Is an approach where you attempt to identify distinguishing characteristics between sets of records, and then place them into groups or segments. This process is often the stepping-off point for data mining as it leads to further relationship exploration. This particular process is an obvious candidate for customer segmentation as you are clustering by similarities.

Association: Here you find rules that enable you to correlate the presence of one set of items with another set of items. This method has been found to be effective in retail where Market Basket Analysis helps you find that certain items are always bought at the same time. If you can find the natural buying patterns of a customer you can use that pattern to help market your product. The output of this association is a list of product affinities.

MARKET BASKET ANALYSIS

Sequential association: Patterns emerge over time and this method looks for links that relate these sequential patterns. The idea is to use associative data such as a checking account or a life event to tie together a sequence of events in a time series. Life-triggers that precede specific purchases and precursor purchases are often found using this methodology. This same methodology is used in web site analysis – if you can understand the sequence (regularly occurring behavior) of use of certain web facilities and services you can begin to personalize that site by individual.

Distillation/Summarization: The search for patterns enables the found patterns to be used for various purposes. Reducing large amounts of data to meaningful summaries by use of rules can further extend this.

Prediction

Customer Relationship Management For E-Business

An organization that sells products but does not expect immediate payment really would like to be able to predict among other things whether someone is credit worthy or not. Models to do this are built and trained with data about known outcomes such as prior credit history. An algorithm (or multiple algorithms) is then applied so that predictors are developed. Although products like SAS and SPSS can be used, alternative techniques such as classification are winning favor. These methods are based on inductive processes.

FROM DESCRIPTION TO PREDICTION

Classification

Decision Trees: This is an induction method (machine learning) that works by developing multiple choice type questions that can be yes/no or have probabilities and or values. The answers radiate out from an initial field that then splits (at a node) as each new decision is made. This process carries on till a data set is classified creating a set of generalities or some pre defined stopping point is met.

MACHINE LEARNING

Rule Induction: The method develops rules that classify data and are often derived from decision trees, or other algorithms. An example could be: "If age>50 and married and homeowner, then good risk." This type of simple rule is easily understood and does not rely on any other.

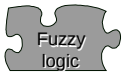
Neural Networks: Based on the concept of the biological brain in that they learn. They consist of a set of connected nodes each having an input and output and arranged in layers. There are two types: those that are supervised and can create predictive models, and those that are unsupervised that are used to separate data into segments or clusters.

LIKE THE BRAIN???

"All large US - based credit card issuers utilize expert systems in conjunction with data mining technology to identify fraudulent transactions. Expert systems can identify known fraudulent patterns, but data mining tools (primarily involving neural networks) can pinpoint new or previously unknown patterns." (META Group) This article will look at a few techniques used and some of the banks that have applied them and had outstanding success.

Fraud Management

Other Potential Tools



Most of the tools available use the same types of algorithms, use the same base statistical methods or are variations on theme. Some have been coined by consulting firms and tool vendors in an attempt to differentiate them from the competition. Some of the possible tools are: Bayesian statistics, genetic algorithms, intelligent agents, linear programming, reasoning (profile based, model based, constraint based and case based) fuzzy logic, influence diagrams, field force analysis, etc.

Customer Relationship Management For E-Business

The Effort

Data mining can produce immense value but it requires a large investment in terms of people and technology throughout the process although the tools themselves initially appear inexpensive. Figure 2 shows how the technologies align with the business problems. It also outlines the data mining process in the center and this is not a trivial undertaking. The other major factor often overlooked is that, just as a data warehouse is a process that never ends, neither does data mining. You will require in depth banking (domain) knowledge, plus technology-specific expertise to really make a go of it. There is no magic to data mining. It takes a great deal of effort and there should be a data warehouse to test your results against. Only you know whether a hypothesis or fact the data mining tool finds is of value and then you must be able to apply it for it to have any value at all. Many of the tools however are not currently scaleable or able to cope with large data sets and few can be used directly with a data warehouse (especially massively parallel processing data warehouses). This means that representative samples have to be chosen. The choice of data subsets is best left to the "experts" and there lies the problem.

There are many who claim expertise and will tell you that you don't need large data sets to work on. Often the very people who try to persuade you that you don't need large data sets are the tool vendors whose particular set of tools only works with small sets!

Good Data Mining

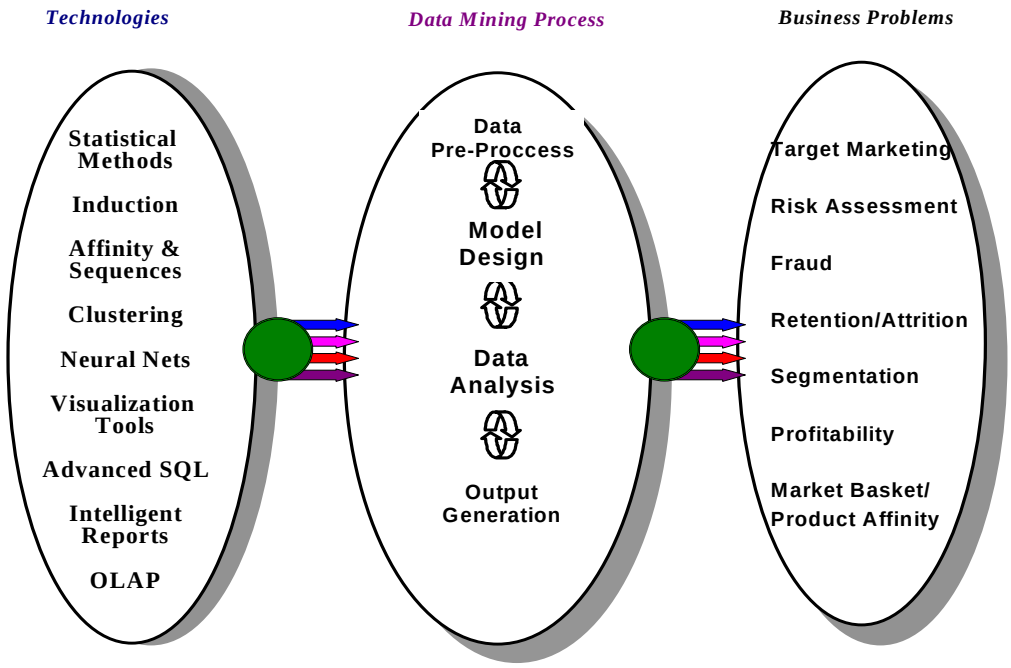
Effective data mining is dependent on a comprehensive and robust data warehouse and not a summarized data mart (a subset or department-specific collection and aggregation of data), as you cannot easily predict what attributes (events, behaviors, static data, transactions, etc.) will not contribute to the business facts you uncover.

Who really knows what data you should keep and what to discard?

It may be that, hitherto un-thought of attributes are causal factors. In these situations there is never too much data as at last you have the means to create actionable business information. Data mining offers an opportunity to find business facts hidden in data - at a cost. Their value is in their application and the next part of this article looks at their application.

Customer Relationship Management For E-Business

METHODS MATCHED TO BUSINESS PROBLEMS



Customer Information Is The Differentiator

The major differentiator that an organization has is the information it stores on its customers. With creative use of that data the organization has stored in numerous systems but now brought together in the data warehouse can build up their understanding of their customer base. That understanding can then be used to support strategic and tactical business decisions. One of the means of extracting meaningful knowledge from vast amounts of data is by using data mining techniques as outlined above.

"Valuable insights still tend to have a reasonably high price tag"

In the early days (just a few short years ago) the process was seen as complex and expensive. Although there has been a move to reduce the perceived complexity, any valuable insights still tend to have a reasonably high price tag. Recently there have been some lower cost forays into data mining tools such as DataScope a low cost toolset for marketing analysis. However it may not be the software or the hardware purchased that really costs but to achieve sustainable results investment must be made in people and ever-increasing data storage. The rewards however when the search has been methodologically sound have been high.

Cyberspace

THE INTERNET CHANGES EVERYTHING

The growth in the use of the Internet for Business to Customer (B2C), Customer to Business (C2B) and Business to Business (B2B) means the amount of data to be stored managed and understood is increasing dramatically. Robert Utzschnieder of Torrent Systems believes that

Customer Relationship Management For E-Business

'Click volumes will increase by a factor of ten every twelve months… companies will need to build massive stores of this rich granular click-stream data.' This data will achieve terabyte proportions very quickly and will enable predictive modeling for content management, campaigns and personalization (potentially one to one marketing). All predicate don good data being collected, cleansed, stored and sensibly applied to real business opportunities.

Affinity Marketing

There is a tendency to separate marketing within many organizations into at least two camps, product management and operations. While one attempts to search out new needs and affinity based clusters for an increasingly fragmented market (read segment of one), the other attempts to execute campaigns cost effectively whilst also attempting to reduce risk and increase the accuracy of the medium used. Product management and operations are both interested in:

Product management and operations

- Refining customer segmentation into meaningful sub and or even micro-segments to enable more effective relationship management.
- Understanding what benefits customers try to get from the products they buy today and will want to buy tomorrow.
- Understanding what models can be created that will identify customers propensities to buy and what triggers dissonance.
- Knowing what segments are price sensitive to enable relationship pricing to be implemented.
- Building channel usage models that can predict the most favored channel for current and new services and products.
- Implementing activities that target the right customers with the right messages and enable an interactive dialogue if appropriate.

Benefits that customers seek

CUSTOMER ATTRITION

TARGET MAILINGS

There are other interests embedded within these such as fraud detection, direct marketing, market basket analysis, trend analysis, customer attrition and risk reduction. Businesses also use the output of data mining to develop marketing strategies, design branch layouts, analyze promotional effectiveness, target mailings and eliminate spending where a certain pre defined returns cannot be predicted.

The Use of Predictive Modeling

Predictive modeling is the prediction of a variable based on analyzing how the variable related to other variables in historical data. By using techniques known as supervised learning the system is trained on a historical database that includes data for the predictive variable, and the resulting model is used to predict the value for new data that does not include the predictive variable.

a low risk of default profile

Customer Relationship Management For E-Business

Case Studies

Many of the case sited in this article are of banks that seemed to have got into both data warehousing and data mining as the beta testers. They are also willing to let the press know what they have achieved the failures tends to keep quiet.

A major UK bank (TSB before it joined Lloyds) wanted to identify potential credit card customers that would more readily reply to a direct mail shot and would bring higher returns in terms of card usage coupled with a low risk of default profile. They tracked over eight million customers and were able to pinpoint those that fitted the required profile (see Retention, Development and Acquisition article also available in this series) increasing response rates from 1% to nearer 4%. A spokesman for the bank said "we can offer the right financial products to the right customer at the right time and we can target a particular program or product to just those accounts that meet our criteria." Royal Bank of Canada believed that the old ways of mass marketing / mailing reduced customer intimacy. With a data warehouse and mining technology they believe they are recreating that sense of customer intimacy. What the growth in size of banking industry and technology took away newer technologies enable banks to bring back!

Royal Bank of Canada believed that the old ways of mass marketing - mailing reduced customer intimacy

Use Relevant Data and Information

Another example to consider is the account information (what accounts they have, the balances, and the like) along with other demographic data (where the customer lives, etc.) held on bank customers. They would like to market home loans to the customers that are most likely to be interested. The data for customers who already have home loans is used to train the system. The resulting model is then applied to the customers that do not already have home loans, and the system selects those most likely to respond to the campaign by applying for the loan. Another method used was to see how many customers in the last campaign used to send regular payments to other financial institutions that were later found to represent home loans. This data with amount parameters was fed in to help identify existing bank customers that made large regular payments out but did not currently have a home loan with the bank. These customers became another target group. This type of analysis reduces marketing costs and focuses the investment in the campaign on specific customers to increase the response rates.

TARGET GROUP

The Use of Clustering

Bank of America

Customer Relationship Management For E-Business

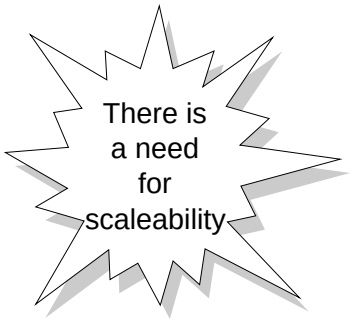
For over 10 years, Bank of America before it merged with Nations had been creating a huge storehouse of data from its banking operations. The information flowed from forty-two separate "systems of record" daily into the corporate data warehouse. The result is an information pool, which provides a means of creating a relationship with each of the 9 million customers at the bank (before the latest merger); this formed the basis for developing long-term customer profitability (life-time value), relationship enhancement activities and customized marketing programs leading to segment of one dialogues.

According to Dyke Garrison of B of A, the bank's data warehouse was and is so vast traditional analytic approaches didn't work. "For some customers, we had almost three hundred different data points. With some techniques, we could only analyze twenty [data points] at a time and no matter which twenty you chose, you were leaving out something potentially important." This where the need for scalability of the tools comes in. With some tools you can look at hundreds of variables across tens of millions of records. (HYPERparallel was used and Yahoo now owns them - maybe because of that need to make sense of that clickstream).

"traditional analytic approaches don't work"

Bank of America's wants to retain its best customers (the annual customer turnover rate in banking is 30% in the US whilst tenure in Europe tends to be measured in years) to identify opportunities to sell them additional services. The bank has developed profiles of its most valuable accounts, with relationship managers being assigned to the top 10% of the bank's customers. The appointment of relationship managers is of course not new but there is now an analytical basis for assignment. In addition further data mining of its terabytes sized data warehouse enabled the creation of probability models to identify customers who are in danger of taking their business elsewhere.

Bank of America



There is a need to identify valuable market segments but that is just the start. For each market, B of A can offer a wide variety of individualized product packages by tweaking fees, features and interest rates. Couple this with the potential number of marketing messages delivered through numerous channels at different points in time and the result is a huge number of potential strategies for reaching profitable customers. Sifting through the immense number of possible combinations requires the ability to identify very slim but valuable opportunity segments. By using a powerful tool that works across their parallel data warehouse they were able to determine that a certain set of customers were 15 times more likely to purchase a high margin lending product.

Certain Customers were 15 times more likely to...?

The bank then went beyond simply understanding who had acquired the lending instrument in the past and who would most likely buy today to understanding when the customer was most likely to purchase. They believe the results of their work have been an improvement in response to their targeting of over 100%. "The

strategic implication is the transformation of the retail side of the Bank of America from a mass marketing institution to a targeted marketing learning organization." (Dave McDonald, Vice President of B of A's National Consumer Asset Group) B of A is also testing out data mining to determine what customers are bad risks to enable fraud avoidance whilst not alienating their existing customers. Bank of America can use data mining techniques effectively because of their belief in the need for keeping data at its atomic level. The prerequisite for a valid data mining expedition demands a data warehouse as figure 2 depicts.

The data warehouse in an integrative force in any IS environment and enables the bank to function more effectively. Data needs to be available in huge quantities, scrubbed, loaded and accessible. Without granular data you cannot be sure that the answers derived have validity. In addition to its granular data B of A is also adding different types of customer trend information from commercial data service bureaus. They want to understand their customers and their target market. The range of tools they use range form standard SQL calls to SAS Institute, various OLAP products and in-house developed data mining algorithms and software.

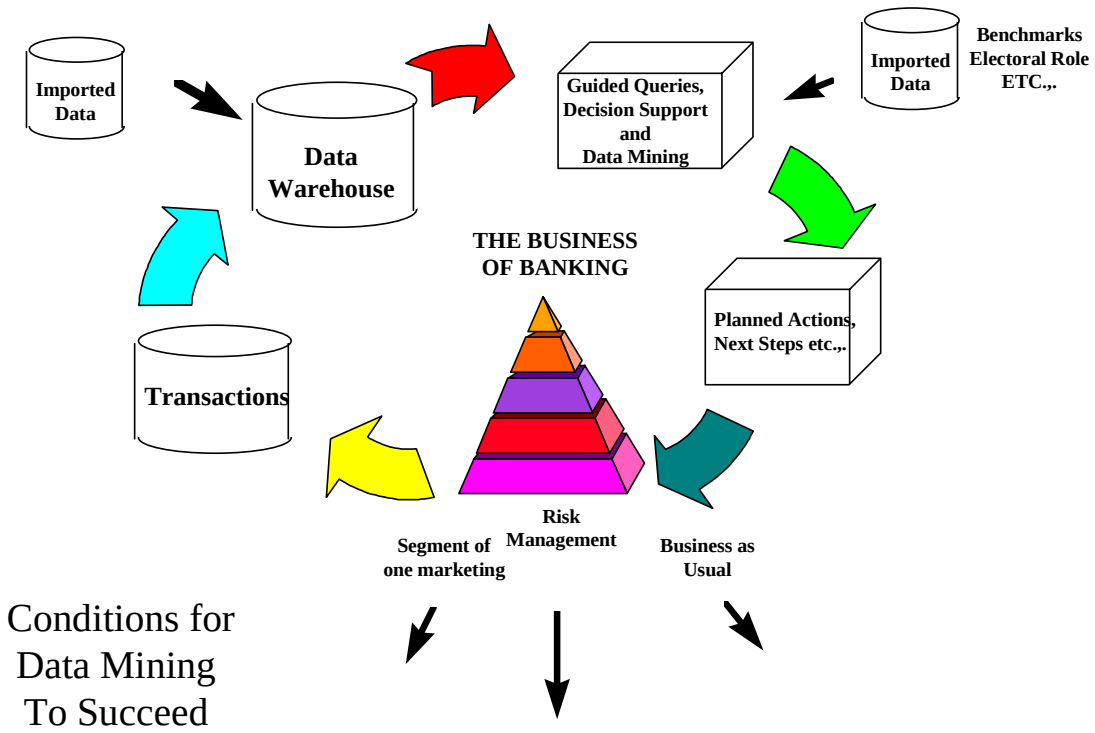


Figure 2

The Canadian Imperial Bank of Commerce (CIBC) has used data mining to manage it mortgage portfolio. They used modeling, data analysis and prediction to review late payers for their mortgage product. They wanted to create customer profile of those that would most likely become a serious problem to the bank. To their surprise

Canadian Imperial Bank of Commerce (CIBC)

Customer Relationship Management For E-Business

they found that when a conscientious payer fell behind in their payments they were the group most likely to fall even further behind. They found that this group of customers were likely to be suffering real financial problems. This finding has enabled CIBC to react more quickly to this new counter intuitive situation and take remedial, supportive actions earlier. Royal Trust is the private banking subsidiary of the Royal Bank of Canada wanted "to build an information resource that was both up to date and event driven, and which could be used for predictive modeling, not just for old style historical analysis". (Dr A. Gandy and Dr C. Chapman TPS Ltd.) As with many other banks they have improved their response rates to direct marketing campaigns, and used data mining technique to: increase revenue from target segments, increase their share of wallet, increase retention, increase sales force productivity and the use of alternative delivery channels. Recently they have found that customers that pay a flat fee tend to stay loyal for about three years more than those charged on a per-service basis. They believe that many customers don't like surprises and the flat-fee service gets away from that.

Royal Trust

Other Banks

Others like Chemical, Chase (now one bank), Banc One, Nations Bank (now Bank Of America) and Citicorp (now Citigroup) in the US have used the data warehouse and full data mining for all the above and more in their quest to better use their unique competitive advantage - the information they have on their own customers - to better understand and target those customers. By understanding and profiling the most profitable customer to have they can now better target the type of customer they want to have in their portfolio. In south eastern France Caisse d'Epargne Loire Drome Ardeche (CELDA) that is one of the largest of France's 31 savings banks uses data mining techniques and it's data warehouse to answer many questions some of which are: precisely who are our customers, what do they want, and what are their buying patterns?

Caisse d'Epargne Loire Drome Ardeche (CELDA)

Although banks in many ways were the pioneers in data warehousing and data mining the non-banks are also heavy investors in this technology. And as each new loyalty card, air mile or award system is created a data warehouse and DM tools are rapidly attached. Charles Wendel of FIS consulting in New York believes that there will be a shake out in the banking industry. He sees that "banks are taking lessons from non-banks, and those that plan on surviving will need to know how to mine their customer database and create defensible niche positions."

"those organizations that plan on surviving will need to know how to mine their customer database"

Farmers Insurance Group

Insurance has been using analytical / actuarial tools for years in their approach to offering actual product but is only recently they have used tool to access and understand all the data they have been accumulating. Farmers Insurance Group has begun data mining

Customer Relationship Management For E-Business

expeditions by using IBM's DecisonEdge software. They tried to understand the interaction of several variables out of the 200 individual pieces of information tied to each policy. In digging in they found that sports car enthusiasts that were married and had a couple of children had very low claim rates. These customers were paying the same surcharge as the young single boy racers. So CRM was applied out of a data mining foray: Farmers lowered their rates on certain sports cars and customers that fitted the lower claim profile. One comment made by Tom Boardman, an assistant actuary in personal lines pricing, was "we are sitting on a gold mine"![3]

Data mining is a useful set of philosophies, tools and applications that can help any organization become more competitive. However technologies don't replace human capabilities but rather augment them.

Data mining products as yet don't understand the business. ***"The key to making a successful data mining software product is to embrace the business problems that the technology is meant to solve, not incorporate the hottest technology"*** (Dr Kurt Thearling). Any product or service used must be related to the business and will the result create some actionable information. Most of the products that currently create real value require statistical interpretation and domain knowledge. If the value you searched for was easy to get at then would it really have value. "Information has value only to the degree that the receiver has invested effort in getting it. Getting information without lifting a finger means that everyone else is getting it too, which means it is useless. The value of information is related directly to the degree that it is unique and that you can use it for personal benefit." (Stewart Alsop New Enterprise Associates)

You must augment human capabilities

Retailing

The supermarket chains have been at it for years collecting data from point of sale terminals and marrying that data with loyalty cards in an attempt to analyze market baskets. Their idea proven in action has been that you can increase the sale of "affinity products" by pairing them in the aisle. They are also using the data gleaned to assist in forecasting product sales. Some like Ames department stores in the US are thinking of creating store profiles based on each stores local selling pattern. Wal-Mart that may have one of the largest retail data warehouses in the world has carried out studies that have made and saved millions of dollars. From greater and more sophisticated logistic modeling and partner access to improving seasonal profiles and assortments in store that have helped to boost both revenue and margins.

Ames

Wal-Mart

Fingerhut

[3] Article "Data Mining Digs In," by Jennifer Lach

Customer Relationship Management For E-Business

An example in the retail industry that represents either the depth of knowledge that many catalogue retailers possess or where they have to go is Fingerhut now part of Federated stores.

As a direct marketer in the form of catalogues now available in a printed format and on the web they have been refining their CRM approach before anyone began calling it CRM. It produces over 130 different catalogues that are based on the segmentation models and propensity to buy findings derived form it's six terabyte plus data warehouse that monitors more than sixty five million customers especially the most active twelve million. There are about 3,500 variables we now study over the lifetime of a consumer's relationship with us, " said Andy Johnson, senior vice president of marketing at Fingerhut. "I can predict in the aggregate which customers will do similar things and data mining is a low-cost way for us to assess the buying behavior of groups of customers. " The data items collected include everything from specific product transactions to demographic data collected from customer surveys and enriched by outside research.

FEWER MORE PERSONALIZED CATALOGUES SAVE AND MAKE MONEY AT THE SAME TIME

They have used data mining to predict likely product purchases by customer group. They then created specific catalogues for these groups enabling the pruning of mismatched lists (reducing printing costs) and more targeted marketing.

In one study they found that some 20 per cent of their customers move each year and that they were three times more likely to buy items such as tables, fax machines, phones and decorative products, but were not more likely to purchase high-end consumer electronics, jewelry or footwear. Based on this data they created a special catalogue for recent movers.

Henry Singer Fashion Group

This menswear retailer in Canada demonstrates that you don't have to have a huge database to use the power of data mining. They currently process some 20,000 names.

In real CRM 'fashion' this retailer used to keep manual records of customer preferences but has moved to using it's point of sale system coupled personal insight and Data Mining. They can now tailor a wardrobe to meet customers specific needs based on intimate details such as the customer travels for their business and what are their hobbies. "We can do specific letters to our Canali, Brioni or Giorgio clients, or events such as a trunk show or a shoe clinic when a company's representative is coming in," said Elaine Saxer the manager of Henry Singers information systems.[4]

This retailer also carries out direct mail campaigns and attempts to focus on its most active customers by providing special attention.

[4] Article "Canada's Henry Singer goes for data-mining gold" by Adam Blair

POTS & PANS

Telecommunications (Telcos)

US West is typical of many POTS (plain old telephone systems) as they move towards the PANS (pretty awesome new stuff). This phone-service carrier has been analyzing millions of billing records to identify what it calls "high value" (based on revenue generated) customers who are likely to switch to another service provider. They are also interested in the "high potential"(what they might generate) customers who could create greater profitability by purchasing the right mix of service says Dennis DeGregor, US West's VP of database marketing. They go further and mine the data to compare the cost to serve against revenue generated. This requires analyzing detailed data about the vendor's network, including switching and infrastructure expenses, and service costs, says Jovan Barac, US West's director of decision-support systems. They want to move unprofitable customers into the profit zone. As with all strategies like this they want to cross-sell and up-sell products/services where the margins are larger and charging higher fees to cover costs, and shifting unprofitable customers to lower-cost service channels.

Bell Canada

As the Telco market continues to heat up with mergers and an increasing number of new products and services offered there is a need to better understand the customer and the business. To this end Bell Canada has been making some significant investments. They have been gathering as is now typical of many Telco's data from the Internet, billing, order management and customer service systems and coupling this with demographic as well as psychographic input to create a wealth of potentially useful information. Bell is no exception, but they have bitten the bullet and invested in data warehousing, (NCR Teradata) business intelligence tools and data mining.

They believe that the data collected from the clickstream, call records, customer interactions that amounts to a hundred million items a day and requires terabytes of data storage is just the price that must be paid to be in business.

"The future is in the marriage of business-intelligence and CRM software…we realize the most important thing is to organize our information by customer," said Bill Comeau, senior director of database marketing services for Bell Canada International Inc. in Toronto.[5] "We also use predictive models to help guide us in determining where we should place our network facilities."

They collate information from different sources around the company to get one single view of the customer. Various tools are then used against the data, such as SAS and Holos, to identify patterns, customer

[5] Article "Telcos turn to analytical tools to stay in touch" Information Week

Customer Relationship Management For E-Business

characteristics to enable the creation of trusted models of behavior and business opportunity.

WEB HOUSING

If maybe that Web Housing is taking over form Data Warehousing because of the need for Internet speed but much of the real value of this data will come from the marriage of terrestrial data with the web. Yet it this need for speed that is forcing change as it is now time to ask why have we been building these new systems. Losing lots of money cannot be the real objective of the Web can it? "People invested heavily in e-business are frantically scrambling to fill in an understanding of what's been happening through data analytics," said Douglas hackney, president of enterprise group Ltd., "The focus has been on getting the operational systems up----what they haven't had is why.[6]

Manage Customers and Prospects more Effectively

Data mining represents a means for all organizations to manage their customer and potential target customer relationships more effectively. To get to benefit from these techniques the organization must understand that there is a competitive world out there and that traditional methods of survival will no longer cut it. Hunkering down and attempting to out wait the competition is an 'activity' that will lead to oblivion. There is a need to invest your way into a profitable future.

WHAT IS THE VALUE OF INFORMATION THAT IS FREELY AVAILABLE?

What has become apparent in all the work in the marketing domain to date is the refinement of the abilities of companies to better segment their customer base. This segmentation / clustering to eventually the segment of one (maybe one to one) is of major concern to all. Data mining as a process is just one of the new technologies companies are using as they compete to retain their existing customers and try to gain potentially profitable new ones.

TECHNOLOGY TO COMPETE

The question of who are the profitable customers remains central to any plans regarding retention modeling and the use of data mining techniques. If you don't know who the profitable customers are how can you sensibly segment based on potential customer lifetime value. There are other articles in this series that explore profitability in more detail and recreating customer intimacy.

The final word is that all that glitters is not gold – the fine words and hype that surrounds data mining cannot hide the need for "common sense". If you have millions of customers, can a sampling routine help you better understand the mass or better understand the niche? Tools that can scan your whole data warehouse, data marts or multiple

[6] Article "Dotcoms cashing in on data analysis," PC Week

databases are now coming on to the market look for them. The quick fix is merely that!

About the Author

Customer Relationship Management For E-Business

Michael Meltzer is a Managing consultant at CSC and has over 20 years experience in Line Management, Consulting and Information Technology. He has authored many articles on CRM / E-Business, banking and computing using the customer focused approach, and is a frequent speaker at industry conferences. With a first degree in marketing and an MBA, Michael is ready to help your organization create your own sustainable competitive advantage. He specializes in three related areas of E-Business / CRM: Profitability Management, Marketing and Business Architecture for success.

Tel 44 (0) 1252 364207

E-Mail mmeltzer@csc.com