Bank of America Case Study: The Information Currency Advantage

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Abstract

This paper describes the external forces that motivate financial institutions to collect, aggregate, analyze, and mine data so that it can be transformed into information, one of a financial institution's most valuable assets. In this paper we refer to this strategic information asset as "information currency." In general, we describe the state of banking and the rapid global changes that affect financial institutions. We analyze how Bank of America (BofA) created and employed its information currency using the Teradata™ Relational Database Management System (Teradata RDBMS). The Teradata RDBMS manages a very large data warehouse (NCR Scalable Data Warehouse) for BofA using an NCR WorldMark™ 5100M MPP (Massive Parallel Processing) platform [Wck93].

1.0 Introduction

Financial institutions are drowning in a Sargasso sea of raw data pounded by waves of new applications and services. If money managers are not careful, these waves may become a tsunami, dashing them against the jetty of financial ruin instead of providing an opportunity to surf safely to shore [Arm96].

This paper's main focus is the banking industry and the experience many banks have had since the 1980s using the Teradata RDBMS to build data warehouses [Inm92]. These Teradata data warehouses have been used to re-engineer banking processes [Ham90] for customer information databases in order to create unified customer profiles for relationship banking (also known as "householding," "cross-segment marketing," "target marketing," "databased marketing," or "marketing to the segment of one."

The data is sourced from diverse geographical areas, different lines of business (for example, checking, savings, auto, home, credit cards, and ATMs), and/or from various online transactional systems (such as IBM's IMS, DB2, or CICS, as well as systems from DEC, Bull, NCR, Unisys, Siemens, Tandem, Fujitsu, Hitachi, and many others).

In [CK92] we described three categories of data warehouses: precision, discovery, and cross-functional views. That paper provided a "discovery" banking example for an institution that used its information currency to detect customer patterns. The bank data mined information about customers, which resulted in realization of the following factors and subsequent decisions:

1. Retention of customers with three or more services was high. Consequently, the bank targeted sales of new services to these customers and developed other retention programs.
2. Identification of customers shopping for the highest interest rate. These customers were not marketed to, resulting in a reduction in the frequency of opening and closing accounts.

The remainder of this paper is organized as follows: Section 2.0 describes the current and evolving state of banking. Section 3.0 provides a Bank of America (BofA) case study on information currency. (Note: information currency is our terminology, not BofA's).

2.0 State of Banking

Global deregulation, consolidation, and privatization—which reached U.S. shores in the 1980s and 1990s—allowed interstate banking and permitted banks as well as insurance, mortgage, and mutual fund companies to enter each other's markets. This set off a flurry of mergers, takeovers, and acquisitions. The U.S. banking consolidation began in 1985, and additional massive future consolidation is expected [Bro96]. The U.S. still has more than 10,000 banks [Eco1-96]. The 1995 GATT/WTO free-trade agreement increased competition worldwide. Bank privatization in Europe raised $22.5 billion from 1985-1995 [McR96], while bank privatization in the developing countries totaled $16 billion from 1990 and 1994 [Eco2-96].

In this increasingly competitive, deregulated, and global market, banks need to attain certain large economies of scale in order to compete. BofA can determine the merit of a potential acquisition by integrating the consenting candidate company's master-file tapes into BofA's investment analysis format. Not only can potential takeover and merger candidates be identified swiftly using the Teradata RDBMS, but also—once an institution is acquired—its customer information can be quickly integrated into the existing Teradata data warehouse.

Technological advances—such as the Internet, ATM machines, automatic payroll deposits, banking by phone, and home banking on PCs—are dramatically altering the banking industry by lowering entrance barriers for newcomers and increasing competition from new directions. These technological advances may even make vast networks of physical branch banks obsolete.

3.0 Bank of America: Case Study

Bank of America (BofA), based in San Francisco, is the third-largest banking institution in the U.S., with 1996 sales of $22 billion and profits of $2.9 billion—both up eight percent from the previous year (*Fortune*, 4/28/97).

BofA decided to implement [Kov97] a corporate marketing web site (intranet) using Teradata. BofA uses a 2-terabyte Teradata data warehouse running on a nine-node (8 CPU) 5100M WorldMark server with 1,700 users. The Teradata data warehouse started in 1986 with about 25 users and 20 GB of data. By early 1998 it had over 1,700 users and 2 terabytes of data. Over 40 OLTP systems feed the Scalable Data Warehouse™ (SDW) containing 38 million accounts. Data analysis includes: 1) profitability scores, 2) Channel propensity scores, 3) product propensity scores, 4) behavioral scores. The Teradata SDW is fully integrated into the BofA Call Center (CTI).

BofA has the largest data warehouse in the banking industry and maintains information going back five years on 36 million customer accounts from 30 different operational OLTP systems, including data on checking, savings, time deposits, ATM transactions, real estate, consumer loans, bank cards, and commercial loans.

BofA always had a lot of data, but the key to success is the database's transformation into information currency for use in the following:

- Target and cross-marketing
- Acquisitions
- Relationship banking
- Credit card tracking
- Customer intimacy
- Retail banking
- Portfolio analysis
- Credit risk management

A bank manager successfully used the system to detect that some customers were leaving because of unhappiness with the bank's fees. BofA was able to offer a low-cost checking plan targeted to these customers, thus halting the departures. BofA is trying to create the kind of intimacy between itself and its customers that existed 20 years ago.

The challenge to information currency is to provide greater access to detailed data for customer segmentation, clustering, and retention analysis as well as allowing more sophisticated analysis of the bank's financial metrics. The benefits of meeting this challenge are 1) decreased loan defaults, 2) increased customer retention, and 3) increased per-customer profitability.

Customers are placed on a continuum from most to least profitable. The goal is to retain profitable customers and deepen relationships, target products,

and convert high "potential" value customers to high value. Data quality is checked by plotting external data regarding customers' yearly income with the bank's internal data (BofA loan applications).

Information fed to the SDW includes checking, savings, time deposits, investment products, commercial loans, small business loans, consumer loans, real estate loans, credit cards, branch channel transactions, ATM/POS transactions, telephone banking transactions, PC Banking transactions, wholesale product & customer MIS, and global capital markets. External data includes Donnelley Demographics, Dataquick R.E. Loans (all lenders), Claritas PRISM codes, and Dunn & Bradstreet.

Loads can be daily, weekly or monthly. Data can be categorized as account-centric, customer-centric, product, ownership, sequencing, geography, profitability, and "scoring". Access types are: 1) Browser Access, 2) Analyst workstation, 3) Advanced analysis. Browser Access means standard reports, advanced SQL, database documents, project summaries, Web OLAP. Analyst workstation includes point and click, advanced SQL, and OLAP. Advanced analysis means statistical analysis, non-parametric methods, exploratory, and visualization.

Strategic blends of user access are: 1) time frame for results, 2) $$ impact of business decisions, 3) $$ expense of technology decisions, 4) staff skill set to execute. Data analysis includes 1) profitability scores, 2) Channel propensity scores, 3) product propensity scores, 4) behavioral scores. Channel decisions include intra- and inter-channel evaluation and call center reegineering. Product propensity models include small business, IMAX, home equity, and "next most likely purchase" models.

In 1994, all 35 of the bank's district managers were given access to BofA's information currency via Andyne's Graphical Query Language (GQL). GQL is a client-server-based desktop PC, point-and-click, query and reporting tool. At that time, more than 1,200 other users also used GQL, running as many as 2,500 complex queries daily to determine which products to offer to which customers.

More than 100,000 customers a day call BofA to check on their accounts. Once they're on the line, the bank has a sales opportunity. Check bouncers may need overdraft protection, or customers with high passbook balances may need a higher interest-rate product. With so much customer behavior information currency, BofA enhances and sells more services.

Numerous traditional and non-traditional competitors (for example, GM, GE, Microsoft, and Charles Schwab) prowl the information currency waters. To avoid shrinkage of the customer base, BofA plans to use Cray supercomputers in conjunction with the Teradata RDBMS to identify more profitable sales opportunities before the competition identifies and devours them [Ver95]. For example, the BofA sales team can now sculpt detailed demographic views of select groups of customers and then tailor its offer for remortgage loans and other financial products. Also, BofA can now data mine for targeted information (such as how many of the 6,000 Silicon Valley residents in a particular sales district own Acura Legends and golf club memberships, or which Hispanic customers are potential first-time home buyers) [Hof95].

BofA uses the Teradata RDBMS to analyze trends in its relationships with customers to determine which are likely to purchase a particular bank product or service. The bank can thus tailor promotional mailings to the interests of specific customers [IW94]. Information regarding the bank's $28 billion mortgage-loan portfolio are also maintained by the Teradata RDBMS. These loans can be sold as securities to Fannie Mae, Ginnie Mae, Freddie Mac, or to private investors.

The system proved invaluable in the aftermath of the devastating January 17, 1994 Los Angeles Northridge earthquake, allowing the residential lending group to discern within minutes its potential losses [Bar94]. BofA was able to determine immediately—by ZIP code—how many and what type of real estate loans they had in those areas affected by the earthquake.

Deregulation of interstate banking has allowed BofA to expand eastward by merger and acquisition from its base in San Francisco. A newly acquired regional bank's customer information can be quickly integrated with the 36 million accounts already in the data warehouse. BofA merged with Security Pacific (also a Teradata RDBMS user) in 1993 and, subsequently, increased its Teradata data warehouse capacity to accommodate the new data. In 1994, the Federal Reserve approved BofA's $1.9 billion purchase of Chicago's Continental Bank, making BofA a major presence in Midwestern business banking [DMS 94].

Before using the Teradata RDBMS, commercial lending officers spent substantial amounts of time before loan renewals querying different operational

systems to gather information on borrowers and co-borrowers. After the Teradata RDBMS was installed, full information on all loans up for renewal became available one month in advance, including commercial loans, consumer loans, real estate, deposits, credit cards, and so on. Bankers now have more time to analyze their data for breaking waves of opportunity [ATT 95].

In 1994, an internal paradigm shift occurred in which the bank began allowing non-technical managers access to the Teradata RDBMS using GQL directly from their desktops. Users no longer had to come to MIS with their requests but could instead access the Teradata data warehouse directly. Other access tools in use include NOMAD and Micro Decisionware's PC/SQL link.

BofA uses a three-part iterative process for using the Teradata RDBMS to enhance its information currency:

1. Growing the business through marketing support and acquisition.
2. Cross-selling by "householding," target marketing support, and branch support.
3. Increasing profitability by lowering risk, creating opportunities, and improving auditing processes and compliance to regulatory agencies, such as the Federal Reserve.

Householding involves creating a unified picture of all of the different accounts in a household, including credit cards, checking, and savings, as well as consumer, home, and car loans. In this three-part process, you can see how one step feeds into the next in a continuous cycle.

As regional banks are acquired, new opportunities to cross-sell are found. Risk is spread over more customers, whose profiles and payment histories can, in turn, be monitored to avoid bad decisions when granting credit. In summary, BofA has stated its belief that this process is powered by the integrated view, flexible access, timely data, and cost-effectiveness that the Teradata RDBMS provides.

4.0 Conclusion

We described the global forces that are changing how and where people bank. We also provided a case study analysis, demonstrating how BofA uses the Teradata RDBMS to convert raw data into a strategic information asset (information currency). We described several BofA information currency applications and uses.

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