

Multidimensional Analysis of Performances in a Credit Brokerage Entity

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Abstract. *This paper presents some proposals on a multidimensional database model that helps analyzing the performances of a credit brokerage company. The brokers' activity is influenced by many factors, which were considered when creating the dimensions. The physical model implemented, and some analysis capabilities this data structure offers to the users. The model is loaded, at the physical level, with a data set, for testing purposes.*

Keywords: multidimensional, performance, credit broker, activity, measure, influence.

JEL Classification: C88, C80.

1. Introduction. Literature review

The credit broker is a legal entity that acts on the financial market as an intermediary between credit granting actors, the commercial banks, on one hand, and the credit solicitors, on the other hand. The main purpose of the credit broker is to “sell” credits to solicitors, while making sure the requests for credit and attached documents fully comply with the granting banks rules, which are enforced in the same manner as for the credits demanded directly to the bank. A successful credit, that is a credit approved by the bank and subsequently “drawn”, delivered to the customer, will enable the broker to receive a financial commission that forms the base of its business model and, of course, its incomes.

The credit brokerage company employs consultants whose educational and professional background, skills and abilities should be focused on two directions: sales and banking. Their role assumes contacting new potential customers for the company and then, upon realizing the customer’s need for a financial resource from a banking loan, advising the client through the process of credit application, as defined by the guidelines of the bank. There is to be noted that banks also have specialized departments that represent a serious competition for the credit brokers. As any provider/supplier in a competition-driven economy, the credit broker company must strive to offer quality services for the customers, taking into account the complexity of procedures related to credit approval elaborated and enforced by the banks.

Anghelache and Anghel (2014) develop on economic and financial-monetary modeling. Anica-Popa and Manole (2014) present some considerations on the use of multidimensional data structures in the analysis of turnover. Popa et al. (2006) describe the applications of Sql Server in data analysis. Sivakumar (2012) present the use of Sql Server Analysis Services. The principles of data warehouses are covered by Gallo, De Bonis and Perilli (2010). Also, the MSDN official library was a useful reference in the research covered in this article.

2. Data warehouse design

The design of the data warehouse should pursue, at first, the identification of the activity measures available. The model proposed in this paper will focus on the following measures:

- The amount of credit requested by the customer;
- The amount approved by the bank and drawn;
- The commission (income) received by the broker.

Of course, the first measure is relevant to all credit demands, while the other two are applicable only for approved credits. The structure of the *fact* in this business environment is outlined by the credit request, a document completed by the customer, which will form, in our approach, the base of the fact table.

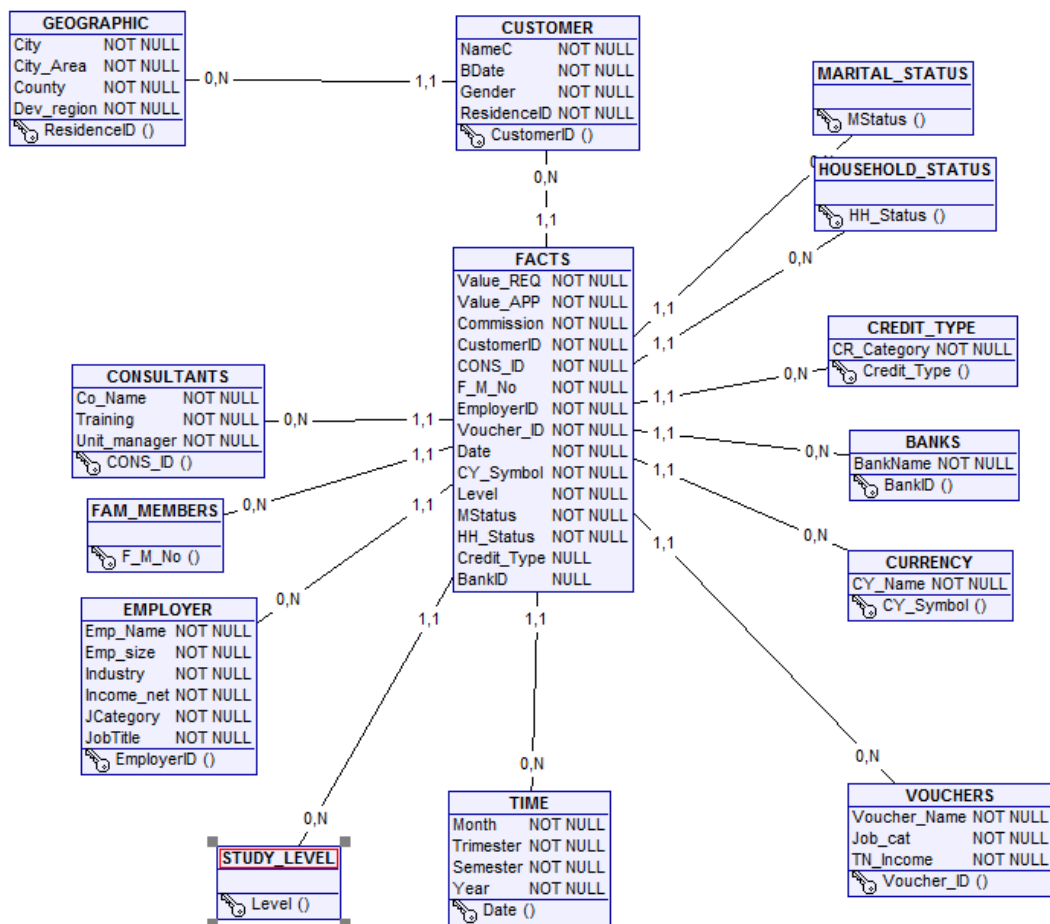
The dimensions relevant for the purpose of this paper are the following:

- a. Clients/solicitors. They are the most important factor, for the brokerage company, in achieving an income and thus in performing a successful activity. As stated before, the client has a well-defined need for financial support and resorts to applying for a credit, from a bank. Then, the client must be provided with accurate consultancy, and properly guided through the complexity of the credit approval process. It can be reasoned that a customer well-satisfied will address the services of the company for a future application, or can recommend the company to new customers. Some characteristics of the customers are to be included in separate dimension, as their values can change over time;
- b. Number of family members: is a criteria that can be used in analyses, to separate several categories of credit applications. As two or more different values can be associated, at different moments, to a customer, the solution is to define a separate dimension, linked directly to the fact table, as its value realization depends, as time reference, on the date on which the application is signed;
- c. Employer: the company where the solicitor is employed, also there is to be described the net monthly income at the date the application is submitted, the job category, as a solicitor can be placed in one of the following categories: employee, entrepreneur, retired etc., also the job title, at the date of application;
- d. Level of studies, also at the date of application;
- e. Marital status;
- f. Household status (owner, co-owner, lives with parents etc.);
- g. Consultants. They represent the interface between the company and the customers and their role is essential in both core plans of their activity: enlarge the customer base of the company and offer quality service during their business relationship with the customer. If the number of consultants is growing and a single manager cannot handle the supervision of the whole team, they can be split into more teams, each headed by a team leader – unit manager;
- h. Credit types. The brokerage company acts in its intermediary role on the basis of contracts signed with banks, contracts that specify, among other provisions, what types of credit can be applied for through the credit broker, the percentage values that form the base of commission calculation. The credit offers can be grouped in several major categories: credits for personal needs, credits for auto acquisition, real estate credits etc.;
- i. Banks. They are the “other side” of the broker’s activity model, but they are an equally important actor in the business process, as the broker must make sure its customers’ characteristics are compliant with the procedures of the banks;
- j. Currency. Based on their attitude towards risk, on the currency on which their incomes are computed, the advantages/disadvantages related to various types of credits, in different currencies, as offered by banks, customer can opt for a currency that governs the value of the credit received and the amounts of rates scheduled for credit reimbursement;
- k. Voucher. A voucher is a person that assumes the payment of credit rates when the initial holder of the credit obligations (at this stage, the customer/solicitor) is unable to fulfill its duties – to pay the rates himself;

- l. Guarantees-collaterals. The credit policy of the bank might impose collaterals to be brought by the customer, to support his “cause” in front of the credit approval department. The value of the collateral might be an interesting analysis factor;
- m. The geographical dimension. As the address of the customer can modify, a more accurate evidence of the customers’ geographical distribution can be presented in a separate dimension.

A structure of the conceptual model of the data warehouse is presented in the figure below:

Figure 1. Conceptual model of the CBroker data warehouse, as designed with Open Model Sphere



3. Data warehouse implementation – towards the physical model

The implementation of the data warehouse starts with the design of the physical model and the insertion of data from a data source. For the scope of this research, a data source is available, with a dataset that is to serve for testing purposes. The data source is a

relational database, including data on the items covered in the previous section (credit requests, solicitors, consultants etc.), being originally designed to support the daily operations of the brokerage company. However, the relational model is not fully compatible with the data warehouse, and some data transformation processes are necessary. Therefore, a data staging area was defined, under SQL Server 2014 Database engine, which will enable the use of relational database instruments to adapt the initial dataset to the structure of the data warehouse.

Two of the fundamental aspects in the transformation of data from relational to multidimensional database are the creation of the fact table and the time dimension. There are three measures of activity, of which two are direct inputs (from the data source), while the third measure is to be calculated, by applying the percent commission negotiated with the bank to the value of the credit approved. The value of the commission is calculated in the source database, for operational reporting purposes, therefore there is no need to define a separate procedure in the data staging area, only the appropriate value must be inserted in the facts table.

Since a dataset already exists, the dimensions describing the study level, marital/household status, number of family members, employer can be drawn from the source database, which includes a comprehensive table *SOLICITORS*. The procedure applied for the first data set is presented in figure 2.

Figure 2. *Design of the simple dimensions of the model*

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Insert Into Fam_Members Select Distinct No_Fm From Solicitors
Insert Into Household_Status Select Distinct HH_Status From Solicitors
Insert Into Marital_Status Select Distinct Marital_Status From Solicitors
Insert Into Study_Level Select Distinct Studies From Solicitors
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Following all the preparatory operations, a data warehouse is obtained, under the physical form of a multidimensional database stored in SQL Server Database engine, which can be further used for analyses.

4. Conclusions. Future research directions

The data structure implemented upon the structure represented in Figure 1 will form a unique source for developing the data analysis (client) component of the application. The author proposes, as further research directions, to build a set of reports that exploit the data analysis instruments and techniques provided by the software application used.

For a credit brokerage company, whose volume of activity and data is significant both as frequency of new additions and historic data collected in the previous years, the multidimensional model proposed could represent the core of a data analysis application, destined to provide key information to the managers, apart from the information drawn from current, operational reports.

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