

18 months to make an Analytical CRM dream come true: results obtained by Vodafone Omnitel in B2B churn prevention

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Abstract

Implementing Analytical CRM, are you ready to go? You need money, commitment, technology, right skills and management . . . , just like John Belushi had sun glasses, half a tank of gas and above all a strong and determined will to go.

Are you worried about the monsters you will encounter, before getting a possible return on your investment? We would be glad to share what the following points actually mean:

- *Allow the IT resources the necessary time to prepare the infrastructure for “the big project”, but do not wait until the CRM environment is available;*
- *transform your business goal into a non trivial analytical design;*
- *build a predictive model for churn prevention, considering the future data production process, the continuously changing characteristics of the offer, the timing and details of the customer caring activity,*
- *implement in a new production environment a data mining process, developed off-line;*
- *do not reach paradise, but achieve a reasonable quality standard to start with successful.*

1. Introduction

Churn management of ones clients entails the optimisation the client number turnover while minimising the out-flow of profitable clients, which is typical in the contest in which we are operating, namely that of highly competitive mobile phone telecommunication companies. In concrete terms, this means analysing the phenomenon of attrition with the aim of predicting the single out-going churn event on the basis of the succession of behaviour that the client displays in a defined period of time.

Predicting churn on behalf of ones clients using multi-varied statistical methodologies, equates to a basic competitive advantage for Vodafone Omnitel because it allows them to adopt counter-measures for maintenance and loyalty of so-called “at risk” clients: in doing so, a preventative approach to churn is adopted rather than a costly cure approach.

Predict to prevent: this, then, needs to be the final goal of a churn management system that will assist Vodafone Omnitel in the construction of a privileged and long-lasting relationship with its clients.

2. Presentation of Vodafone Omnitel and Nunatac*

2.1 Vodafone Omnitel

Vodafone Omnitel, the private mobile telephone operator, has been present in the Italian market since December 1995. From the outset, Omnitel stood out for its innovative approach, which made it a driving force for change in the Italian telecommunications sector, both from a commercial point of view and with regard to the communications services on offer. Omnitel placed the customer at the centre of every

activity and initiative, developing a new Customer Relationship Management Model, based on themes linked to innovation, development and progress.

Having become part of the Vodafone Group, the world's biggest mobile telecommunications group, as of April 2000 Omnitel now boasts about 16 million subscribers, 8 operational call centres spread around the country, over 2,000 retail outlets and 137 Spazio Omnitel stores. The GSM network covers 97% of Italy, representing 99.4% of the population, as does the GPRS network, which was completed at the end of 2000. Omnitel currently has international roaming agreements with 81 countries.

2.2. Nunatac

NUNATAC is a European Quality Partner of SAS, composed of a group of professional consultants with statistical, computing and marketing skills.

The defining characteristic of NUNATAC is the combination of specific abilities and a well developed "know-how" in the field of Database Marketing.

Over the course of the last 9 years, Nunatac has developed vertical market capabilities in the following sectors: Banking, Insurance, Mail Order, the Automotive Industry and the Cellular Phone Industry.

3. Goal of the Project

The goal of the project is to predict the probability of churn for corporate clients. In concrete terms, this

translates to the construction of a model, which can assign to each client a probability that they abandon the company, or that they drastically reduce the use of its services, in a period of time measured from the moment of prediction.

This is carried out via a multi-varied statistical operation of particular behaviours that the single clients manifest in a fixed period of time that precedes the moment of prediction. The aim, therefore, is to summarise, in terms of a score, the symptoms of dissatisfaction, on different levels, of the clients, so as to anticipate their decision to churn or to reorganise the supply of services from Vodafone Omnitel.

This obviously entails:

- assigning a probability of churn to each client in a future defined time period;
- drawing up a list of “high-risk” clients;
- setting up a Customer Care service which will formulate alternative proposals that look at needs which have not been addressed up to that time;
- recording, with the assistance of hindsight, the containment achieved in the rate of “Customer Attrition”.

4. Description of the project: from churn model development to operative test

4.1 The corporate client

A feature of corporate clients derives directly from one of the requirements that needs to be satisfied when taking out a company Telephone plan, be it a normal contract plan or a prepaid one. That is, activation is only possible with a minimum number of SIM cards. This is considered at all times whenever we are dealing with a corporate client. When our goals are to seek answers to questions of the type: “Is the client high or low value?”, “Is the client inclined to take our certain tariff plans and/or services?”, “Is the client a high or low churn risk?”, then we cannot disregard the fact that the client, in this case, is the “summary” of its own company SIM portfolio. Given the high behavioural uniformity of the SIM cards of the one client, it is more appropriate to undertake an analysis of client logic unity rather than the client’s individual SIMs, which is what normally occurs in the case of consumer clients. This approach was also adopted in the analysis which is the subject of the present paper:

1 SIM CARD ✕ 1 CLIENT
1 CLIENT = 1 COMPANY SIM PORTFOLIO

4.2 Analysis Methodology

The objective of the project was to define a rule that assigns a probability of churn to each client so as to

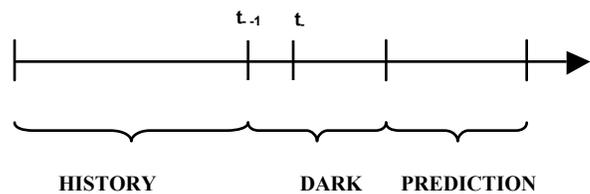
periodically identify the clients that have the highest churn risk. This was done using propensity models whose development required a precise definition of:

- the predicted time period;
- the analysis Population;
- the typology of the clients;
- the target variable;
- the explanatory structure.

4.2.1. The temporal dimension

To better predict attrition, it is of prime importance to specify the time period in which to study the phenomenon. In our case we identified three intervals: the *prediction period* (on which the target variable is exploited and the prediction is carried out); the *dark period* (consisting of the time required to update the data warehouse and the insertion into the system of the contract cancellation); the *history period* (required in order to construct the model input indicators which consider the evolution of the client in time). The models obtained refer to the temporal dimension as shown in the following diagram:

Diagram 1



In the production phase, the prediction horizon of the model will be the months following the days of commercial darkness.

4.2.2 The Reference Universe

What we are dealing with here are all the active corporate clients at the temporal moment t_1 with the exclusion of several categories:

- clients deactivated in the dark period;
- clients deactivated involuntarily (in the case of Vodafone Omnitel cancelling service to insolvent clients or the physical replacement of the SIM card);
- big clients;
- clients with no traffic in the whole 18 months considered (the three periods, history, dark and prediction).

4.2.3. Client typology

The dynamics of churn among clients turn out to be differentiated according to their individual characteristics, even in terms of requirements and the terms of the contract. In the case in point, we

distinguished between clients which took out only *company prepaid SIMs* and those that also took out a *subscription type contract*; this last group was subdivided on the basis of the percentage of SIM cards with obligations; lastly, we took into consideration the size of the client thereby obtaining the following analysis segments:

	With obligations	Without obligations
Contracts Big Clients	X	X
Contracts Other	X	X
Prepaid		X

This basic segmentation was further reduced to three segments which are numerically more relevant, and for each one a propensity model was constructed for the specific churn:

1. *Prepaid*,
2. *Contracts With Obligations*,
3. *Contracts Without Obligations*.

4.2.4. The target variable

The constructed models are able to predict *voluntary churn* of a client. With reference to the three-month prediction period, clients who satisfied the following were considered targets:

- those that had deactivated completely their own company SIM portfolio within the end of the prediction period (deactivations must be voluntary; this is *real churn*), or
- those that had drastically reduced total outgoing traffic compared to the preceding three months (reduction of more than a third; this is *reduced traffic churn*).

4.2.5. The explanatory structure

The fundamental concept behind the formulation given to the project, is, as we have already explained, the step from SIM entity to an entity which is hierarchically more advanced, that of CLIENT. At the time of the development of the models, the company's Data Warehouse (DWH) predicted the recording of the information almost completely at a SIM level. As we didn't have access to the definitive data environment, we had to revise the data available in the system to reach the unit which interested us from a Corporate perspective: in other words the Client, proceeding with particular caution, and trying to minimise the loss of information. An example of the process is as follows: The variable *Tariff Plans*, at the SIM level, form an extremely detailed piece of information; at the client level, it was revised as a percentage distribution of the SIMs associated with

the client compared to the type of tariff plan considered important at a company level.

The analysis dimensions brought together in the Customer Table, which was constructed expressly for the development of the churn models, refer to the following categories:

1. General client features: activation areas, activation channels, ...;
2. Seniority of client: in terms of average seniority of the active company SIM portfolio, last contact made and months since first activation;
3. Snapshot of company SIM portfolio at t_1 : number of SIMs, tariff plans, options, obligations, ...;
4. Dynamic of company SIM portfolio in the 12 month history period: calculation of deviation indicators on quarter summaries of the number of active and deactivated SIMs;
5. Client traffic at t_1 : incoming and outgoing traffic (with relative split for traffic guidelines), number of SIMs with zero traffic;
6. Traffic dynamic in the 12-month history period: calculation of deviation indicators on quarter summaries of incoming and outgoing traffic (differentiated by traffic guidelines).

4.3. Construction of the models

The churn models were produced by applying the technique of Decision Trees; this choice was made because of the need to obtain an instrument that was legible and was able to be interpreted not only by analysts; this algorithm rendered the Department's work easier with reference to the spreading within the company of the obtained results and of the way the actual project was carried out. In general, the results obtained using this technique can be interpreted in a more immediate and direct way compared to the results obtained using other Data Mining techniques; also, the algorithm guarantees a good performance and proves to be at the same time sufficiently robust from a perspective of model scoring at a later time.

4.4. Implementation of models in production

The definition of the characteristics and the requirements of the data structure needed for the development of the models, occurred with the help of data drawn out expressly for this project. In May 2001, which is when the work commenced, IT was engaged in functional analysis for the construction of a production environment to be used for the development and the production of all the modelling concerning the clients Vodafone Omnitel. This environment, named SAS4CKM, puts the company DWH (based on Oracle DB), in touch with SAS tables which have a simplified structure across a very easy-to-use interface. Marketing analysts, who comprise the main users of this application, are able

to specify alone the Data Mart for the analyses they intend to carry out.

In this new environment the implementation of churn models required a significant commitment which gave form to a series of steps with the following aims:

1. *transmit the specifics to IT* for the construction of the Table containing all the information used for the development, both as analysis variables and variables useful for profile description. The key for the table is the client. Also, the calculation of the indicators already includes all the SIMs that belong to it.
2. *Historical recovery* of the information. SAS4CKM carries out the loading of the data every month. To be able to test the models, access to 12 months' history was required. So, in November 2001, when the pre-production phase that was needed to test the constructed environment commenced, data was recovered to reconstruct the history of active clients in October 2001, going back to November 2000.
3. At this stage, a data audit activity was planned whose aim was to verify that the indicators were constructed correctly, that the distribution of variables corresponded to the development environment, and that the results were consistent with what was obtained with the data a year before. The activity carried out was of considerable importance for both the identifying of problems linked to the data loading and to gain an understanding of the availability of a data environment which was certainly similar to the development one, but not completely identical. For example, the very definition of company SIM portfolio is slightly different:
 - In development: only company type SIMs;
 - In production: all the SIMs, both company and individual.

This phase forced IT to carry out multiple loadings with the aim of making up for inconsistencies as they were detected.

4. In January 2002, the first list of high risk churn clients was extracted, thereby commencing client prevention and recuperation actions. The Operative Test was based on a pre-production environment, which was almost entirely in line with the structure thought up for the model implementation but in any case referred to the active clients in October 2001, three months before the beginning of the churn prevention activities.

5. Conclusions

What has been done up to now and the results obtained with the Test Campaign provide us with

multiple elements which constitute the basis for further reflection with regard to:

- Targeted churn prevention actions, studying the client profiles;
- Evolution of the clients over time with regard to churn inclination and measured behaviours following recovery actions;
- How to best exploit the production environment: the monthly extraction of lists of high risk churn clients now requires an effort to integrate SAS4CKM with the campaign management software; at present, the extraction of a list requires an exercise in creaming off and of checking, carried out off-line, with regard to clients who have already been contacted in other campaigns or who have been classified as high risk in the preceding months and therefore who have already been contacted. The list, in a particular format, is given to the Campaign Manager to trigger a contact action. The results, recorded within the same Campaign Manager, are in turn dealt with off-line for result summaries.
- The goal is to achieve an ideal design in which all the process components communicate within just one flux.
- In this regard, we consider what has already been experimented with the implementation in production of a model developed off-line:
- The organisation of different players, resources and abilities requires a huge organisational operation, in terms of communication, transmission of concepts, especially if the intent is for everybody involved to achieve the same goal.

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