# Contents

# 1 Business Objective

## 1.1 Background

xyz.

## 1.2 Business Case

Given the need to increase revenues and continuously empower XYZ company value creation culture it was necessary to further improve and develop its capability of Customer Analytics, particularly in the topic of the Next Offer, which is the selection of the best offer for each customer, in order to attend their needs, accordingly to their behavioral, socio-demographic and life cycle characteristics, but also considering the revenue generated and other strategic issues involved in the offer of products and services.

This document serves as live reference for the most appropriate approach to the Next Best Offer, to detail all the necessary processes and analytical models, and to provide the guidelines and best practices on model development and implementation.

The Next Best Offer (NBO) Project was divided into:

- **Strategic Definition** – definition of the NBO process and the necessary analytical models;
- **Analytical Model Development** – development of all analytical models;
- **Process Development** – development of the processes for setting the NBO;
- **Implementation in Production** – set all the scoring and NBO processes in production and monitor the results.

# 2 Project Management

## 2.1 Project Roles

### 2.1.1 XYZ Team

The following list describes the team involved in this project:

| | |
|---|---|
| Marketing Manager | |
| | |
| | |
| | |
| | |

### 2.1.2 SAS Team

The list following describe the practice team involved in this project:

| | |
|---|---|
| Customer Advocacy | Amul Desai |

## 2.2 Project Plan

As mentioned above the main involvement of SAS Team is in the **Strategic Definition**. The suggestive time frame for the project, as well as its activities and deliverables are show in Table 1.

**Table 1 – Project Time Frame**

| Phases | Activities | Deliverables | Days | Effort (days) |
|---|---|---|---|---|
| Planning, Assess and Define | Review Plan and Detail Scope | Document for Definition of approach to Data Mining | 3 | 5 |
| | Define the Universe (Study, Modeling and Scoring) | | | |
| | Define the Category (Products) to be Included | | | |
| | Define Scoring Process | | | |
| Analysis and Evaluation - Requirements | Evaluate Data Requirements | Document with the evaluation of data and infrastructure to develop the necessary models and to implement the processes | 5 | 8 |
| | Evaluate IT requirements | | | |
| Strategy Definition for the Next Best Offer | Define the Predictive Models | Document Defining the Next Best Offer Strategy and Process | 6 | 12 |
| | Define "Push v/s Pull " Effect | | | |
| | Define Economic Value | | | |
| | Define Business Rules | | | |
| | Define Sequence Rules | | | |
| | Define any other Policies, if exist (commercial) | | | |
| Definition of the Development plan | Define Development and Analytical Approach | Development Plan Document | 4 | 10 |
| | Define Target Variables | | | |
| | Plan Development Phase | | | |
| Definition of the Implementation plan | Design Data Model (ABTs) | Implementation Plan Document | 5 | 10 |
| | Define the Production Process | | | |
| Definition of Monitoring Reports | Define Production Monitoring Process | Monitoring Processes Document | 2 | 5 |
| | Define Successful Sales Monitoring | | | |

## 2.3 Key Risks

Key risks were identified:

# 3 Methodology

For this project following Methodology phases should be used:

- Assess and Define;
- Analyze and Evaluate;
- Define Data Mining Target;
- Create Data Mining Data Mart (just ABTs definition).

## 3.1 Assess and Define

### 3.1.1 Define the Business Problem

In order to best serve their customers with products and services they need and at the same time increase revenue, reduce marketing effort and costs and achieve better offer conversion rates, XYZ COMPANY dedicated to implement a process to obtain the 3 next best offers (category/product) for each customer.

In this way it was necessary to define the entire process and universe of customers to be focused. The customers likely to be subject of study on the Next Best Offer (Study Universe) must meet the following general restrictions:

- To be a Loyalty Base Customer;
- To be an Individual Customer;
- To be an Active Customer (last x months);
- To have an open account ( last y months);
- To be aged a- b years old.
- ..
- ..

The Study Universe will consist on: (1) Modeling Universe, (2) Scoring Universe and (3) Offer Universe, as show on Figure 1.

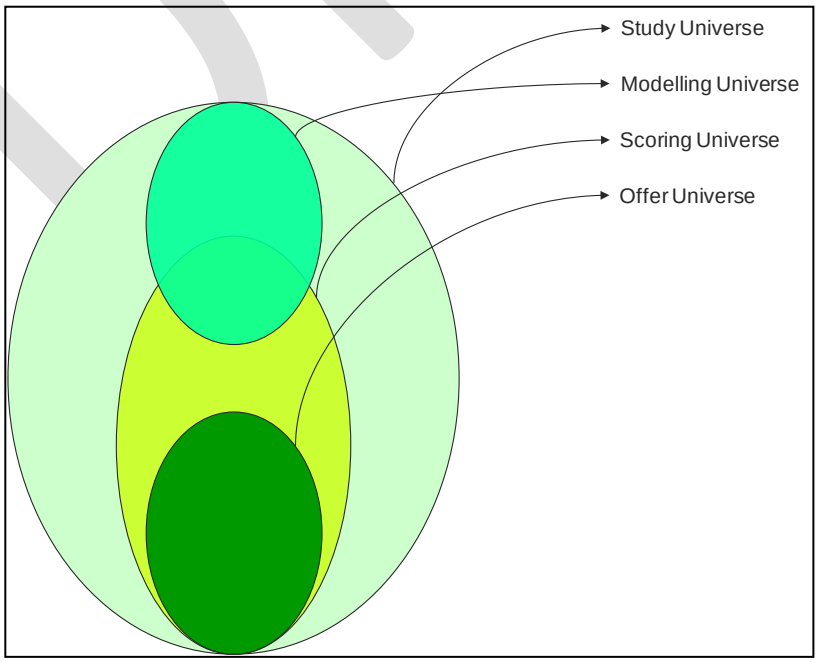


**Figure 1 – Study Universe**

- **Study Universe** – Customers subjected for the Next Best Offer analysis;
- **Modeling Universe** – Customers to be used on a given model development (meet modeling restrictions);
- **Scoring Universe** – Customers which can receive a score form a given model (meet scoring restrictions);
- **Offer Universe** – Customers which can receive a Next Best Offer (meet business restrictions).

### 3.1.2 Process

The Next Best Offer process will be based on 6 stages:

1 Select the Universe by applying a set of generic restrictions and possession of Categories (products);
2 Calculate the scores - probabilities of cross-sell and up-sell for each product;
3 Weight the scores by "Push" effect, Economic Value and Commercial Policies;
4 Exclusion of offers according to rules of business;
5 Adaptation of the Next Best Offer taking into account a Sequence Analysis;
6 Obtain of the Next Best Offer.

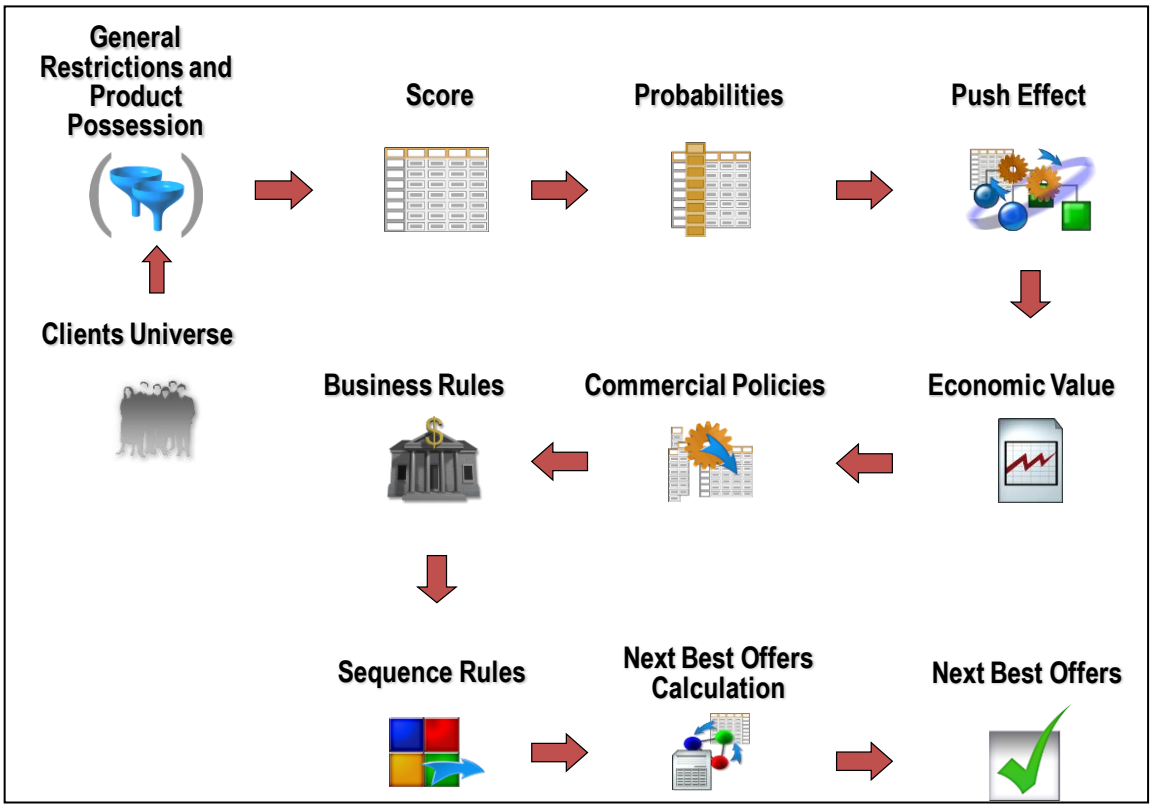


**Figure 2 – Next Best Offer Process**

### 3.1.3 Final Output

The final output of the Next Best Offer process is a dataset with Customer IDs and next best offers identification sorted by their relevance.

## 3.2 Analyze and Evaluate

### 3.2.1 Development

The entire process of the Next Best Offer, in development can be viewed as shown on the Figure 3. Consequently, it is necessary to develop the following processes:

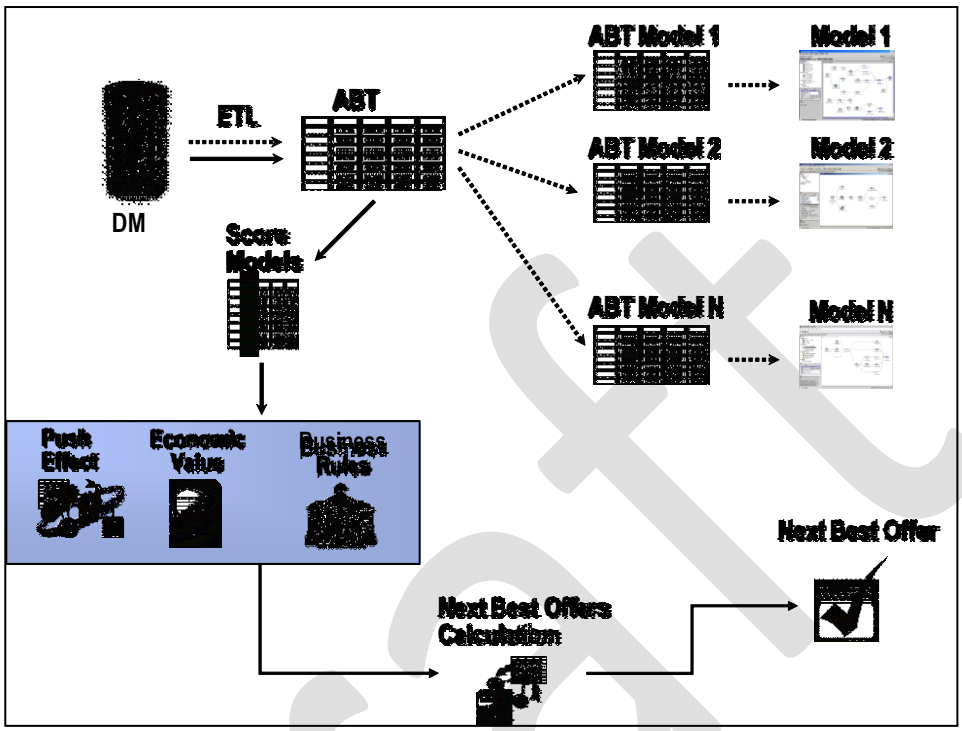


**Figure 3 – Next Best Offer Process (Development)**

- ETL process to select of the Study and Modeling Universes, by applying a set of generic restrictions and Category (products) ownership;
- Develop ETL process to generate the ABTs that will be used to develop models;
- Develop the analytical models for Cross-Sell and Up-Sell;
- Develop ETL process to generate Scoring ABTs;
- Develop the Scoring process;
- Definition of the "Push" Effects – data set;
- Definition of the Economic Value for each product – data set;
- Definition of Other Policies – data set;
- Develop ETL processes on existing business rules (including rules of closure and limitation of age to offer products);
- Establishment sequence rules, which is the creation of great baskets of acquiring products;
- Define the weights of "Push" Effects, Economic Value and other Policies to obtain weighted probabilities;
- Define termination which rules to impose a business which will result in a possible exclusion ;
- Adaptation of the next best offer in view of great baskets previously obtained (by setting up rules for sequence);
- Calculation of Next Best Offer;
- Make the Next Best Offer table available.

### 3.2.2 Categories (Products)

It was necessary to define what category (products) would be subject for the Next Best Offer, which will also determinant to define the necessary predictive models. The following categories (products) were included:

- Men's
- Kids'
-

## 3.3 Define Data Mining Target

### 3.3.1 Predictive Models

In order to obtain the Next Best Offer it is necessary to have the Cross-Sell and Up-Sell probabilities for all products. Table 2 shows all the necessary predictive models.

**Table 2 – Cross-Sell and Up-Sell Models**

| Product | Cross-sell | Up-Sell |
|---|---|---|
| Men's | ✓ | × |
| Kid's | ✓ | × |
| | | |
| | | |
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### 3.3.2 Analysis and Prediction Horizons

In this type of models is necessary to use a time horizon to make the prediction of the event, the Prediction Horizon, which in this case it was defined as 3 months after the current month.

The Analysis Horizon is the time period, prior to the current month, it contains the information about customer behavior, and in this case it was defined as 12 months.

These are illustrated in the Figure 4.

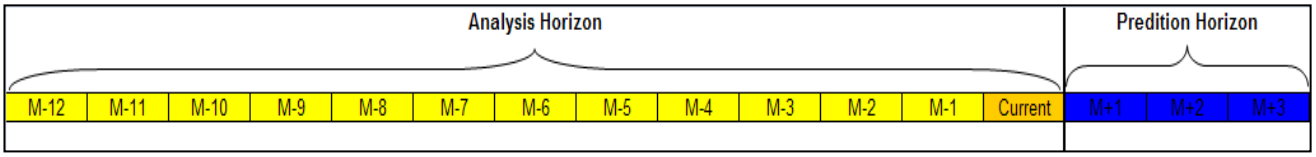

**Figure 4 – Analysis and Prediction Horizons**

The modeling ABT will be formed by customers into time windows, referring to different Horizons which contains their behavior variables and the target variables for those periods, as illustrated in the Figure 5.

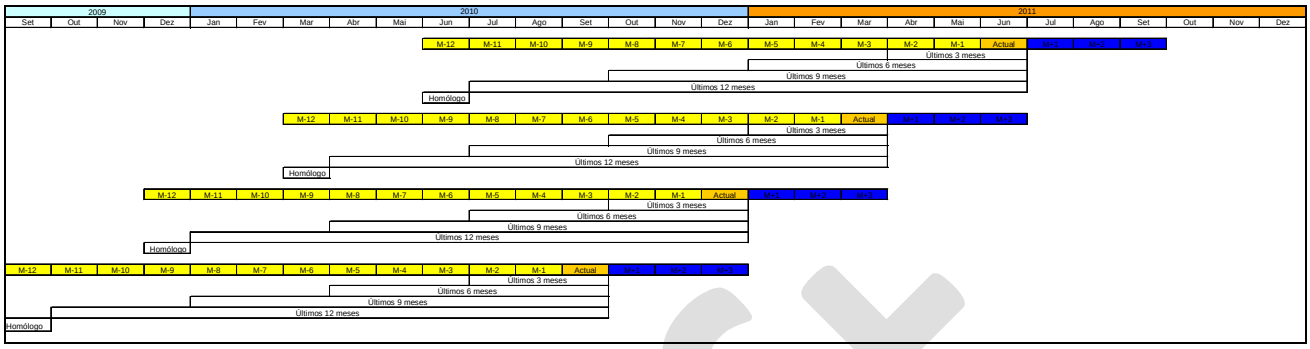


**Figure 5 – Time Windows**

## 3.3.3 Data Preparation

The data preparation processes for the model development as illustrated in the Figure 6, is composed by 3 major steps in which customers data are collect from a data mart, accordingly to the defined number and period of time windows forming a General Development ABT, then it is divided into N different ABTs one for each model accordingly to the modeling universe (see Restrictions below).

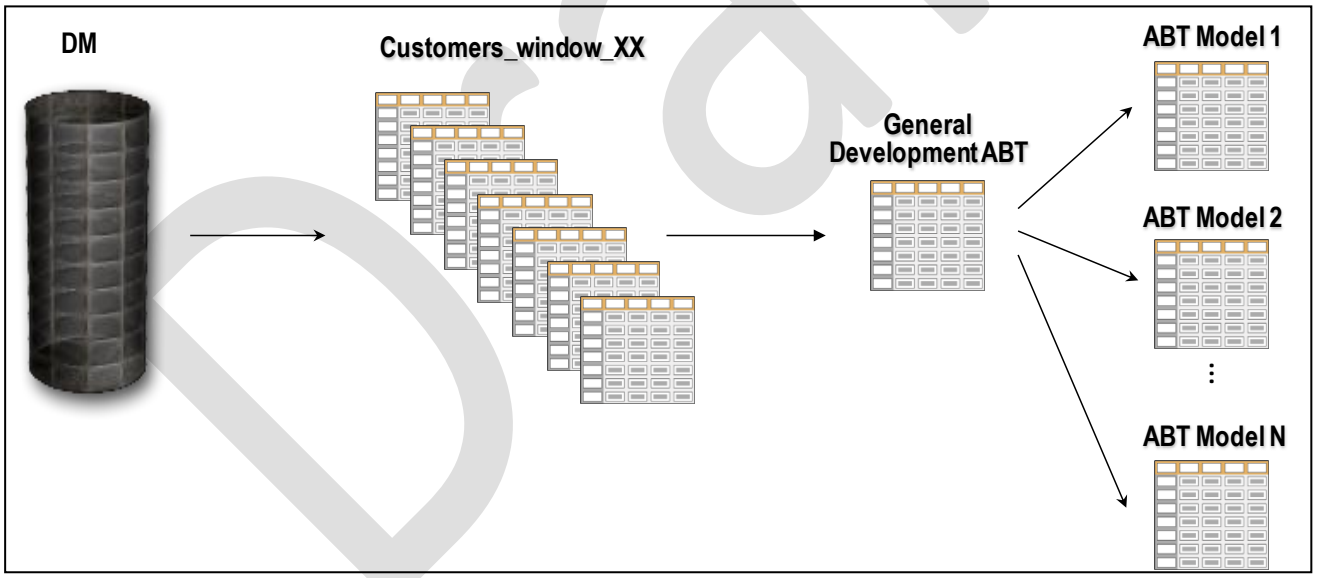


**Figure 6 – Data Preparation for Modeling**

### 3.3.3.1 Restrictions

The following restrictions can be applied:

- **Generic** – applied to obtain the study universe;
- **Modeling Generic –** applied to select observations for any model;
- **Specific or Modeling Specific –** applied to select observations for scoring (Specific) or modeling (modeling Specific) for each model.

## 3.3.4 Target Variables

For each predictive model it was necessary to define the target variables, those are listed on the Table 3.

**Table 3 – Target Variables**

| Model Cod | Model Description | Target Description |
|---|---|---|
| 1 | Men's | Purchase product in Men's CAT |
| 2 | Kid's | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
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| 11 | | |
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| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |
| 21 | | |

## 3.4 Create Data Mining Data Mart (just ABTs definition)

In order to identify and analyze what is the availability, suitability and appropriate transformations of variables, first was necessary to check which variables already exist in the XYZ COMPANY.

After analyzing the available variables existing in the database (provided by the XYZ COMPANY team), we have to identify the need to include: (1) new information; (2) aggregations and transformations variables. All this analysis was made aiming the development of the necessary predictive models.

The ABT was composed of different variable families, as shown on Figure 7. The structure and complete definition needs to be discussed and documented for easy reference see supporting document section


**Figure 7 – General ABT – Variable Families**

# 4 Process to Calculate NBO

## 4.1 Inputs

### 4.1.1 Cross-Sell and Up-Sell Scores

The cross-sell and up-sell scores measure allows understanding which customers have more propensity of buy additional products or services (cross-sell) or products and services with more features (up-sell) to an existing customer. Each customer receives Cross-Sell and Up-Sell Scores for all the products they are enable (without restrictions).

### 4.1.2 “Push” Effect

It is a measure of the increase produced by the commercial offer, face natural acquisition by customers. It was defined by product.

### 4.1.3 Economic Value

The Economic Value is a measure of the revenue generated by product acquisition.

### 4.1.4 Other Policies

It is a measure of the importance of the sale of a given product …….

### 4.1.5 Business Rules

After correcting the original probabilities taking in mind the effect push, trade policy and economic value was necessary to apply business rules existing @ store.

# 4.2 Process for getting the NBO Matrix

## 4.2.1 Stage 1 - Selection of the Universe Object of Study

Initially we have a dataset with all clients universe in the first stage it is necessary to include flags to allow identifying the generic restrictions.

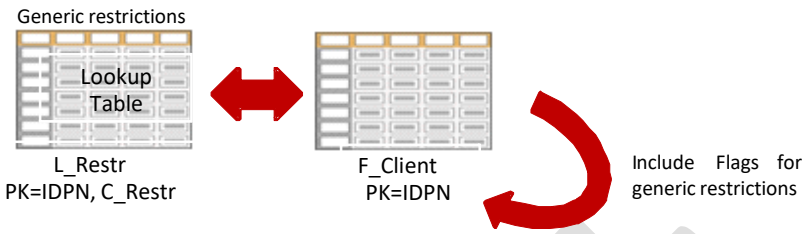


**Figure 8 – Selection of the Universe Object of Study**

## 4.2.2 Stage 2 - Selection of the Scoring Universe

In the second stage it is included the flags necessary for excluding clients with specific restrictions.

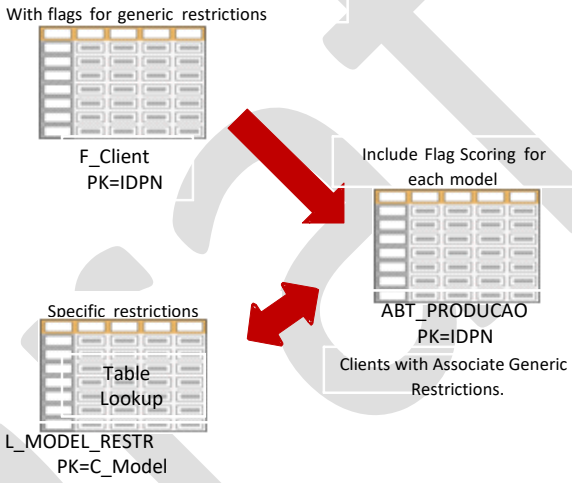


**Figure 9 – Selection of the Scoring Universe**

## 4.2.3 Stage 3 – Clients Scoring

This stage is executed in 3 steps:

(1) Split the data to get a dataset for each one of the predictive models;

(2) Scoring Customers for each model;

(3) Create one dataset with all the Scores.

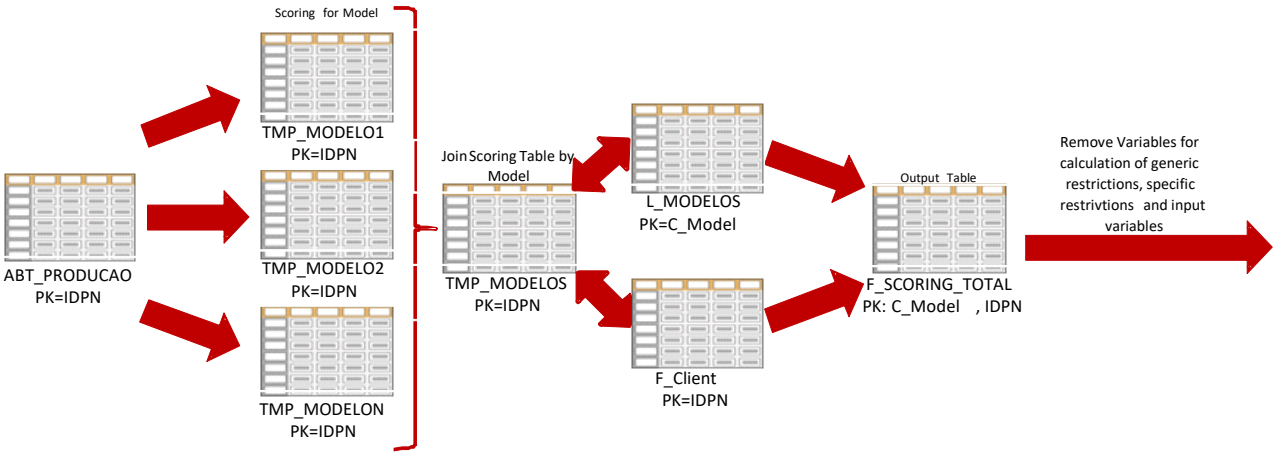


**Figure 10 – Clients Scoring**

### 4.2.4 Stage 4 – Probability Correction with Push Effect, Economical Value and other Policies

This stage is executed in 3 steps:

(1) Weight the Probabilities of the models with the Push Effect generating the variable Corrected Probabilities
(2) Calculate the Economic Expected Return with the Economic Value
(3) Calculate the Corrected Economic Expected Return, with the other policy factor.

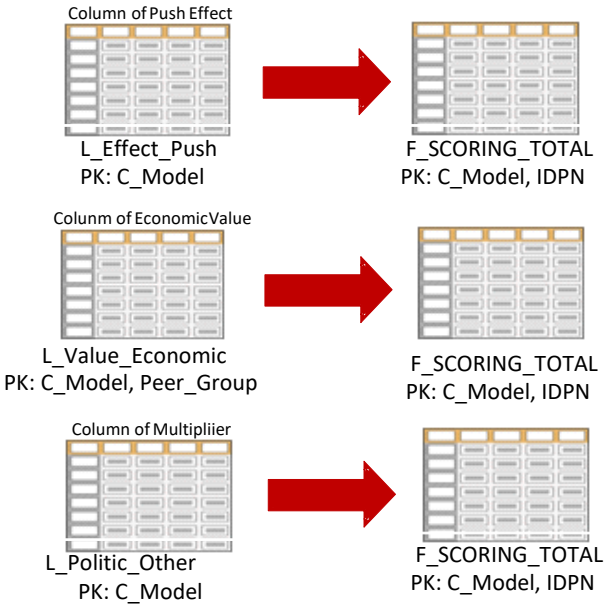


**Figure 11 - Probability Correction with Push Effect, Economical Value and other Policies**

### 4.2.5 Stage 5 – Apply Business Rules

In this stage some business rules can be applied to get the Next Best Offers.

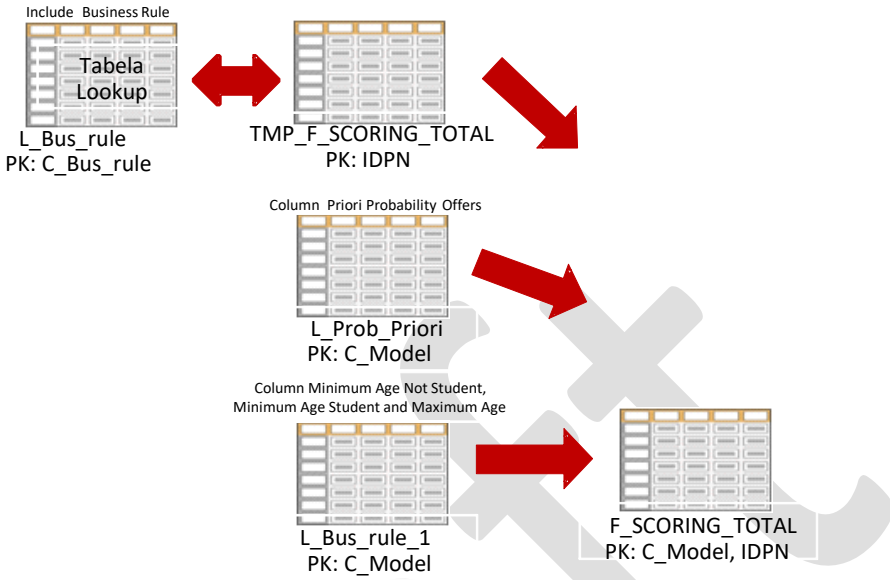


**Figure 12 - Apply Business Rules**

In the output dataset F_SCORING_TOTAL, the following variables are calculated:

- Distribution of the customers scores by each model
- Order of preference between models, by customer
- Corrected Probabilities Rank
- Expected Return Percentile
- Expected Corrected Return Rank
- Expected Corrected Return Percentile
- Offer Priority

### 4.2.6 Stage 7 - Apply Sequence Rules

The application of Sequence Rules is similar to the previous stage. To apply the sequence rules, it is needed two parameters datasets that allow the application of the rules (L_Seq and L_Bus_Seq).

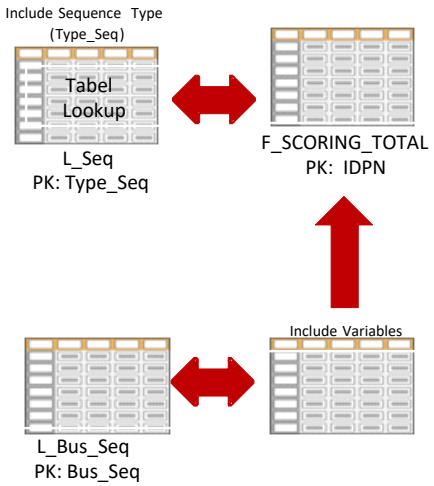


**Figure 13 – Apply Sequence Rules**

After obtain the dataset F_Scoring_Total, it is necessary to proceed to the exclusion of all the clients with Restriction and retain 3 next best offers associated to each customer.

# 5 Monitoring Results

## 5.1 Monitoring Production Processes

Reports monitor possible mistakes that could happen throughout the various stages of the production process to getting the matrix of the next best offers.

## 5.2 Monitoring Results from Models and NBO

Report to monitor the performance of the models through the time, with the relevant measures to allow a periodic quality evaluation of models, and also to monitor the results of the matrix to the next best offers (NBO).

## 5.3 Monitoring Sales Success

Reports in order to allow the evaluation of sales, with metrics for analyze the appropriateness of the products offered taking the NBO into account.

# 6 Supporting Documentation

Excel file contains the information about the defined ABT.

- ABT_VariableList.xls