

Artificial intelligence and machine learning



The secret of Boticário's demand planning solution

The beauty and cosmetics industry is marked by a number of complexities that challenge the predictive capacity of both human beings and traditional computational models. Its main characteristics include fashion, complex sales cycles, the lipstick effect, fast pace of innovation, and chain integration. And, to deal with such complexities, the most advanced machine learning and artificial intelligence tools have to be correctly applied.

Fashion, subjectivity and sales cycles that are not repeated. Marked by trend colors and different

subjective evaluation criteria, such as fragrance and texture, beauty and cosmetic products restrict the traditional evaluation of the functional characteristics. In addition, non-repeating time patterns, different promotion and sales cycles every year, both in number and duration (non-stationary time series). A typical example is the Black Week, which has changed consumer behavior, introducing a new major sales period in the year and redistributing promotional sales cycles. These characteristics require flexibility and high learning capacity from the forecasting methods, exploring apparently non-existent patterns and quickly incorporating new sales behaviors in the forecasting.

The solution

Flexible planning

- ✓ Incorporating sales cycles and promotions that vary over time

Use of macroeconomic indicators

- ✓ That identify counterintuitive sales patterns, such as the lipstick effect

Chain integration

- ✓ in which machine learning models do not only build sell-out forecast, but also include different service and inventory variables, generating a proper sell-in plan

Resource efficiency

- ✓ With most work performed with high-quality computer-based forecasting, with planners focused on the analysis of results

Evolution flexibility

- ✓ Allowing quick testing and update of techniques, technologies and predictive models. For example, incorporation of cognitive intelligence (such as IBM Watson) to extend the predictive capacity with unstructured data (for example, consumer reviews, information from social media, etc.) is fast and easy

It is clear that traditional forecasting techniques are not able to respond to planning needs in the dynamic cosmetics market. For this reason, Boticário combined different techniques of artificial intelligence and machine learning, such as artificial neural networks, decision trees, and regression with support vector machines.

CTI Global was hired by Boticário to prototype and implement IBM Analytics solutions, including IBM Planning Analytics TM1®, a fast in-memory data analysis platform for financial and operational planning. To ensure forecasting with more precision, IBM SPSS® Modeler and the R language were used.

The lipstick effect

Traditional purchasing relationships with macroeconomic indicators are variable. While in general an increase in unemployment and inflation tend to reduce consumer spending, an opposite effect – the lipstick effect – can boost purchases of beauty products. In addition, more expensive categories, such as perfumes, can have a migration of spending with imported goods. Then, the performance of the categories in the cosmetics market is a challenge for standard economic interpretation and requires the inclusion of a broad set of macroeconomic information.

Constant innovation

Besides the lipstick effect and subjectivity, staying competitive in this market requires meeting trends with maximum speed. This implies products with short life cycles of usually less than two years. This portfolio dynamics limits the use of similar products in forecasting and traditional techniques that require large amounts of historical data, demanding from predictive models a quick identification and incorporation of emerging purchasing patterns.

Supply chain integration

With all such complexity, maintaining a high availability of products can result in high and unnecessary inventory throughout the supply chain. When combined, forecasting uncertainties and short life cycles often result in inventory loss by disposal or a drastic reduction of product margin due to product excess flow. Thus, a proper forecast of sales to the market (sell-out) is not enough. Reducing costs in the supply chain requires that both its lead-time and service structure and its efficient inventory operation parameters are incorporated into an accurate sell-in forecast. In a franchise system, this challenge is even greater, as it involves considering the behavior of different actors (franchisees) in different channels (direct sales, e-commerce and physical stores) in the forecast, without affecting the process efficiency with so many planners.

Results

✓ 20% increase in demand forecast precision when compared to the traditional method

✓ Reduction in inventory levels and reduced number of failure of desired products, leading to increased sales

✓ Constant learning at each forecasting cycle, with the ability to react quickly to the portfolio dynamics and market changes

Solutions developed:

Cognitive Demand Forecasting Solution

Platform used in the solution:

IBM Planning Analytics TM1®
IBM DB2®
IBM SPSS® Modeler



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