Replenishment and Price Optimization at OTTO

How OTTO increases sales while rising to the challenge of growing customer expectations
# How OTTO Improved the Customer Experience by Using Machine Learning

In the face of growing competitive pressure in the e-commerce sector combined with rapidly changing fashion trends, OTTO turns to the latest in innovative technology.

Multichannel retailer OTTO’s competitive environment is characterized by low margins, high competitive pressure, as well as increasingly faster changing market conditions and customer demands. Immense data volumes, a multiplicity of influential factors and a permanent need to act in real time under great time pressure are factors that complicate the typical decision-making processes.

Positive customer experience and satisfied customers are at the heart of OTTO. To wow and retain customers, OTTO offers everything on one platform: a comprehensive selection of products at competitive prices with excellent service. OTTO’s success is built on attractive offers, the highest availability of goods and quick delivery times. All these elements are entwined, which presents a challenge. Only those who can strike the right balance will survive and be successful against the fierce competition.

OTTO mastered these challenges together with Blue Yonder. Cloud-based machine learning solutions help the retailer improve customer experience, increase sales, reduce stock levels and decrease returns by basing strategic decisions on data.

Blue Yonder develops its machine learning solutions in partnership with OTTO on a continuous basis to ensure maximum effectiveness. The solutions adapt quickly and flexibly to circumstances in the increasingly changing market and make it possible for OTTO to achieve superior results with its business.

### Project overview

#### Challenges
- Increase profitability
- Meet growing customer demands
- Better manage product line planning
- Ensure product availability and reduce delivery times
- Minimize end-of-season overhang
- Reduce rate of returns

#### Blue Yonder solutions
- Replenishment Optimization
- Price Optimization

### Results

#### Replenishment Optimization
- Higher quality predictions
- Less end-of-season waste
- Shorter delivery times
- Lower shipping costs through optimized logistics
- Lower return rate

#### Price Optimization
- Increased sales through more demand
- Maximized profit through intelligent pricing strategies

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## About OTTO

OTTO, the German multichannel retailer based in Hamburg, successfully mastered the transition from classic mail-order retailer to online retailer by permanently adapting its business processes and reorienting its enterprise. Today, the online shop (www.otto.de) is the focus of the retailer’s business, accounting for 90% of its annual sales of more than €2.5 billion (fiscal year 2015/16). One of the main reasons for this positive development is the company’s extensive range of products on offer. Alongside fashion items and technical products, OTTO also sells furniture, sports articles, shoes and toys. The online shop boasts around 6,000 brands and more than 2.2 million items, including more than 1 million goods sold by retail partners.
How OTTO Ensures Product Availability and Reduces Stock Levels

The fashion and lifestyle retail sector is a highly seasonal business. On the one hand, retailers must guarantee product availability for the entire season. On the other hand, there should be as little stock left in the warehouse as possible at the end of the season.

To manage this balancing act and ensure business success, OTTO must be able to precisely maintain the optimal synergy between product availability and pricing for every single article in its extensive product portfolio. One of the greatest challenges in this is predicting the probable sales of an article at an early stage, because the profitable purchase of goods determines overall success. The most important task is to continuously ascertain the correct amounts.

For many years, OTTO has been working closely with Blue Yonder to uphold its precise item-level sales forecasts. Blue Yonder’s algorithms were trained on historical data with a wide variety of input variables. With machine learning technology, the solution continuously evaluates its own forecasting quality and learns from past events.

“Through the machine learning algorithm, our forecasts are constantly improving. This way, we get precise results that help us plan and control a future-oriented product range.”

Mathias Stüben
Director Category Processes, OTTO

With Blue Yonder, OTTO has little stock left at the end of the season

Today, Blue Yonder’s article sales forecasts are a fixed part of the operative business processes at OTTO. On a daily basis for each article, an up-to-date forecast is made per color and size, based on hundreds of different input variables (i.e. brand, price, online placement, stock situation, weather). This means that OTTO provides Blue Yonder with millions of data records each week. Every year, more than five billion forecasts are created this way.

A considerable business success

Forecast quality has improved compared to the conventional processes and the end-of-season overhang was reduced.
How OTTO Cuts Partner Product Delivery Times

OTTO works closely with renowned business partners in its online shop. Through the partner brand platform, OTTO showcases a selection of popular brands. Each shop within otto.de is individually managed by the partners, who work together with OTTO to determine what items are offered. OTTO then handles the shipping and delivery to the customer.

After many years of working with Blue Yonder and excellent sales forecasting results, OTTO tested Blue Yonder Replenishment Optimization for merchandise planning in the central distribution center with a selection of brand partners. The results were so convincing that OTTO has since automated nearly the entire merchandise planning for partner products with Blue Yonder's machine learning solution.

The challenge: long delivery times and costly returns

The delivery time of its partner products was anywhere from five and seven days, whereas it only takes one to two days to deliver OTTO’s own brands. The extra time could be accounted for in the more complicated logistics process. When a customer made an order, otto.de would forward the sale to the partner. The desired article was first sent to OTTO’s distribution center and from there it was sent to the customer. But in today’s on-demand customer expectations, shoppers are used to short delivery times and react negatively to longer waiting periods. This manifests itself in less orders and higher returns.

The solution: Blue Yonder Replenishment Optimization

In order to reduce delivery times, OTTO requires precise forecasts about the flow of goods on the brand platform, for electronics products as well as fashion brands. Which articles will sell how often in the coming days, in what sizes and amounts and with which product features? The answer is to order the right articles in advance based on the forecasts and thus expedite delivery to the customer.

Blue Yonder Replenishment Optimization delivers highly accurate and automated ordering decisions daily in order to achieve this. For the sales forecasts on brand products, the solution evaluates around 3 billion transactions including sales, prices and inventories and provides machine-driven ordering decisions in advance.

Scope of the partner brand platform project

<table>
<thead>
<tr>
<th>Assortment</th>
<th>Menswear, women’s apparel and sportswear, electronics</th>
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<tbody>
<tr>
<td>Implementation of added value</td>
<td>Conception: 18 days</td>
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<tr>
<td></td>
<td>Implementation: 125 days (without electronics)</td>
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<tr>
<td>Degree of automation</td>
<td>Before: 0%</td>
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<tr>
<td></td>
<td>With Blue Yonder: 100%</td>
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<tr>
<td>Results A/B testing</td>
<td>Electronics</td>
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<tr>
<td></td>
<td>Increase in sales and reduction of article returns 3</td>
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<tr>
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<td>months in comparison with the control group</td>
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<td>Fashion</td>
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<td>Improved availability increases sales and</td>
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The results: shorter delivery times and satisfied customers

With the accurate decisions from Blue Yonder, OTTO succeeded in reducing the delivery period for partner products down to one to two days from five to seven without risking leftover supply. More and more frequently, goods are not even stored in the warehouse, but delivered directly to the customer. With this faster delivery, customer satisfaction has improved and so has the demand for products.

Additional benefits: return rates reduced and cost savings in shipping

Blue Yonder’s machine learning solution has positive effects in other areas as well. With automated planning decisions, the number of returns is minimized, because orders exactly correspond with the customer wishes being forecasted. For both OTTO and the customer, just as interesting is the improved shipment pattern. More products can be combined in one shipment. The customer is happy, because individual items arrive together and OTTO saves on shipping costs as well as improves its carbon footprint.

“The use of Blue Yonder proves itself in practice. From our perspective, the forecasts are accurate when we sell out of articles ordered at our partners within 30 days. With Blue Yonder, we accomplish this at a rate of 90%. For us, this is an outstanding value.”

Mathias Stüben
Director Category Processes, OTTO
How OTTO Attains the Optimal Price

What price will attract the customer?

Today, the requirements of intelligent price management are much greater than during the era of the catalog. The customer always expects a good price, and price transparency for brand name products is close to 100%. The basic question to ask for each item is: what price is the customer willing to pay? The optimal price for a product depends on many influencing factors that can vary on a daily basis: availability, display, competition, season, weekday, time, weather, platform, competitors’ prices and many more. At any point in the product life cycle, there is an optimum price for a product. The real challenge is when to set it. The right price at the right time increases customer satisfaction, leads to more sales and higher profit in the end. Experience shows, in fact, that the rate of returns even decreases with optimal pricing.

Proof of concept and project start

Initial situation

- Introduction of dynamic pricing was patchy without a systemic approach
- A highly complicated in-house system

Project objectives

- Price optimization to increase sales and profit and reduce stock
- Applicable to all product lines
- High level of process automation
- Reliable proof of concept

Project circumstances

- A/B tests under actual conditions
- Small project team (OTTO/Blue Yonder), that communicates with all relevant personnel at OTTO
- Different teams at OTTO and Blue Yonder to evaluate and check the results

Departments

- Men’s Fashion
- Women’s Fashion
- Linens and Towels
- Homewares
- Electronics

Delivering profitability relies on a retailer’s ability to actively keep up with the market’s changing dynamics while still delivering a cost advantage to the customer.
Prices based on Blue Yonder Algorithms: data-driven, automated and self-learning

Blue Yonder Price Optimization supports OTTO in successfully finding the “ideal” price. The machine learning solution for online retail examines and measures the connection between price changes and demand patterns. Based on a number of price-quantity pairs, it can pinpoint the price elasticity for every article. Specific knowledge of the price elasticity makes it possible to find the ideal price for a product according to the chosen price strategy. Based on the results, Blue Yonder Price Optimization automatically determines sales- or profit-increasing prices throughout the entire lifecycle of each and every product for every season.

Increasing sales and revenue

In a six-month pilot project in menswear, OTTO tested how it could automate pricing with the help of Blue Yonder’s solution, in order to increase sales and revenue. With impressive results: Blue Yonder was clearly in a position to significantly optimize sales, revenue, and overall results. Through its automated pricing decisions, Blue Yonder delivered the best results, increasing sales, revenues and optimizing the process. Blue Yonder Price Optimization has since been rolled out across the men’s and women’s fashion departments, as well as across homewares and electronics. In the latter, Blue Yonder Price Optimization factored in competitors pricing for the first time. The result was not only an increase in sales, but also a decrease in product returns.

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<thead>
<tr>
<th>Pricing in the past</th>
<th>Pricing with Blue Yonder</th>
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</thead>
<tbody>
<tr>
<td>Price tests on- and offline</td>
<td>Measurement of price elasticity</td>
</tr>
<tr>
<td>Complex, cost-intensive process</td>
<td>Automated, data-based process</td>
</tr>
<tr>
<td>Only applicable for a certain product selection</td>
<td>Applicable for all products</td>
</tr>
<tr>
<td>Individual test</td>
<td>Continual price optimization based on machine learning algorithms</td>
</tr>
</tbody>
</table>

Price Optimization resulted in a significant decrease in overstock

Before Blue Yonder

With Blue Yonder
About Blue Yonder

Blue Yonder is the leading provider of artificial intelligence and machine learning solutions for retail. Every day, we deliver 600 million decisions to our customers that boost revenues, increase margins and enable rapid responses to changing market dynamics.

Our demand-based predictive merchandising, automated replenishment and price optimization solutions are driven by sophisticated machine learning algorithms, developed by one of the largest teams of PhD-level data scientists in retail.

Founded in 2008 in Karlsruhe, Germany, by former CERN scientist Professor Michael Feindt, Blue Yonder now operates in both Europe and the United States. Blue Yonder works with renowned retail brands such as Morrisons, OTTO, Kaufland and dm.

Blue Yonder has been awarded the Gartner Cool Vendor Award 2015, the Experton Big Data Leader Award 2016 and the BT Retail Week Technology Award, among many others.
Blue Yonder
Best decisions, delivered daily

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