Strategic Pricing for Fashion Retail to Navigate the COVID-19 Pandemic

BlueYonder

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In normal times, strategically sound pricing improves the bottom line. In the crisis, it becomes indispensable for business survival.

Due to its fast adaptation to new circumstances, high degree of automation and immediate learning of all currently arising trends and patterns, machine learning powered price optimization provides an unassailable advantage over traditional manual price rulesets, both in normal and disruptive times.

Apparel retailers' supply chains are disrupted more than ever during these days in which everything is seen in the context of COVID-19; from closed manufacturing sites over delayed or heavily priced-up transport and logistics, to almost global store closures and dramatically changed customer needs and purchasing power. Every step of the supply chain is shaken up by the pandemic.

Technology can help alleviate the disruptive effects on the supply chain. Machine-learning and automation can quickly react to new behavior and adapt to rapidly changing situations. These capabilities are always taking into account the most up-to-date information on inventory available today, in the near future, as well as current and upcoming customer demand. Controlling the price is the only lever in the supply chain that remains under control. Having the steering wheel of the price confidently in hand and understanding how to use that last resort is indispensable for the overall business to survive this disruption.

Manual price-rule sets against machine-learning fueled optimization

Traditionally, markdowns in fashion had been planned deterministically before the season starts. Each item was marked down by a pre-determined value (e.g. 20% or 30%) after a given number of weeks on the shelves, independently of the actual demand and stock situation. A refinement of such static ruleset is a rule-based approach; given a certain sell-through-rate after a given number of weeks on the shelves, different markdowns are applied. Such rules can be differentiated further down to assortments or product categories. They remain, however, reactive and require great manual maintenance. Accounting for a newly arisen effect requires changing each and every rule manually.

Machine-learning based price optimization, on the other hand, re-considers all aspects for each price recommendation run: The stock levels, the demand in the recent and in the far past, the salvage value, as well as optimization goals and sell-through targets for each item are taken into account to compute a price recommendation. The optimization space, i.e. the prices from which the algorithm chooses the recommendation, is unconstrained, except for customer-set price rules such as price endings on 0.99, "same price for all sizes" or "same price for all stores".

A rule set can be manually adjusted to account for exceptional events, which would have to be fed into the algorithm in the case of machine learning based price optimization. The question therefore naturally arises which of these methods has an advantage amid the COVID-19 uncertainty. Although the possibility of manual interventions seems to favor the rule-based approach, the flexibility and speed of adaptation of the machine-learning solution clearly outweighs the presumed control.

The imbalance of demand and supply during the Pandemic

One of the difficult questions of economic sciences is whether the COVID-19 crisis with all its immediate and consequential effects will eventually lead to price inflation or deflation. Shocks on the supply side usually lead to a shortage of goods that meets n unchanged demand, which is acted upon by increasing prices, thus inducing an inflation. Shocks on the demand side at unchanging supply, on the other hand, require retailers to decrease their prices, leading to deflation. COVID-19 shocks the global economy on both sides simultaneously. High-volume government aid packages shall, in addition, support the economy, which makes the prediction which of these forces will eventually win over the other unprecedentedly hard, and a subject to intense current debate. The currently most feared scenario is a "stagflation", whereby aid packages inflate prices, while the economy stagnates.

The supply chain of an omni-channel fashion retailer illustrates these textbook-like elements in a small setting. The fashion retailer currently suffers a supply shock: Its manufacturers need to close down to protect their workforce, leading to failed deliveries. International travel dropped to insignificance, making air freight more expensive,

while sea freight is heavily delayed. The workforce in distribution centers needs to be protected from the virus, forcing to shift down or work abbreviated schedules, which reduces logistical capabilities. Thus, the supply of the previously planned assortment of clothes is jeopardized.

On the other hand, a demand shock heavily shakes the outflow of goods: The closure of stores has the most dramatic impact, with consequently vanishing demand. Other than this obvious effect, also online channels are affected, since customers' daily lives have been shaken up by the measures against the virus spread, and so have their needs and shopping habits. Certain categories like dress-ware, fashion shoes and vacation related items are in very little demand, while others, like children's wear and athleisure, are on the rise.

Whenever the supply and the demand of a given product, such as a fashionable shoe decrease, the two forces are aligned, and the two unfavorable effects serendipitously match and balance each other out, preventing greater damage. More often than not, however, this alignment does not occur: When the supply of a basic T-shirt fails and meets an increased demand, the latter cannot be fulfilled, which leads to missed revenue and dissatisfied customers. On the other hand, when the stable supply of a fashionable dress encounters a broken-down demand, the retailer runs into a severe over-stock-situation. That is, the two disadvantageous forces due to the two shocks aggravate each other. Any aggregation of products into coarse-grained higher-level groups such as assortments can give a dangerously false impression of the actual situation: E.g. when demand is high for small sizes and supply is strong for large sizes, an aggregated view of the product under scrutiny appears to show a seemingly balanced situation. In practice, one runs into both heavy over- and under-stock. Thus, the meticulous consideration of supply and demand on the lowest granularity such as location, size, color, variant, or day is necessary. For an omni-channel retailer that offers hundreds of thousands SKUs in several thousand stores, this gives millions of combinations to consider disqualifying any manual attempt from the very start.

In other words, for a fashion retailer, the supply and demand shocks are not only of unforeseeable strength, but they are also often unaligned for each and every individual product.

The only undisrupted and thereby more powerful than ever steering wheel in the complex network of supply and demand network is the price, giving it unprecedented importance and attention. The price that the retailer sets for a product is the ultimate means to alleviate the misalignment between supply and demand: When the demand exceeds the supply, prices are increased. When the demand is not sufficient to clear the stocks to be ready for the next reset, prices are marked down, or new promotional activities are played out. The price can thereby prevent the worst scenario of a fast sellout of the essential goods in demand with a simultaneous overstock of low-demand goods.

Strategically sound pricing is also eventually beneficial for the customer: While a low price on high-demand goods might appear like an advantageous bargain at first sight, the consequent out-of-stock-situation fuels a black market with astronomical prices, as we have seen for masks and disinfectants. Moreover, the current cash flow situation being precarious for most fashion retailers, the mid-term question is whether a supply of goods can at all be sustained. A wide wave of bankruptcy in the fashion retail market is of no one's interest. The right price during and after the crisis is therefore key for the mid- and long-term survival of every fashion retailer worldwide. Two particular settings emerge: Pricing during the lock-down in online stores, and brick & mortar store reopening scenarios.
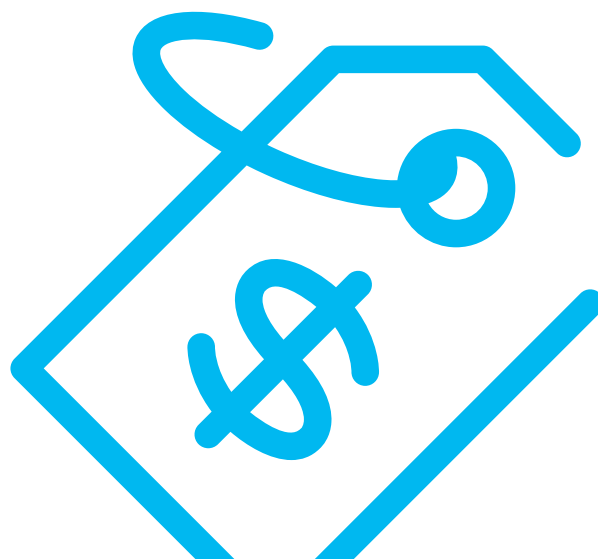
Price steering in online stores

When doors to the brick-and-mortar stores close, the customer demand naturally redistributes among online stores. These online channels, which have, after a short two-week-period of lower demand as an immediate reaction to the unprecedented virus containment steps, now see increasing sales. The increase in demand comes, however, with downsides: The online store becomes the substitute of a brick-and-mortar store instead of a complement, with simple low-margin commodities in higher-than-usual demand, while high-margin fashion is not being asked for. Basket sizes have been increasing, and so will return rates, which are the number-one jeopardy to profitability.

Given the complexity of the situation, however, no general rule of thumb for price setting can be formulated: In our example, the fashionable dress should be marked down heavily to meet sell-through-targets, while the basic T-shirt should be kept at their original price. The worst retailers can do in this challenging situation is to assume a general tendency towards over- or under-supply and to either keep all prices at the pre-crisis level or give general strong discounts and promotions: In the former case will the revenue not be sufficient to satisfy the necessary cash-flow, in the latter, the retailer runs the great risk to also promote and markdown products for which the demand surpasses the supply by far, again jeopardizing the bottom line. For online retail, the optimal price setting needs not only to account for the supply and demand situation, but also for future incoming stocks, stocks in transit and stock increases from customer returns. The latter also lead to additional handling costs so the individual item price has an impact on buyer behavior and on the return rates. Item-specific pricing is therefore key to keeping a viable level of revenue flow and profitability.

Today's behavior is the key to tomorrow's prices

In the current situation with short planning horizons, the best prediction for tomorrow's market behavior is today's behavior and in contrast to "usual" times not the typical season's behavior that was encountered in previous years at the same time. Thus, the key to a good reaction is speed, and saying goodbye to the intuition that made fashion predictable to humans until about five weeks ago. Today's behavior needs to be understood now to set the prices for tomorrow.

Curious on the performance of our own algorithms, we manually analyzed the effects of Covid-19 on the demand patterns of our customers. We were surprised to learn that our algorithms had reacted on the shifts in demand before we finished our own analysis. That is, a thorough manual analysis of demand pattern takes even experienced analytics teams days. This is too long to allow a manual approach to price setting. Machine-learning systems train from scratch every time the system runs and re-consider all aspects of the situation anew. This might seem sometimes even exaggerated and unnecessary in normal times. Why keep all options open if only a few of them seem plausible? This now unleashes its power in the times of crisis. All unexpected trends are immediately caught and taken into account. No prejudices on how "typical" seasons look like will bias the price setting, but only the current established facts on sales, demand and stock levels.
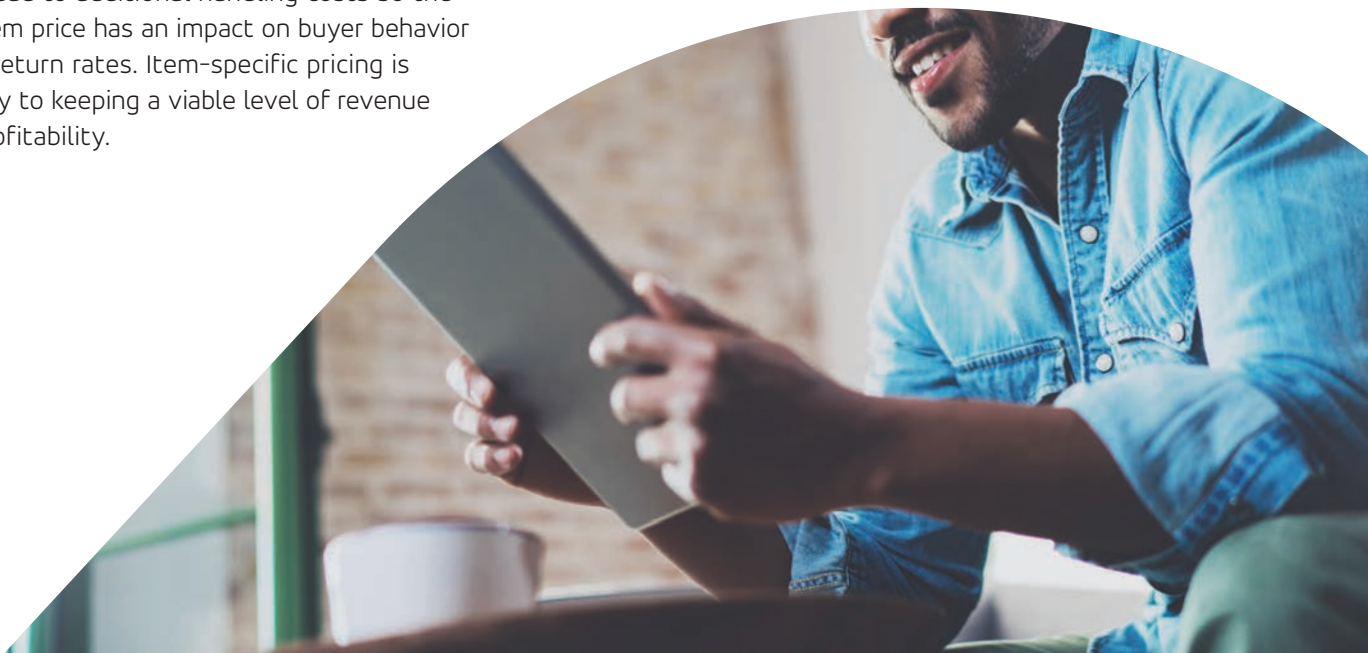
Reopening strategies for brick & mortar stores

The extreme danger that the novel coronavirus entails have led to proportionately strong measures against its spread such as store closings, which will hopefully become obsolete in the (not too far) future. The re-opening of stores constitutes a pivotal moment for retailers. The actual demand after re-opening is hard to predict, while the attained sell-through-rates are dramatically behind the planned ones. The assortments that were supposed to be sold during March are still untouched in store by the end of April.

The natural tendency in this situation is to offer heavy and global discounts and promotions on the entire assortment. Such strategy would, however, lead to a concerted price war between retailers that fight for the customers' now strongly reduced purchasing power. It also disregards the strongly increased demand in certain assortments, while other assortments, like swim wear, will not sell at all, independent of the price, and should be stored for the next season. Some inconspicuous assortments might unexpectedly become popular, such as cozy in-door clothing and everything that can be turned into a substitute mask.

The key to survival is the extremely fast adaptation to the new circumstances. There is simply no time to manually setup a new price-rule-set from scratch every day to react on the then-discovered trend. A machine-learning training will, on the other hand, re-consider all assumptions every day and provide a forecast that balances optimally the overall seasonality trend that was learned from the previous years with the current exceptional demand situation.

Conclusion: Machine-learning saves the detail in normal times, and the business in times of uncertainty

Today's retailers have all set good prices before the COVID 19 crisis, be it in an automated or manual fashion: Those retailers that did not set good prices in the past have vanished from the market already many years ago. In normal times, a machine-learning based price optimization solution yields an improvement of the bottom line due to attention to detail and correcting for minor misalignments in the supply chain, compensating for overly optimistic or pessimistic buyers. Thereby, price optimization allowed to shift the price setting from good to optimal and adding additional value thanks to automation.

During this uncertain time, assumptions on the behavior and need of customers and the state and price of transportation are often outdated immediately. An immediate reaction to the trend is required, which needs to account for the entire situation including inventory, DCs, stores that are open and demand in a holistic way. Manual rule sets for markdowns require months to be setup and therefore cannot be adapted and used effectively right now. A machine learning system, on the other hand, questions the assumptions of the day before on customer behavior, supply and demand, and adapts accordingly. Since it bases its decisions on all available information, it makes the very best decision in this difficult situation, and becomes the key for survival.

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