Normalizing Demand Using Price

Ebook

QUICKLIZARD

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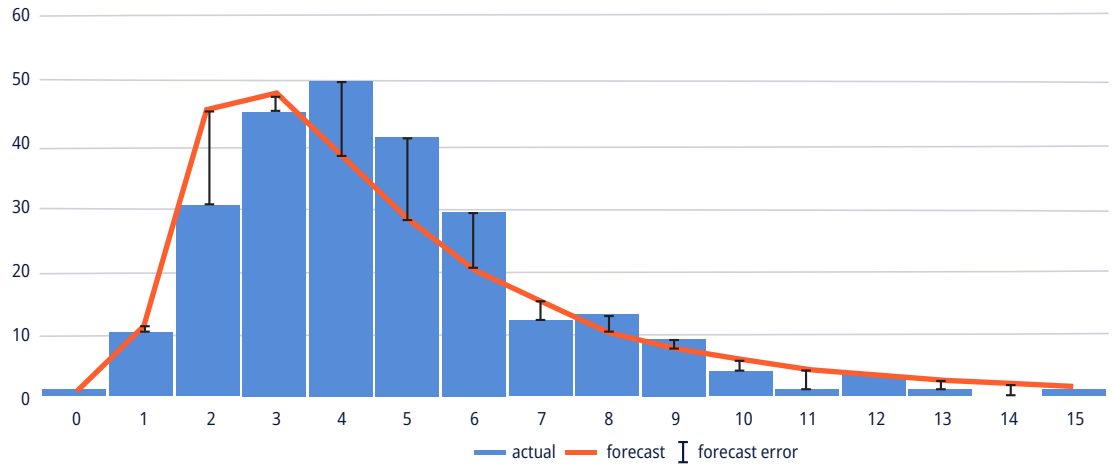
What Is Demand Forecasting

The ability to forecast demand accurately is a fundamental part of retailers' success. Demand forecasting apportions product demand through time at the aggregate as well as SKU levels. It is an important factor in making business decisions around buying, inventory replenishment, and financial planning. Product demand is not uniformly distributed through time and varies across time and product types.



When building a demand forecast, there are multiple factors to consider. Two of the most important ones are seasonality and growth. Recognizing that demand is not uniformly distributed over time, apportioning it across seasons and accounting for period to period growth results in a more accurate forecast. In practice, demand forecasting is managed via a sell-through curve that accounts for these factors. A sell-through curve is the aggregation of the forecast to 100% sold for a specific period of time. Adjusting real sales/reality to the forecasted sell-through curve is commonly done using pricing.

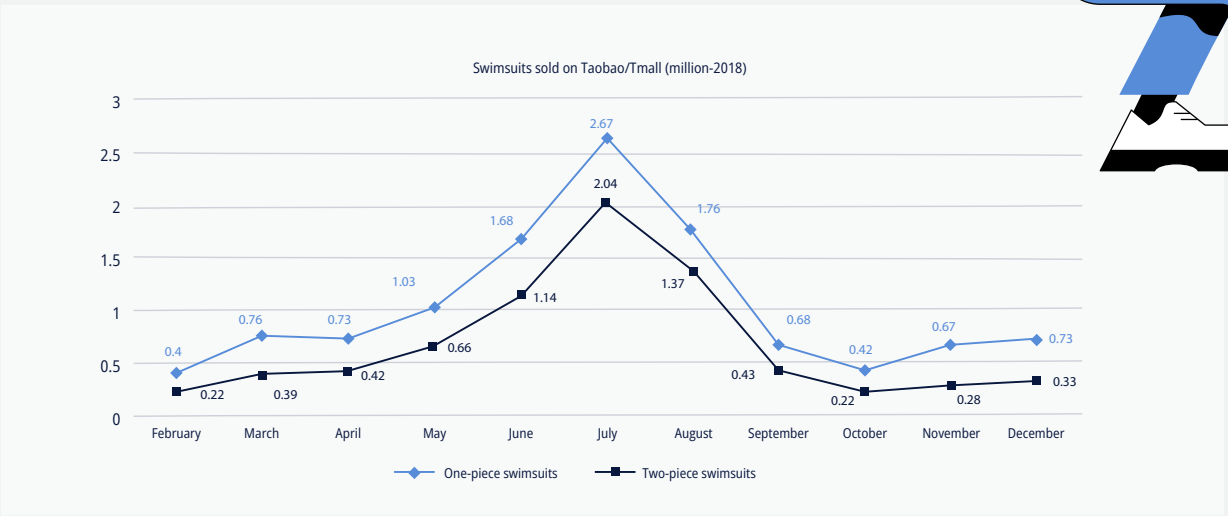
Factors Of Demand

Seasonality

Seasonality is at the heart of demand forecasting. It is the effect that time of year, day, week, or special event has on demand.

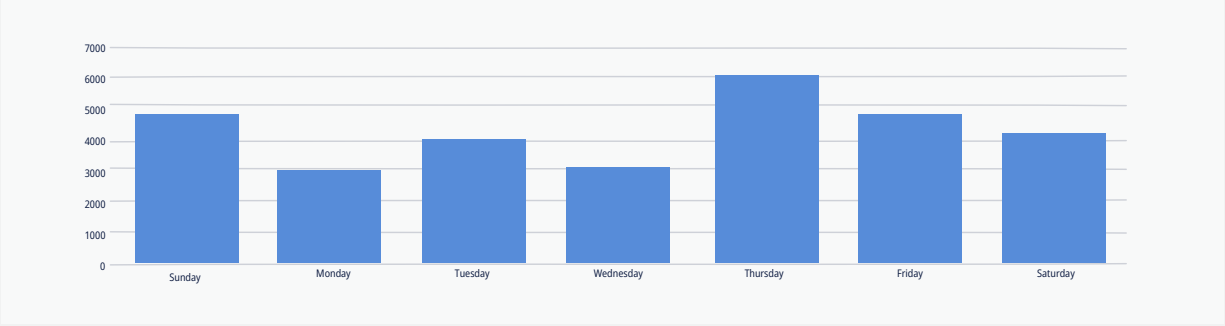
Yearly seasonality accounts for predictable month to month demand changes that are consistent on an annual basis.

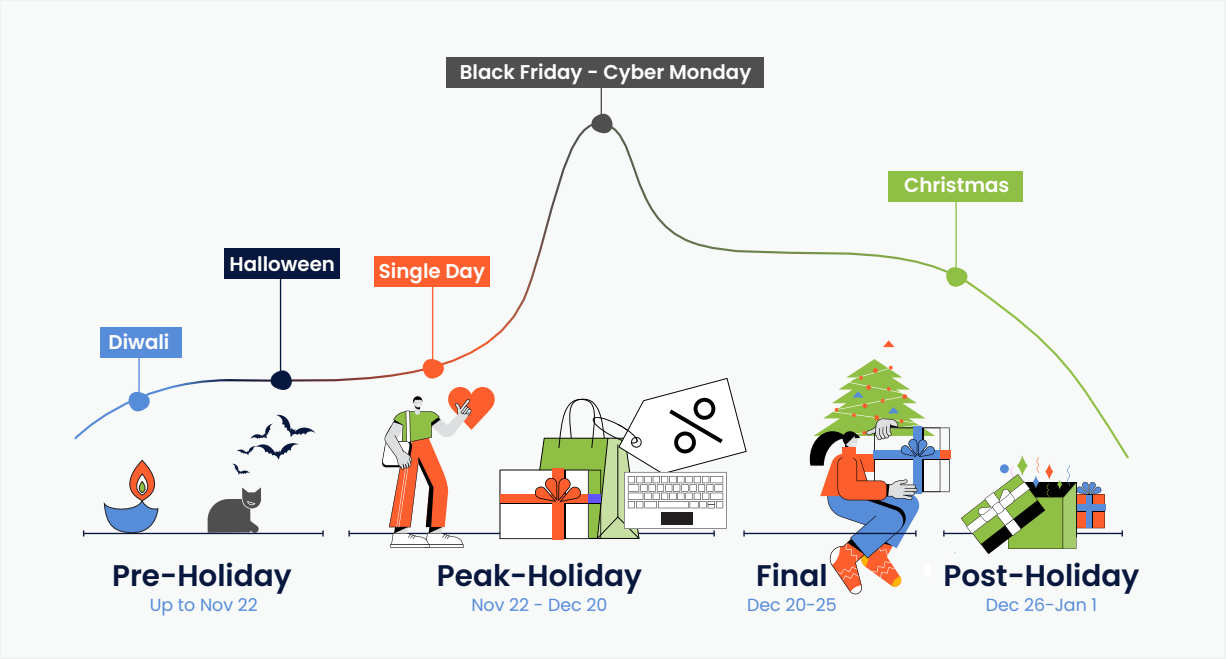
Demand for swimsuits and sunscreen in the summer and school supplies leading up to a new school year are examples of yearly seasonality See Illustrated example below:.



Monthly seasonality accounts for within month fluctuations in demand such as end of the month budget constraints ahead of payday.

Weekly seasonality accounts for within week demand variation such as higher order counts for ecommerce retailers on weekends.



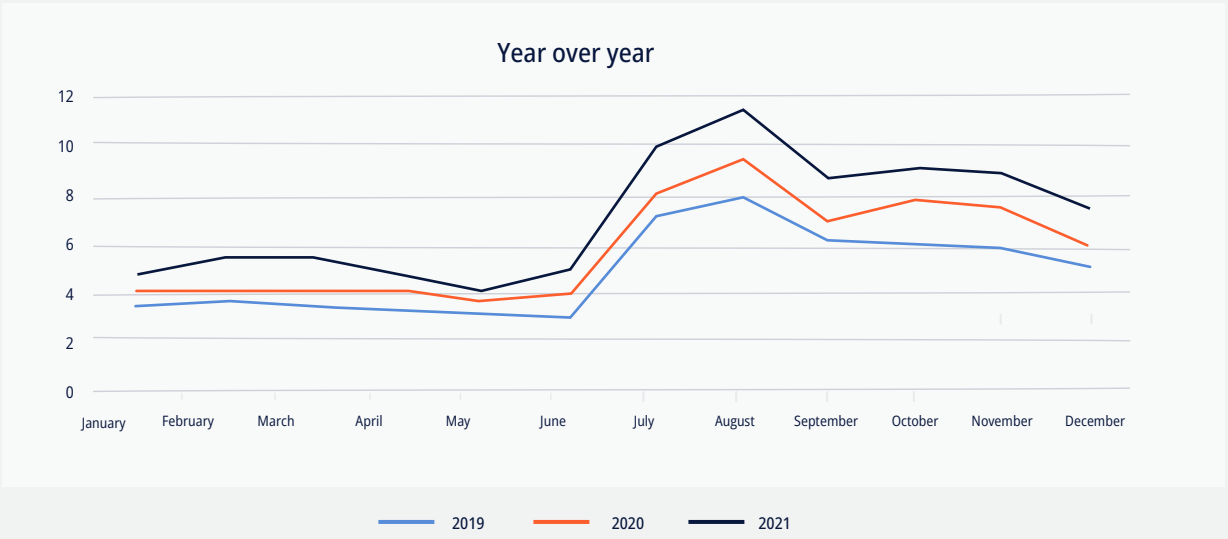


Special **seasonal** events such as Christmas or Halloween also impact demand.

Demand for a Halloween costume or Christmas tree drops to zero the day after the event, or in some cases even sooner.

Growth

A growth factor is the demand increase a company expects to see from one period to the next. It is applied in demand forecasting along with seasonality. For basic products with stable demand, such as black clothes or jeans, retailers simply apply the growth factor to produce a demand forecast.



While seasonality and growth are both factors of demand, demand forecasting in practice relies on a sell-through curve and pricing in order to achieve success.

In Practice

Calculating a Demand Forecast

There are two main ways to calculate a demand forecast.

Historical data

The first, and most commonly used method, utilizes historical data to model what demand will look like in a future period. An airline looking to predict flight demand in summer can take 5 years of summer seasons sales data and a superset of flight routes to predict demand. A retailer looking to predict swimsuit sales can do the same. Even a seasonal retailer of products such as Christmas trees can use historical data from previous seasons to build the demand forecast. In absence of historical data or for brand new products, a Normalization subset will be used.

Normalization subset

The second method compares products to a normalization subset and applies the forecast of the category to an individual SKU. The benefit of this method is that no historical data is needed, and it allows for a comparison across the whole assortment.

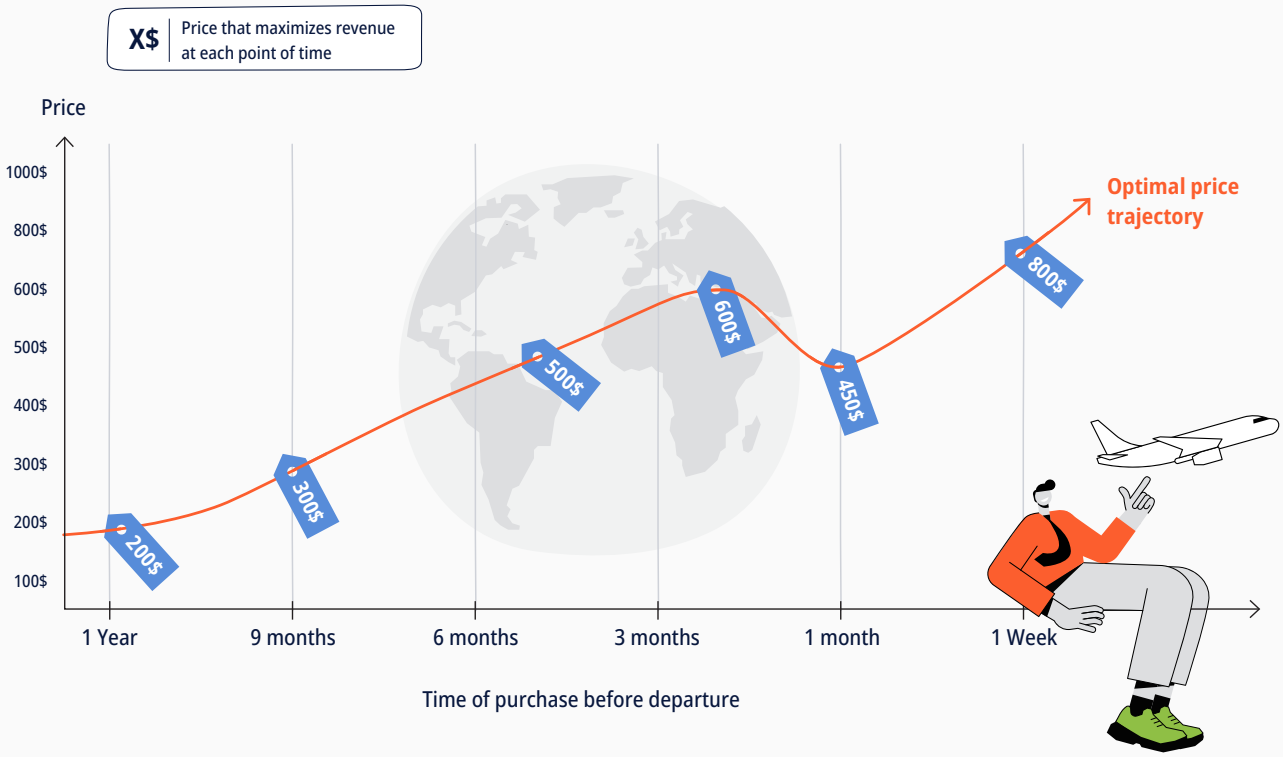
A new pair of jeans with no historical data can be compared to the jeans category and measured for performance. The performance of an individual product is then compared to the wider assortment to identify under and overperformers versus the mean or median.

Sell-through Curve

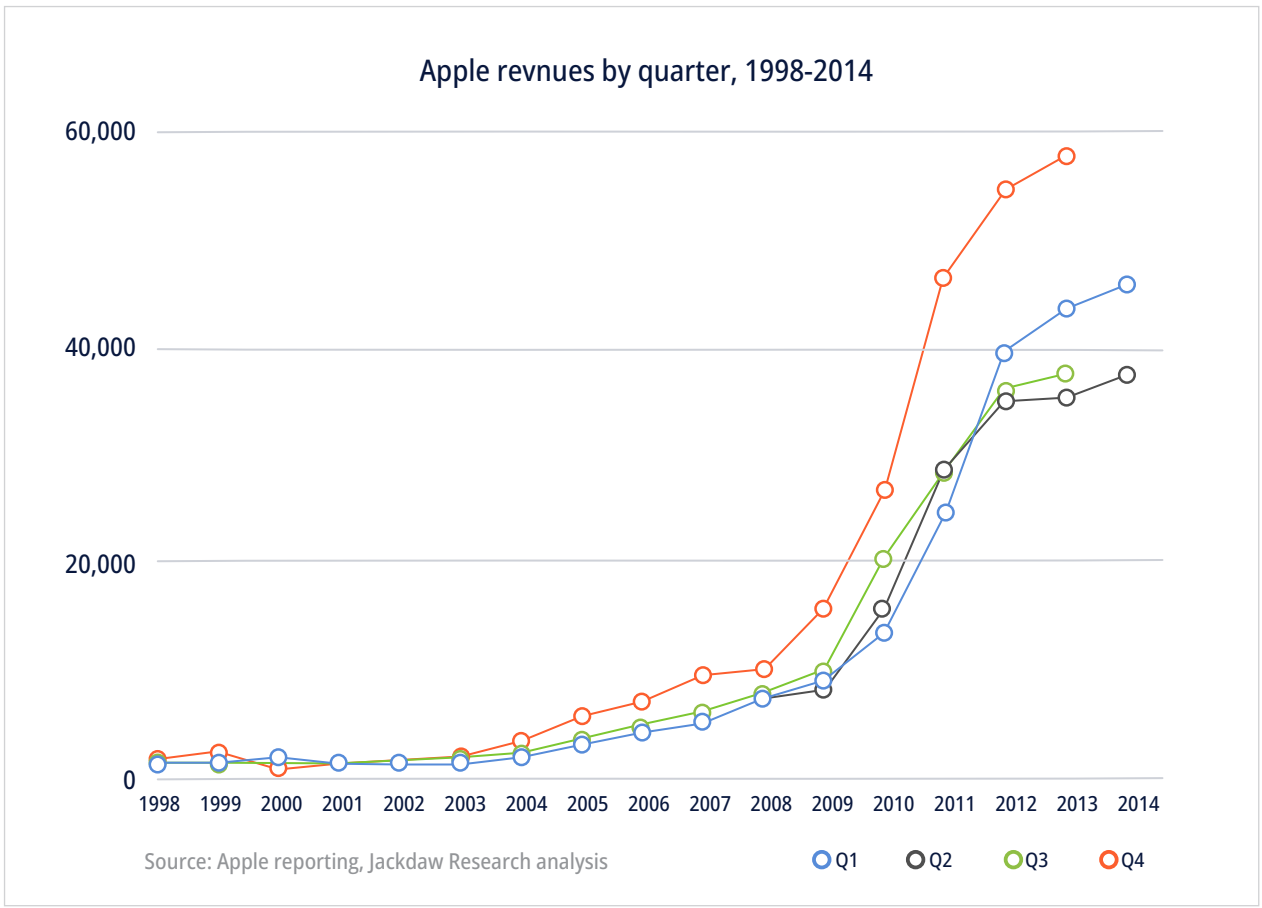
Once the demand forecast is determined through one of the methods above, a sell-through curve is created. A sell-through curve is an aggregation of the forecast for a specific inventory cycle. An inventory cycle is the amount of time required to produce and sell through a set of inventory. It varies by industry, vertical, and type of product. (Swimwear may have a different inventory cycle than a shirt that is sold in the same store.)

In fast fashion, an inventory cycle is 12 weeks. The sell-through curve in this case is the aggregation to 100% sold from week 1 to week 12. With uniformly distributed demand, 8% of inventory would sell in each week. However, once seasonality and growth are added in via yearly targets and special promotional events, the demand across the 12 weeks varies week-by-week.

In the airline industry, the inventory cycle is longer. Seats are sold one year before departure and the sell-through curve accounts for route type and seasonality. While the demand a year ahead is lower than a month ahead, there is still demand and this is accounted for in the forecast.



The mobile phone industry inventory cycle is also a year long. Apple releases the new iPhone in September each year. The sell-through curve of the new model is created with most of the demand expected in Q4 of the same year and decreasing over the subsequent quarters. Once a new model is released the following year, the demand forecast for the old model looks markedly different.



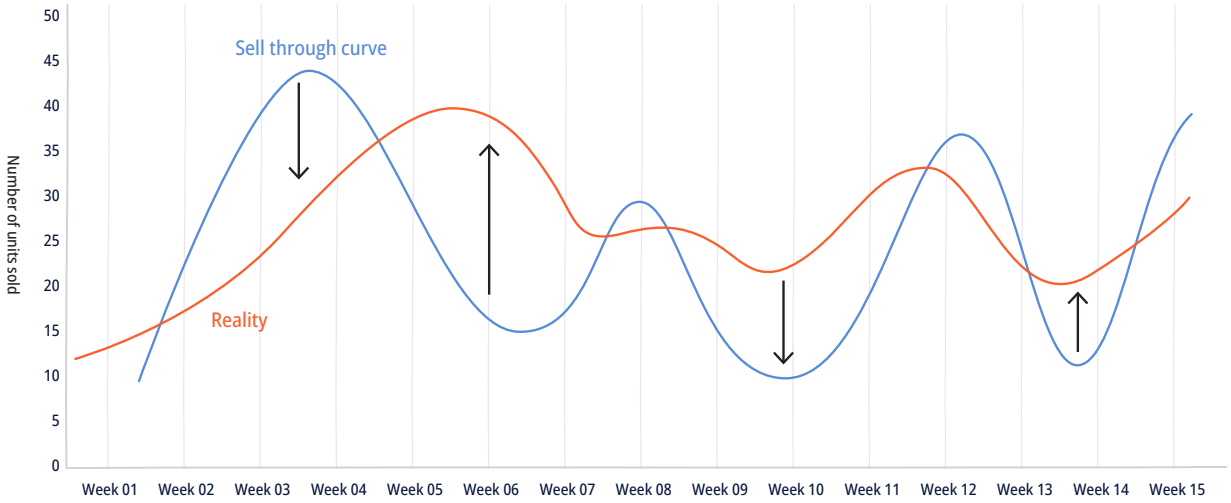
Applications In Pricing

Once the demand forecast is created and a sell-through curve is developed accounting for all factors, matching sales to the forecast is done using pricing.

Matching to reality

The sell-through curve is monitored for deviations from reality and pricing is adjusted to make reality as close as possible to the forecast. If sales are falling short of the forecast, prices are decreased to increase the quantity sold. This adjustment has to take into account the amount by which the products were undersold in the previous period and make up for it in the future period.

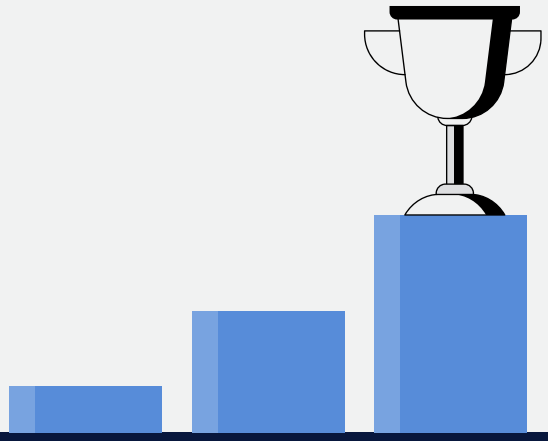
If a sell through curve forecasts 10 units sold per week for 12 weeks and in 3 weeks only 22 units are sold instead of 30, the price decrease should account for selling an additional 8 units in the remaining weeks.



Conversely, if reality is outpacing the forecasts, potential inventory shortages can be averted by increased price levels. In this case, a price increase is used to prevent going out of stock on a product. In the example above, if by the 3rd week 45 units were sold, the price increase will prevent the product going out of stock before week 12, and it'll increase the retailers profits. This is how dynamic pricing is used to optimize sales and profit.

Challenges

While sell-through curves that account for seasonality and growth and dynamic pricing can be used to optimize performance, there are some challenges to consider.



Type of inventory

Demand forecasting applies differently to different products. For perishable items, time has a greater effect on price than for non-perishable items. Products that have a short shelf life like produce are marked down faster than longer lasting consumables. Products that are sold regularly but are still perishable such as hotel rooms, rental cars, and flight seats are also impacted by time more disproportionately. Once the flight leaves, unsold seats will never be sold. This means that retailers have to engage in demand forecasting at the category and product level and that different rules will apply depending on the type of inventory.

Seasonal products such as Halloween costumes have inventory cycles with a very short peak period after which demand drops off entirely. Additionally, certain costumes may only be relevant for one inventory cycle and never again. A costume for the latest Netflix show such as Money Heist or Squid Games is likely only relevant for one Halloween season and never again.

Seasonality variance

Seasons are not the same year to year, and they evolve over time. For retailers with short life cycles, variability in seasonality can have a big impact. A late start to a summer season can affect swimsuit sales, an early start to spring can affect patio furniture sales. Inventory planning can be thrown off by these types of effects.

Additionally, promotional campaigns have grown longer and more complex over time. In a globalized world, events like Christmas, Black Friday, and Boxing Day have impacted demand forecasts internationally. In addition, the expansion of these campaigns and inclusion of the lesser-known Singles Day, Cyber Monday etc. have increased the complexity further.

Large macro events such as workers' strikes or a pandemic also cause unpredictable effects. Supply chain issues from the Covid-19 pandemic have impacted availability and pricing on many products. Stores that were closed for months had inventory that was not matched to the season or demand when they reopened. Additionally, the closure of production facilities impacted supply for many retailers. The electronic chip industry that supplies chips for phones, cars, and other electronics experienced marked shortages that were felt for many months following closure.

Reasoning

One of the tenets of demand forecasting is the ability to use pricing to match reality to the forecast. However, while the sell-through curve indicates problems with moving inventory, it does not reveal the cause of those problems. The retail industry is highly influenced by trends meaning that a product may be underperforming or over performing for a variety of reasons unaccounted for in the demand forecast.

Case Study

Cristiano Ronaldo

Cristiano Ronaldo is one of the best soccer players in the world. During his career he has played for 6 clubs and sold millions of jerseys. Upon his latest move to Manchester United 2021, his jersey generated £32.5 million in sales in the first 12 hours. The first hour of sales alone surpassed the best full day of global sales for the club. Within the first month of signing, his jersey sales totalled £187M. From a demand forecasting and inventory planning perspective, this type of sell-through curve is hard to establish for a couple reasons.

The Ronaldo jersey is a product that is contingent on him signing with a club while the production of the product can only be done after the trade is confirmed. Therefore, the inventory cycle differs from the standard retailers where demand is forecasted on products that are already confirmed. From an inventory management perspective, the record-breaking sales also presented a supply problem. His jersey was sold out everywhere for weeks.

While historical data from previous Ronaldo jersey sales can be used to create the demand forecast, growth factors need to be estimated with the added complexity of stage of career and its impact on popularity and success. In addition, aggregate market data is not relevant as he has seen record breaking sales more than once and there are few like-for-like comparable products in the market. Nonetheless, the amount of star power Ronaldo has means that his jersey is so lucrative that high price points and long wait times are tolerated by his fans – a dream for any retailer.

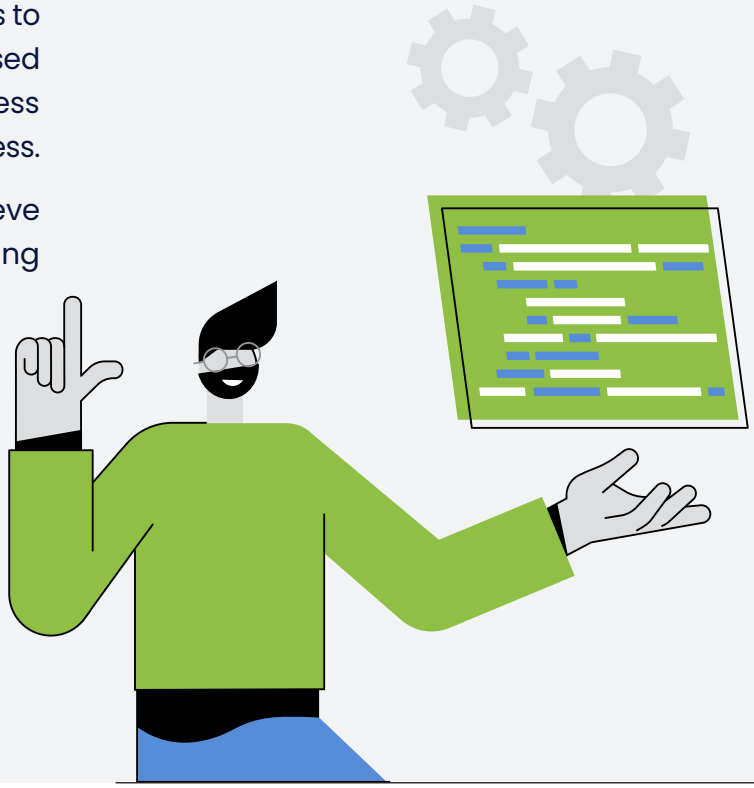
How Quicklizard Can Help

Demand forecasting requires retailers to respond dynamically to external factors and constantly monitor and adjust sales to sell-through curves. While factoring for seasonality and growth is important, the real success lies in reacting quickly to unpredictable trends. QuickLizard can help. The QuickLizard seasonality and demand forecasting modules use machine learning to forecast demand and give retailers the ability to react to changes in real time and adjust inventory and pricing accordingly.

The proprietary algorithm and full suite of pricing optimization and enrichment modules advances pricing excellence, at scale. It enables retailers to automate pricing and move to a fully digitalised pricing infrastructure that is tailored to business goals. Powered by science, designed for success.

To learn how QuickLizard can help you achieve pricing excellence, speak to one of our pricing experts today

Learn more



QUICKLIZARD

Quicklizard enables retailers and brands to automate their pricing strategies and move from manual pricing to a smart, fully automated digital pricing infrastructure. The Pricing Platform and suite of pricing optimization and enrichment modules advances pricing excellence at scale, based on individualized business goals.