

# Dynamic Price Optimization

## D&A at KPMG Switzerland

Artificial Intelligence and Mathematical Modelling

By applying Machine Learning methodologies, companies dynamically optimize their prices in response to exogenous as well as endogenous demand drivers. However, an accurate demand estimation model is only the first step in designing a successful pricing strategy.

### Demand estimation

How are your customers responding to price changes? Machine Learning methodologies facilitate the analysis of historical data and allow the estimation of price sensitivity, as well as the extraction of other customer behavior patterns.

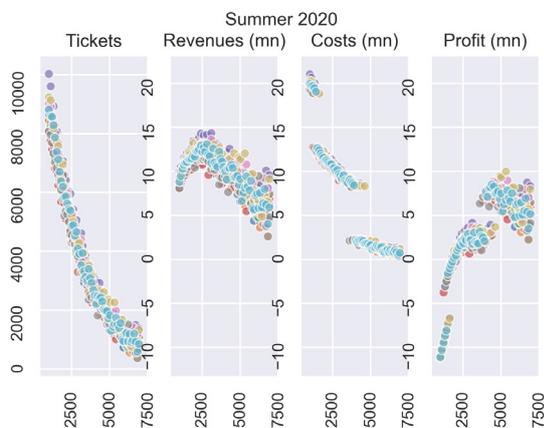


Figure 1 - Demand estimation and price point optimization with Machine Learning in the leisure and entertainment industry

A number of factors may impact the demand for a product at a given price point, including:

- Changes in a company's marketing and promotional strategy
- New product launches (cannibalization)
- Changes in the strategy of competitors
- Fluctuations in the economic environment and in the customers' willingness to spend

Demand forecasting models therefore require a careful selection of internal and external demand drivers.

### Dynamic pricing

Dynamic Pricing dramatically boosts the effectiveness of pricing strategies by allowing the prompt and often real time adjustment of prices in response to internal and external demand drivers such as:

- Inventory levels
- Fluctuations in raw material prices
- Short-term demand swings due to, for example, adverse weather conditions

Smartphones and the possibility to easily compare prices online stress the importance of dynamic pricing, not only for e-marketplaces but also for physical stores.

### Gamification in dynamic pricing

Successful dynamic pricing strategies employ gamification: the application of game-play elements (competition, scores, rewards, player rankings) to the customer experience.

Gamification is necessary to create urgency and avoid carry over, the decision to postpone a purchase to a later point in time hoping for a better price.

Through a more interactive customer experience, users feel more rewarded with the opportunity of an exclusive benefit and are more likely to promote your brand on social media.

### Pricing: a tactical decision with long term impact

The importance of pricing goes beyond tactical revenue and profit maximization. Pricing strategies have a long-term impact on a company: they influence how customers value a product and affect the brand recognition and reputation of a company.

The scope of pricing strategies is indeed not limited to the definition of price levels but extends to the management of price perception: companies should employ a combination of traditional revenue management tactics (e.g. 9.99 prices) and modern digital engagement strategies (e.g. mobile urgency messaging).

## Our solution

KPMG has long-standing experience in end-to-end development of dynamic pricing solutions featuring all the must-haves:

- Alignment between tactical pricing and long-term company strategy
- Fully automated pricing process
- State-of-the-art demand forecasting model based on Machine Learning methodologies
- Engaging and gamified customer experience
- A carefully crafted roll-out strategy aimed at driving trust in the forecasts as well as in the reliability of the dynamic pricing process

## Why KPMG?

Process Mining, Robotic Process Automation, Machine Learning, Software and Cloud Engineering, Strategy, Sales and Marketing, Behavioral Economics, Game Theory: the design of Dynamic Pricing strategies requires a heterogeneous team with a broad skillset.

KPMG has strong credentials in all the required competence areas and experience developing and implementing, end-to-end, Dynamic Pricing strategies.

## Use-case: markdown optimization in fashion

Every season, fashion houses launch new apparel items. How can fashion houses forecast how customer will respond to price changes?

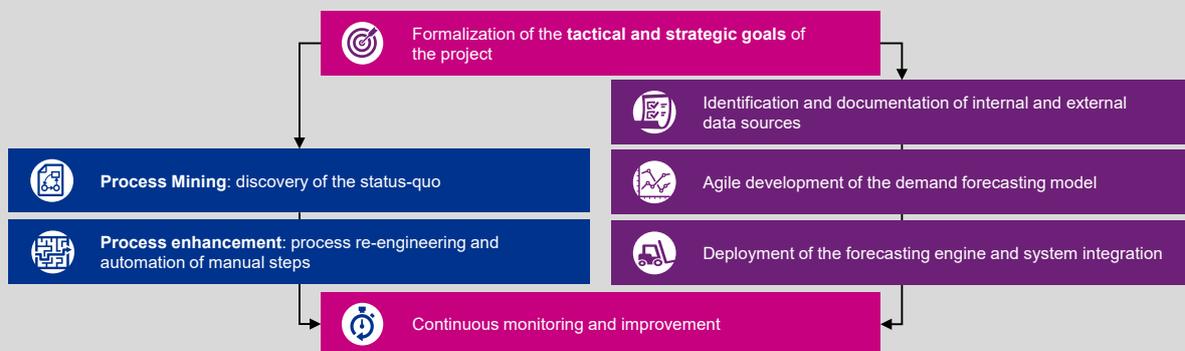
KPMG helped a world-renowned brand optimize markdowns across discount waves with the development of a 13% more accurate forecasting model. The mathematical model extracts customer behavior information more efficiently through full-price sales data and more accurately identifies similar items for which previous discount-wave sales data is available.

KPMG supported the client with the automation of the pricing process by implementing a reproducible, end-to-end Machine Learning pipeline that pre-processes raw data, trains and tests the demand forecasting models and generates optimal price recommendations. The new pricing process

- significantly reduces the time necessary to produce price recommendations
- removes the risk of mistakes associated to the execution of manual tasks.

## Phases in a Dynamic Pricing project

Dynamic pricing projects comprises of several different work streams executed in parallel



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