

The next step in evolution: why algorithms will change the ancient art of setting your price

A perspective on the development of your pricing capabilities



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From the dawn of trading, setting the best price for a product has been a skill that many have tried to master. Already in biblical times, merchants and their customers spent a lot of time bargaining before closing a deal; merchants tried to get a maximal profit out of a sale, while their customers tried to find the best deal for their purchase. In the renaissance era, supply and demand of early markets determined the prices of various kinds of spices from all over the world. Supply was low and came with high costs due to long and dangerous trading routes, while exclusivity of spices ensured a high demand. Merchants used this to sell their spices at high prices, thereby creating a high profit margin for themselves.

In later times, the market dynamics of supply and demand evolved into one of the most important topics in the science of microeconomics. As was known for a long time, demand is influenced by the price of a product, and understanding the price elasticity of demand, which quantifies how demand responds to a change in price, soon became the holy grail of microeconomics. When the price elasticity of demand is known, sellers can perform price optimizations by calculating the price at which the total profit margin or total revenue is maximal (see figure 1).

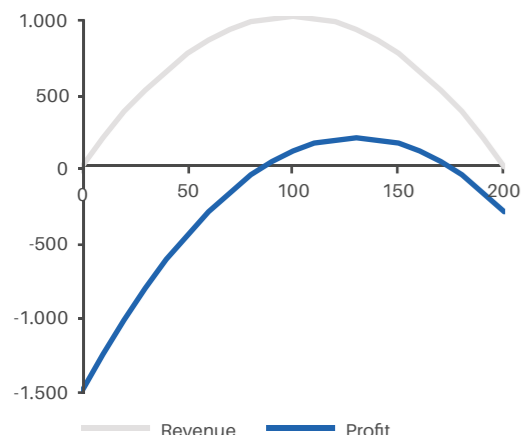


Figure 1. Price optimization using price elasticity of demand

Today, it is remarkable that most companies still set their prices manually. Most of these companies should wake-up, since the data

available in a Big Data world offers dramatic break-through opportunities. Not only to set better prices, but also to automate the overall process. But, as we will see later, it also puts new business challenges, and ethical dilemmas at the agenda of business leaders.

Firstly, the abundance of data allows for more advanced and more accurate ways of modeling price elasticity of demand. In fact, it allows for a world where every price can be optimized for each individual customer, at each point in time. Although society is getting more at ease with a more dynamic pricing approach (such as airlines and Uber apply in their business models), price differentiation purely on elasticity arguments is hardly accepted by consumers to date. Secondly, with digital customer interactions, Big Data also gives companies the option to fully automate their pricing activities. Pricing might actually well be one of the top candidates for being the first company process to be fully taken over by algorithms.

Fully automatizing one of a company's core processes has, of course, major impact on a company's way of working. Moving from 20 analysts active with price analysis to a machine-learning fueled system is a complex challenge, with real risks involved. Some operators in the e-commerce space and online travel space have taken this step, and faced major challenges in the stability of the system and risks involved. However, challenges and risks are under control at most of the players, and there are no fundamental pricing innovators that consider going back to the old approach. Therefore, we believe it is not a question of whether other industries

will move to this automated algorithmic pricing model, but when they will. Specifically, we see four important reasons for automation:

1. Pricing still remains as the highest impact driver. Since pricing affects all sales, and in a contractual setting all existing customers, only small improvements from the current pricing will already generate high impact due to the large numbers.
2. Pricing is getting too complex not to use algorithms. With the rise of digitization, we see pricing getting more complex and more dynamic, also to counter the increased transparency of prices in a digital world. The additional requirements a dynamic pricing environment demands make it difficult to not automate.
3. Price optimization is a quantitative process. As opposed to campaigning, branding or HR management, arguments based on intuition, experience, or even creativity apply less to pricing. Instead, it is all about the numbers, and not about your gut feel. Therefore, human intervention in price optimization can more easily be replaced by algorithms, then for example brand communication.
4. The rise of price aggregators has created a demand for speed. Consumers looking to buy a product can collect price offers from all available suppliers with very low efforts. Therefore, to be in the evoked set of a consumer, it is now essential to offer a competitive price, and react immediately to action

of your competitor. Companies can greatly benefit from outsmarting their competitors by implementing price changes real-time, like traders have been operating for decades in financial markets.

Although the drive to automate price optimization in the long run is strong, making this transition appears to be difficult. We see organisations that underestimate the complexity of algorithmic pricing. Or fail to see the implications it has for systematic change in the organisations. In various pricing projects Mcompany has done over the past few years, a number of lessons have emerged around this challenge.

1. The journey starts with a clear and up-to-date view on the market. Since pricing is getting more and more dynamic, companies should put effort in constantly collecting and monitoring market prices and its promotions, so they can set their prices and promotional discounts in such manner to enter the consideration set of their target segments. Being inaccurate or having outdated market data will lead to false conclusions and therefore incorrect pricing decisions.
2. Granular data allows for modeling price elasticity for each individual, instead of modeling it for the entire market. It appears that there are significant differences in price elasticity between customer segments, so only modeling price elasticity for the entire market will lead to inaccuracy, which could lead to major customer loss or opportunity costs. Therefore, the available granular data

should be used to model price elasticity for each individual customer.

3. When optimizing prices, think about the legal and ethical boundaries of your conduct. Of course, your regulatory and legal framework should set the first set of boundaries to how you want to leverage algorithmic pricing. But equally important, companies need to set their ethical boundaries in price optimization. Uber has learnt its lessons, when the public reacted on Uber prices that exploded on Christmas evening in New York. Financial institutions have learned their lessons from offering products that generate extreme margins, but little value to the customer. When algorithmic pricing will continue to gain popularity, many hard lessons are still to be learnt. For example, clarity on ethical conduct should drive answers on questions such as:
 - a. Should you offer your price insensitive customers a higher price for the same product (when that would be legally allowed)?
 - b. And how about offering price discounts, can you offer these to the more price sensitive customers?
 - c. And what is your constraint on personalization, is it okay to not show discounted products for price insensitive customers?

Although machines can take over pricing in a responsible and controllable manner, they will always need to be guided by real management decisions on business conduct.

4. There is no unique answer to the question which price is 'optimal'. Various optimiza-

tion targets and boundary conditions lead to various solutions, and the role of the pricing manager is to decide which solution to implement. Moreover, underlying models for price elasticity and customer value may suffer from being incomplete, and qualitative arguments should lead to a deviation from a theoretical optimum. For instance, Jeff Bezos shared his aversion against elasticity-based optimization in the early 2000's. He saw that all elasticity projects at Amazon lead to setting higher prices, which would go against the spirit and competitive positioning of Amazon. Or analytically speaking: elasticity models often under-estimate long-term effects, which can be substantial when the competitive position is taken into account. In those situations, an alternative approach is not to optimize on profitability, but compare various balanced price scenarios, which could be assessed on short-term profitability contribution, but also on long-term market competitiveness.

Making the transition to advanced price optimization and even price automation is not trivial, but the writing is on the wall: "it is here to stay and will get much bigger" More and more companies will start utilizing automated price optimization techniques, and change their internal pricing function. The pricing manager of the future will be tasked with data and algorithm innovation, setting clear boundaries on conduct, and explaining the logic of the model to the various business stakeholders. Maybe it is time for your company to break-away from competition, and take the ancient job of pricing to the digital age?