



The role of pricing strategies in digital business models



„The price is the number of currency units a buyer needs to pay for a unit of a product or service.“

Pricing is a company's decision on the price a product or service is offered on the market.



However, it is sometimes not that simple

In reality there is a selection of complex parameters that determine the final price a consumer has to pay:

- Base price (absolute amount, important for the „price appearance“)
- Discounts, bonus, conditions, special offers
- Differentiated prices for package sizes or product variations
- Differentiated prices for customer segments, time, place or lifecycle phase
- Price for complementary or substitute products
- Price for add ons or services
- Multi-dimensional prices (e.g. base plus usage depending)
- Bundle and component prices
- Price as a result of personal negotiations
- ...



There are three main drivers for profit: Price, Quantity and Costs. Out of these, price offers the highest leverage on profit, but also can lead to severe negative consequences.

Example: Effect of price adjustments

Assume a company is selling its product for 10 EUR per unit. Sales quantity is 100.000 units per year. Variable (direct) costs per unit are 6 EUR. Fixed costs are 300.000 EUR per year.

Analyze what would happen if any of the three drivers for profit is **improved** by 10%. All other factors stay constant (= **ceteris paribus assumption**). Fixed and variable costs are treated separately.

Changing the parameters leads to the following profit effect:

Result:

- Setting the right price is a key success factor for companies
- Achieving a better price offers the highest leverage effect of all three profit drivers. However, pricing also offers high risks.
- A negative price development or setting an unnecessarily low price can destroy the profit margin.

Example: Calculate the effect if each of the three drivers in the example develop negatively by 10% (= costs increase, price and quantity decrease).

- The high leverage of price for the profit shows its special role in the marketing mix of a company.
- However, the **ceteris paribus assumption is not true in reality**: Price changes typically show a strong side effect to sales quantity.
 - **Price sensitivity**: Explains the impact of price changes to consumers' purchasing behaviour. It is also known as price elasticity, as it determines the form and gradient of the demand function.
 - In digital markets, **price transparency** increases the side effect of pricing on sales quantities:
 - Prices can be changed without much effort
 - Consumers receive price information with less delay and react quickly on price adjustments.

The specific characteristics of digital products and markets also influence pricing. Some examples:

- Indirect revenue streams allow a **more aggressive pricing** in the core product/service
- Cost structures tempt competitors into price competitions
- **Oligopolistic structures:**
 - Few competitors with similar products that are frequently seen as interchangeable, thus competition is mainly price-based
 - New competitors try to break the market via pricing
- Digital technologies allow companies to set prices dynamically and if required even user specific
- Companies have profound information on purchasing decision making behaviour and price sensitivity of their customer segments.

One of the most dangerous sentences in sales:

„Let's reduce price to generate more sales quantity“

Due to the leverage effect of price changes, the required quantity increase to balance a price reduction is usually significant.

Example: What quantity increase would be required to balance a 10% price reduction, i.e. to make at least the same profit as before?

Assume constant fixed costs, and also constant direct costs per unit

To calculate the required volume effect to balance a price change, the **Volume Hurdle Formula** can be applied. It exists in different versions.

Q = Quantity

Q_f = Future Quantity

Q_i = Current Quantity

CM = Contribution Margin

CM_f = Future Contribution Margin

CM_i = Current Contribution Margin

P = Price

Example: What quantity increase would be required to balance a 10% price reduction, i.e. to make at least the same profit as before?

$$\% \Delta Q \geq \frac{- \% \Delta P}{\% CM + \% \Delta P}$$

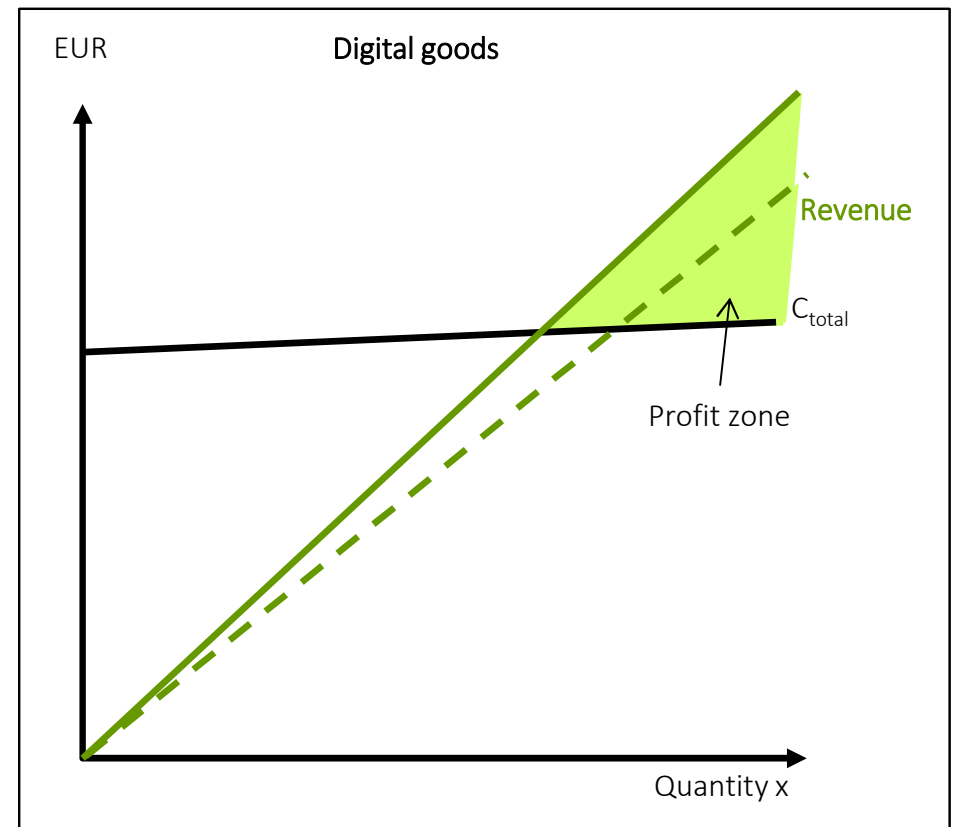
$$Q_f \geq \frac{CM_i}{CM_f} * Q_i$$

Digital products and services have distinct costs structures:

- Low direct costs
- High fixed costs

This leads to a high leverage effect of price changes:

- Price reductions require a high quantity effect to balance profits
- Price increase leads to significantly higher profits



The central question for pricing is

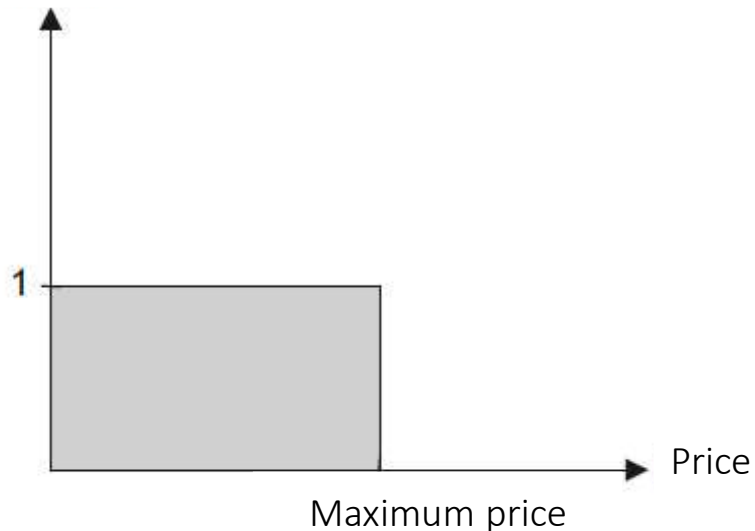
... how will pricing decisions influence the behaviour of our target customer groups, intermediaries, competitors etc.?

Only a good understanding of the willingness-to-pay of our clients will allow a good pricing decision!

The individual price-demand-function can be used to explain reactions on pricing decisions.

Yes/No decision

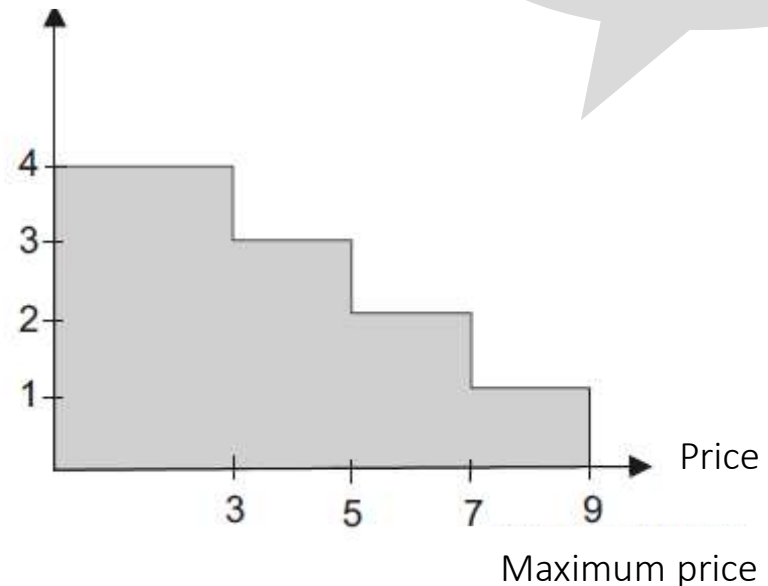
Demand



Durable consumer goods /
durable digital goods

Quantity decision

Demand



Consumer goods / digital services and non-
durable digital products

The aggregated price-demand-function visualizes the dependency between our price decision and the overall demand we can expect from our target customer segment:

- Is valid for a specific segment = a grouping of similar individual consumers
- Is calculated by summing up the number of buying customers for different price points (Yes/No) or by summing up the purchased quantity of the consumers (Variable quantity decisions).

Usually a higher price leads to a decreased sales quantity.

Price elasticity ε is the most important metric to measure the impact of our price on our sales quantity. It shows how demand varies depending on price variance.

$$\varepsilon = \left| \frac{\text{relative change of demand quantity}}{\text{relative change of price}} \right|$$

Inelastic: $\varepsilon < 1$

Changes in price will only lead to a smaller change in demand

Elastic: $\varepsilon > 1$

Changes in price will result in a higher change in demand

Unit-elastic: $\varepsilon = 1$

A change in price will result in an equal change in demand



Inelastic: $\varepsilon < 1$

Changes in price will only lead to a smaller change in demand

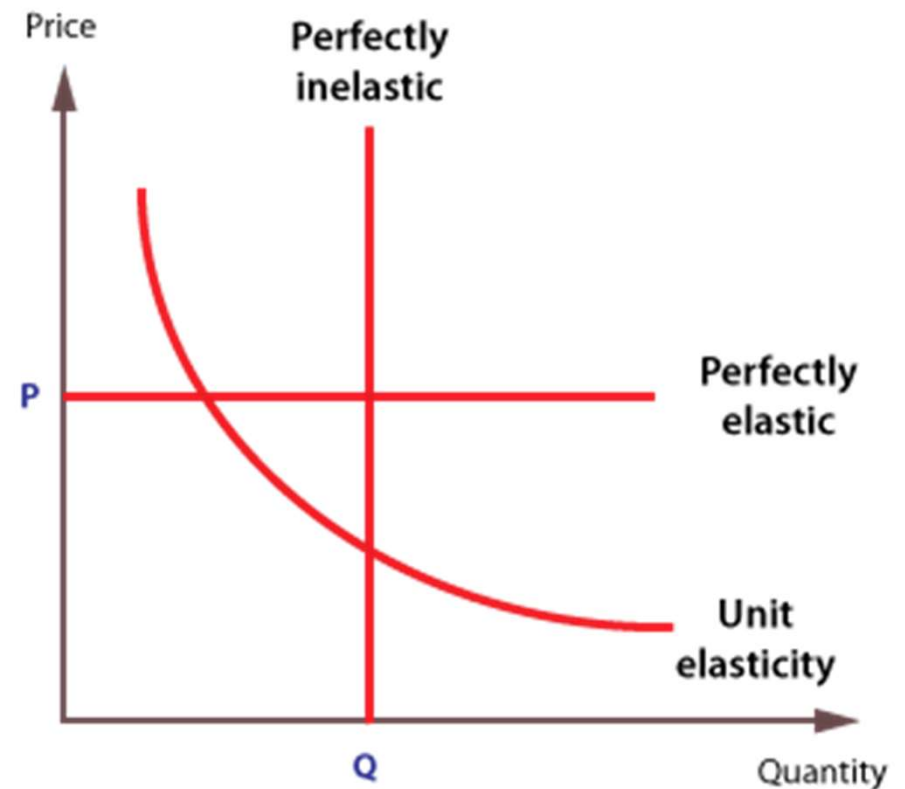
Elastic: $\varepsilon > 1$

Changes in price will result in a higher change in demand

Unit-elastic: $\varepsilon = 1$

A change in price will result in an equal change in demand

In rare cases the slope of the demand curve can be >0 . What would that mean?



For most industries it can be assumed that a price increase makes at least a part of the target consumers refrain from making a positive purchasing decision or buys from competition.

=> Higher prices cause a decrease of demand

However, price reductions sometimes do not lead to the expected positive demand effects.

In rare cases the slope of the demand curve can be >0 . What would that mean?

A high price elasticity can be expected in the following competitive environments:

1. High exchangeability of products
2. High price transparency
3. Good knowledge about the product and its features = high involvement
4. High purchasing frequency
5. Low brand loyalty
6. Low importance of image or prestige of provider
7. Simple pricing models

⇒ On the opposite, the price sensitivity can be reduced by overcoming these factors

yahoo/finance | Yahoo Finance

Peloton CEO: Sales increased after we raised prices to \$2,245 per bike



JP Mangalindan · Chief Tech Correspondent

5 June 2019

Peloton, which [filed confidentially](#) for an initial public offering on Wednesday, might not have gained a cult following had it not raised the price of its in-home exercise bike to \$2,245 early on.

“It was interesting psychology that we teased out,” Peloton CEO John Foley recalled in an interview last year with Yahoo Finance. “In the very, very early days, we charged \$1,200 for the Peloton bike for the first couple of months. And what turned out happening is we heard from customers that the bike must be poorly built if you’re charging \$1,200 for it. We charged \$2,000 dollars for it, and sales increased, because people said, ‘Oh, it must be a quality bike.’”

What price sensitivity
would we expect?

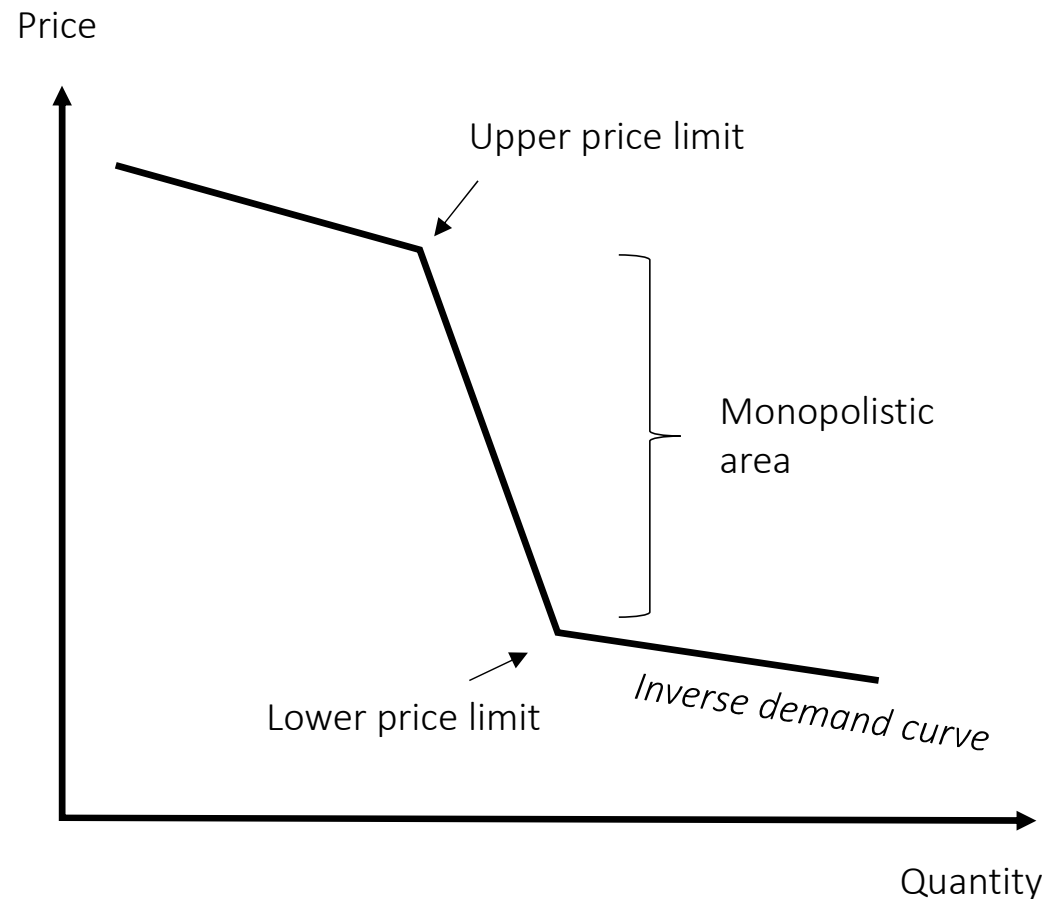


Double kinked demand curve
(Gutenberg curve). It was set up as an *inverse demand function* = which price can be achieved depending on demand quantity?

- Quite steep (inelastic) central part of the curve
- Two more elastic outer areas of the curve

⇒ Suppliers target for a price in the monopolistic (steep) part of the demand function, as price changes only result in small changes of demand.

Question: How can this curve be explained? Why might customers react like that?



Skimming Strategie

At the beginning of the market cycle it is tried to realize high prizes for innovative products. After a while prices are reduced either voluntarily or due to competitive pressure in order to generate higher volumes and to lock out competition.

Problem: Consumers must not anticipate this strategy, otherwise Coase-Conjecture.

Penetration Strategie

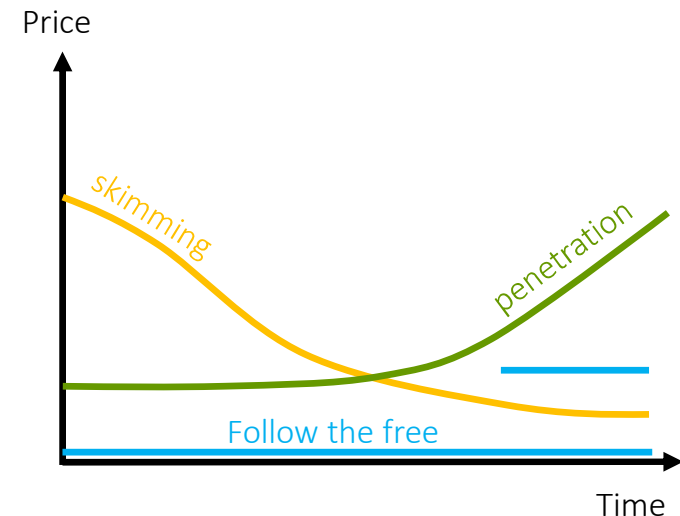
Market entry with very low prices in order to achieve a high market presence and market share. Low or negative margins are accepted. Later prices are increased step-by-step.

Problem: „Free Lunch Mentality“: Consumers change to providers that offer for free or at lower prices as soon as prices are increased. To keep this from happening it is important to generate high **Switching Costs** or **Lock-In-Effects**.

Follow-the-free Strategie

Goods are initially offered for free in order to get a broad market coverage and awareness. Once customers are using the product extra add-ons, premium functionalities etc. are sold that come with regular prices.

Problem: Finding the right balance to attract consumers with the free version but offering enough extras to charge for the premium version.

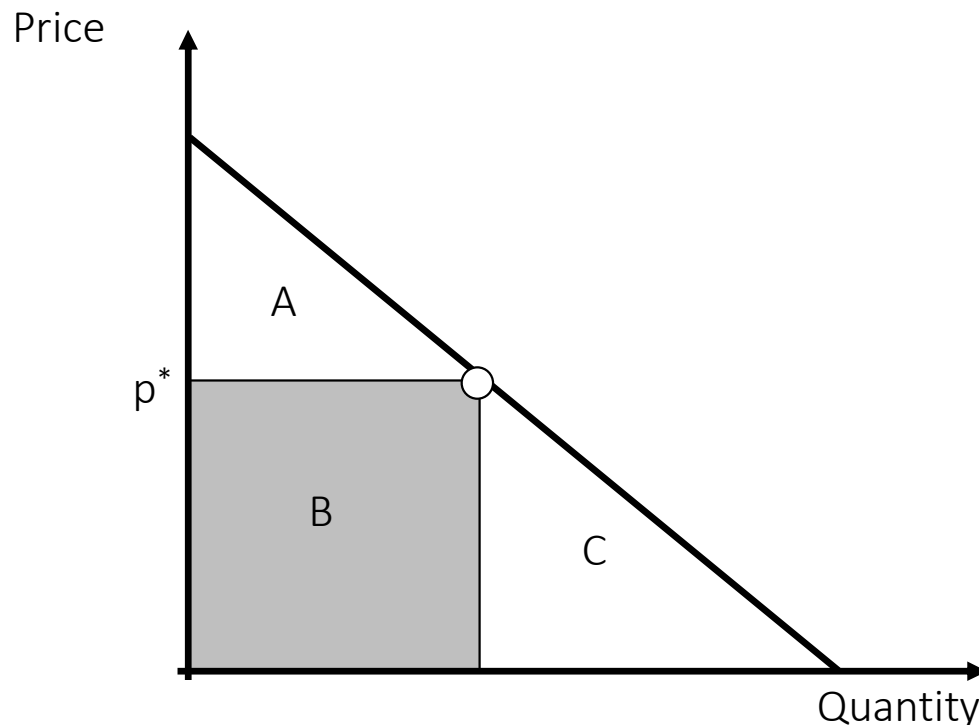


Digital markets allow a much more dynamic pricing strategy compared to regular markets. It is possible to generate different prices for different consumer groups („**Price Differentiation**“).

	Supply-sided price assignment	Demand-sided price assignment
Individual preferences	1st degree: Perfect price differentiation	2nd degree. Self selection: - Quantitative - Qualitative - Time-based
Aggregated preferences	3rd degree: Segmentation: - Demographic - Geographic - Behavioral	

Different forms of price differentiation require different information and offer different profit mechanisms for suppliers.

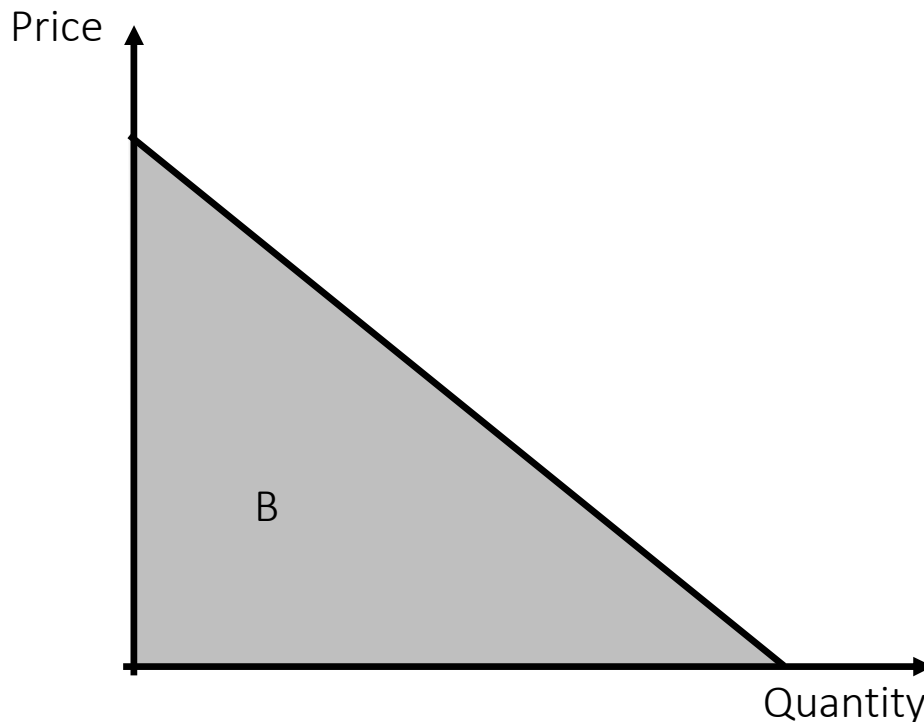
Classical monopoly model: Demand quantity is negatively depending on price. The lower the price, the higher is the demanded quantity in the market. The monopolistic competitor will set a price p^* .



- A = Consumers with a higher willingness-to-pay will purchase the good for p^* . They benefit from this price (= consumer welfare).
- C = Consumers with a lower willingness-to-pay will not buy the product for p^* . They are priced out of the market and do not receive the product („Deadweight Loss“).
- B = Income of the monopolistic supplier.

Perfect Price Differentiation:

The supplier manages to offer the product to each consumer to the price that equals his willingness-to-pay. This requires an exact understanding of the consumers' price sensitivity, i.e. there must not be any consumer anonymity in this market.



- The monopolistic supplier would maximize his income. He would take in the full consumer welfare as well as the deadweight loss.
- There would no longer be an under-coverage of products in the market, so there would be a welfare gain.

But:

- There would be a strong re-allocation of profits towards the monopolistic provider.

This is why data protection is crucial also from a social and macro-economic perspective to avoid one-sided welfare allocations.

Perfect price differentiation up to now was a theoretical construct. In classical markets it is impossible to achieve it due to the following problems:

Information Problem:

The supplier does not know the individual preferences of consumers.

Transaction Cost Problem:

Setting client-specific prices would be very expensive or even impossible, e.g. Price lists, catalogues...

Arbitrage Problem:

Consumers can buy products cheap and sell them to a higher price to those with a higher willingness-to-pay. They could realize an arbitrage profit which would be taken from the profits of the monopolist.

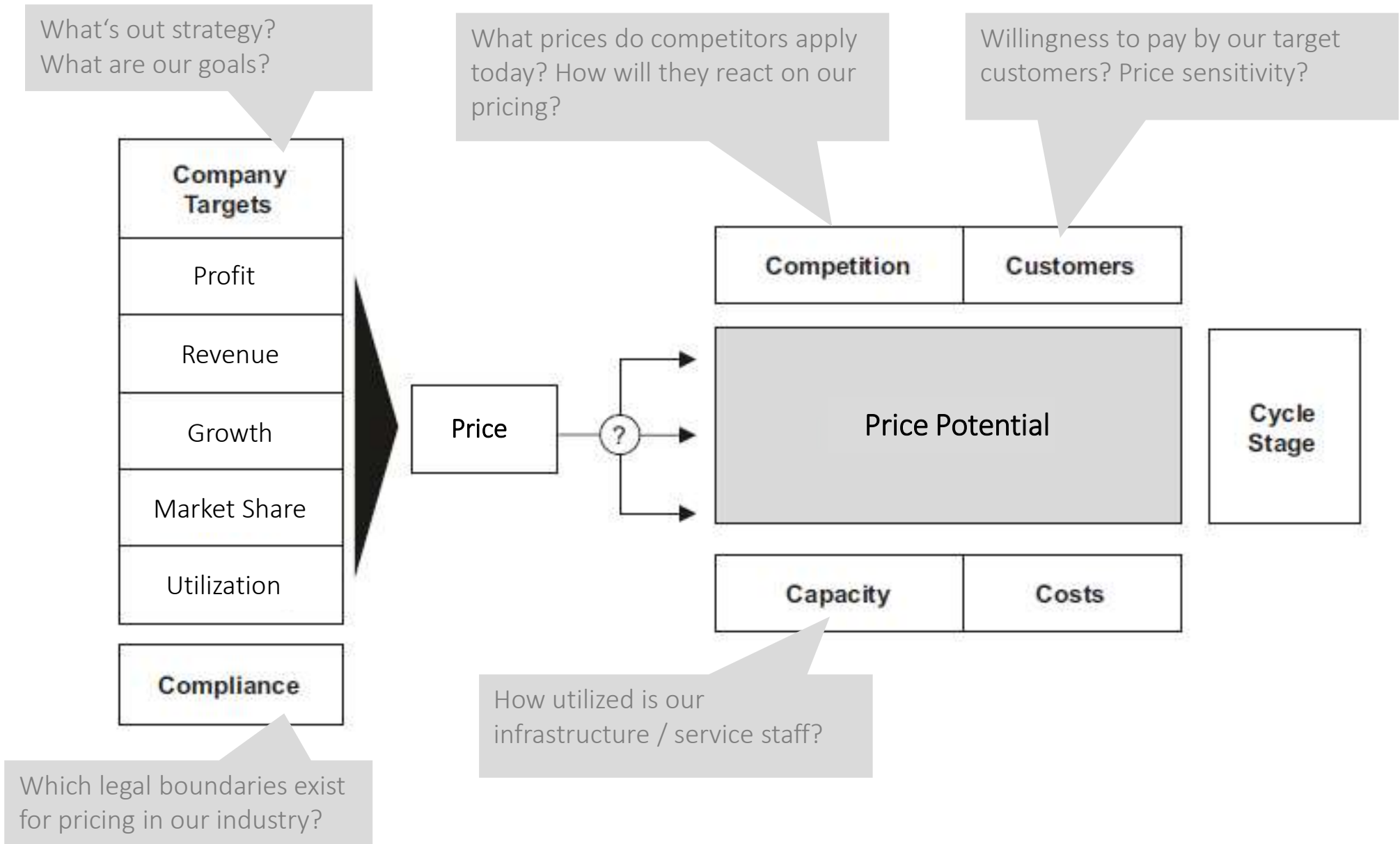
Digital markets

Analytical CRM aims at generating as much knowledge about consumer behaviour as possible.

It is technically possible to adjust the price display depending on which user looks for a product or receives an offering.

Digital Rights Management, fraud detection, blockchain technology etc. can prevent consumers from sharing products or services.

Determining factors for pricing decisions?



- There are three main drivers for profit: Price, Quantity / Volume and Costs
- The price has a specially strong leverage effect on profit
- When changing the price, the leverage effect has to be taken into account
- Price adjustments have side effects on sales quantity. The extent of this effect depends on the price elasticity / the price sensitivity of the target segments
- Aggregated demand functions can help to understand how consumers will react on pricing decisions
- Price elasticity usually is negative, as an increase in price typically leads to a decrease in demand quantity
- The specific cost structure of digital goods makes pricing one of the key competitive strategies
- In digital markets skimming, penetration and follow-the-free strategies are common.