Platform economics

Tutorial 2 : Strategies of established platforms

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Successful two sided platform, with c_b cost for users of side b, v_b^0 the intrinsic utility value, β_b the marginal utility of a transaction with users of side s, n_b and n_s number of users on side b and s, A_b the access fee for side b. We define utility of users of side b as :

$$U_b = \beta_b n_s - A_b + v_b^0 \tag{1}$$

And profit-maximizing access fee for side the platform is given as :

$$A_b = c_b - \beta_s n_s + \frac{n_b}{\frac{\partial n_b}{\partial A_b}} \tag{2}$$

- Why do we specify the assumption : successful two sided platform ?
- How the price emerges ?

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- Why do we specify the assumption : successful two sided platform ?
  - We assumed that the plaform is able to attract both sides
- How the price emerges ?
  - Charge a higher price if group i is less price sensitive
  - Charge a lower price on side i if users on this side can attract a larger number of users from the other side. Discount larger if indirect network effects stronger
  - Charge a higher price if it is more costly to serve an additional participant (high client acquisition costs).

If one side is attractive enough for the other side, it can make sense to subsidize their participation and extract the surplus from the other side. E.g. :

- Nightclubs : why do women tend to get a free entry ? In some cases they are even offered a drink : negative pricing strategy. Cf *It takes 2 to tango : the economics of two-sided markets*, S.Evans, 2003.
- Buying positive reviews
- In two sided platforms, prices are almost always asymetric.

- $-\beta_b n_s$ the total value derived by all users on side b from the presence of users on side s. It's a measure of the network effect, where each additional user on side s adds β_b units of utility to users on side b.
- The socially optimal price is found by subtracting the value of the network effect ($-\beta_b n_s$) from the cost c_b. This calculation suggests that the platform should potentially subsidize access for users on side b based on the value they derive from interacting with side s.

$A_b = c_b - \beta_b n_s$,
Lower than monopoly price (profit maximizing price) : $c_b - \beta_b n_s < c_b - \beta_s n_s + \frac{n_b}{\frac{\partial n_b}{\partial A_b}}$

- $A_i = c_i$?
- The price would be too high compared to the socially optimal price, because it does not account for the externality. Less participants than optimal would enter the platform, and less trade would emerge. Everybody would be worse off.

$$U_s = n_b\pi - A_s + v_s \tag{3}$$

$$U_b = n_s u - A_b + v_b \tag{4}$$

Assumptions for network effects : $u\pi < 4$ and $(u+\pi)^2 < 16$

- Indifferent seller : $\hat{B_s} = -nb\pi - A_s$, all sellers with utility lower than $\hat{B_s}$ don't join.
- B_s is uniformly distributed over $[-1, 1]$, thus $\frac{1-\hat{B_s}}{1-(-1)}$ joining. Then $n_s = \frac{1+n_b\pi-A_s}{2}$
- We find similarly $n_s = \frac{1+n_b\pi-A_s}{2}$.
- If we use this expression into previous n_s equation we find $n_b = \frac{2(1-A_b)+u(1-A_s)}{4-u\pi}$
- similarly we find $n_s = \frac{2(1-A_s)+u(1-A_b)}{4-u\pi}$

Platform's maximization problem $\max_{k_s,k_b} \Pi = A_s n_s + A_b n_b$:

$$\max_{k_s,k_b} \Pi = A_s \frac{2(1-A_s) + u(1-A_b)}{4-u\pi} + A_b \frac{2(1-A_b) + u(1-A_s)}{4-u\pi} \tag{5}$$

FOCs :

- $\frac{\partial \Pi}{\partial A_s} = \frac{2-4A_s+\pi-(u+\pi)A_b}{4-u\pi}$
- $\frac{\partial \Pi}{\partial A_b} = \frac{2-4A_b+\pi-(u+\pi)A_s}{4-u\pi}$

Solutions (we recall $u\pi < 4$):

- $(2-4A_s) + \pi - (u+\pi)A_b = 0$
- $(2-4A_b) + \pi - (u+\pi)A_s = 0$

Thus :

- $A_s^* = \frac{2(\pi-u)+8-u\pi-u^2}{16-(u+\pi)^2}$
- $A_b^* = \frac{2(u-\pi)+8-u\pi-\pi^2}{16-(u+\pi)^2}$

Buyers pay a lower membership fee only when $\Leftrightarrow A_s^* > A_b^*$. Thus :

$$2(\pi - u) + 8 - u\pi - u^2 > 2(u - \pi) + 8 - u\pi - \pi^2$$

'$\Rightarrow 2(\pi - u) - u^2 > 2(u - \pi) - \pi^2$
$\Rightarrow 4(\pi - u) > u^2 - \pi^2$
$\Rightarrow 4(\pi - u) > (u + \pi)(u - \pi) \quad (6)$
The inequality can hold only if $\pi > u$. Buyers pay less if the externality that an extra buyer generates on the sellers side is larger than the externality that an extra seller generates on the buyers side.

With $u = 1$ we have $A_b = \frac{2(1-\pi)+8-\pi-\pi^2}{16-(u+\pi)^2}$

- We recall the assumption $(u + \pi)^2 < 16$, meaning the denominator is always positive. This assumption also means that $\pi < 3$
- Thus, $A_b = 0 \Leftrightarrow \pi = 2$ and $A_b < 0 \Leftrightarrow \pi > 2$
- This means that buyer gets subsidized when $\pi \in]2; 3[$

Enumerate possible revenue streams for platforms and discuss if AirBnB is using these (or not).

- By selling digital products and services
- By having consumers work 'for free'
- By selling advertising space
- By selling data about consumers

Airbnb charges hosts a percentage of the booking total as a service fee, and guests are also charged a service fee on top of the booking price : they sell digital services.

Enumerate different ways to set prices for a platform and discuss under which conditions one is more appropriate than another.

- Membership/subscription fees
  - Good choice if platform provides high value and users may engage several transactions
  - But, Chicken and egg problem (cf freemium)
- Usage/transaction fees
  - Users are not charged before they get value from the platform (easier entry), and platform gets a piece of all the value that passes through it.
  - But harder to monitor, necessary to invoice the whole process otherwise users will coordinate elsewhere and platform won't be able to get its value.
- Freemium models
  - When there is a basic service that is hard to monetize (legal or technical constraint)
  - Paid services need to provide enough value to be tempting for a good portion of users

Describe the pricing strategy of AirBnB towards sellers and buyers and try to find arguments why it makes sense from their perspective.

AirBnB use 3% fee for host side, and 6-12% fee for guest side, without annual fee. With this strategy, they are able to get value from all transactions, and they offer services like warranties and payment facilities to invoice the whole process.

They charge higher fees for guests because they value more host side.

Could you think of whether AirBnb can profitably add another revenue stream or change its pricing strategy?

Imagine that you would like to establish a platform. Which monetizing and pricing strategy would you choose if your business model consists in facilitates finding people interested in the same kind of activities ?

Imagine that you would like to establish a platform. Which monetizing and pricing strategy would you choose if your business model consists in helps you selling your game cards?

- *It takes 2 to tango : the economics of two-sided markets*, S.Evans, 2003.
- *The Economics of Platforms, concepts and strategy*, P.Belleflamme & Martin Peitz, 2011