

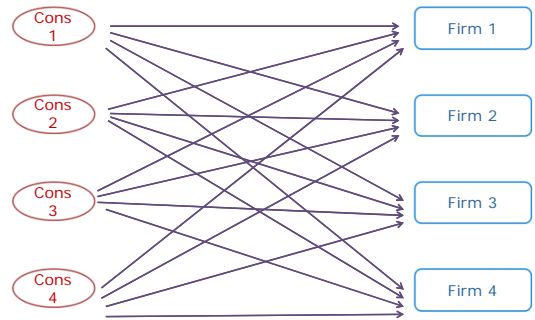
Lecture 27

Platforms & e-markets

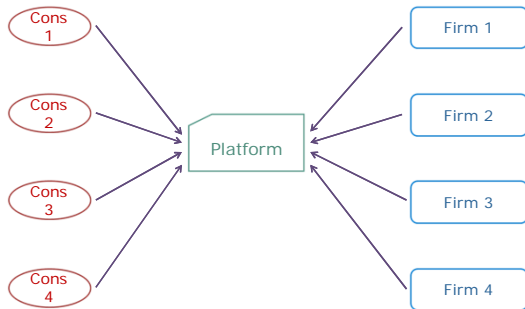


Industrial Economics

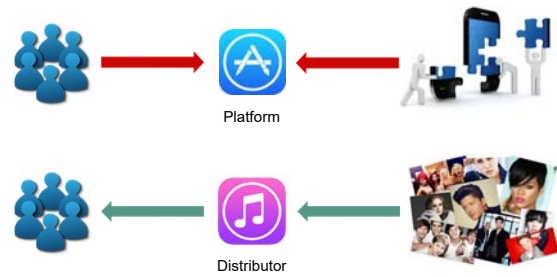
Direct transactions



Intermediated transactions

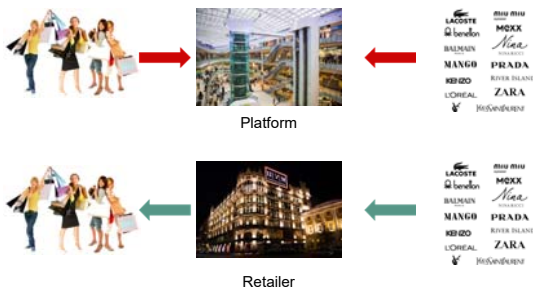


Market vs. Platform



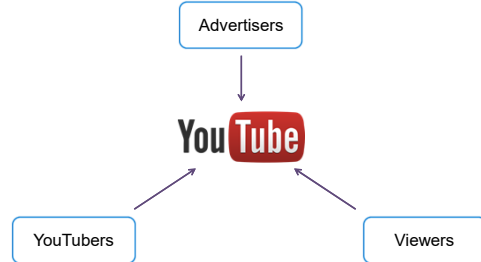
A non-digital case

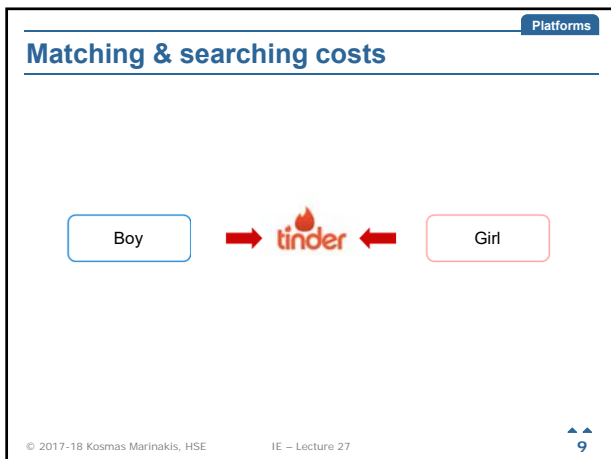
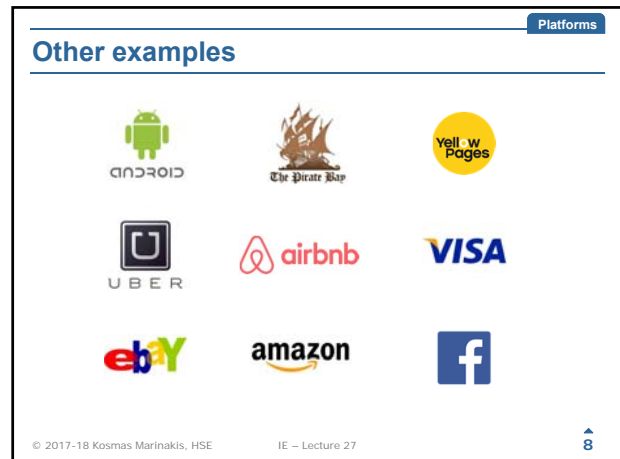
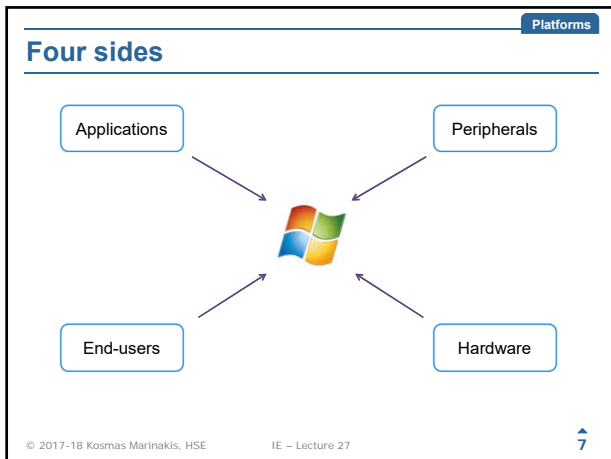
Platforms



Three sides

Platforms





Platforms

Information trade

- ★ Amazon's CEO, **Jeff Bezos** was asked to describe Amazon's business plan
*"We are **information brokers**, we help readers and books find each other!"*
- ★ Today, **several** other platforms are in the business of **information trade**.

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Platforms

Information and externalities

- ★ In a market it does not matter how we split the **average transaction burden** to each side
 consider for example an **excise tax**
- ★ In a platform there are **network externalities**
 lowering the burden of the buyer attracts more buyers and seller's **potential demand** increases
- ★ Therefore, a platform does not exhibit **price neutrality**.

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- Platforms
- ## Instruments of the platform
1. Membership or registration fees
 - ◆ **Participation** fees for buyers and/or for sellers
 - ◆ Requires **monitoring of participation** at a low cost
 2. Usage fees
 - ◆ **Matching** or **transaction fees** for buyers and/or for sellers
 - ◆ Requires **monitoring matches** and especially, **transactions**
 3. Advertising
 - ◆ Revenue from advertising is a way to **finance the activity**
 - ◆ It can be analyzed using the **multi-sided** market approach
 4. Bundling with complementary goods
 - ◆ Goods or services that **attract members**.
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The OS platforms

- ★ When the first commercial computers were introduced in 1951 each Mf would develop **their own** OS
- ★ With the introduction of PCs in 1970 producers followed the **same** traditional **vertical integration** model
 - Apple, Commodore, TI, Atari had each **their own** OS's
- ★ When **IBM** entered the PC industry in 1981 it **followed the norm**, planning to develop several OS's
 - one of those was the PC-DOS licensed by a small software company, Microsoft
- ★ The personal computer marketplace soon became a **battle** between the **Apple** and **IBM** platforms.

Business models

- ★ The **choice** of business models appears to have had a **dramatic effect** on the evolution of the PC industry
 - ◆ **Apple** **bundled** its proprietary hardware platform with its proprietary software platform
 - ◆ **IBM** offered several compatible OS's developed by 3rd-party vendors and **permitted vendors to license** these OS's out
- ★ From those OS's, Microsoft's **DOS prevailed**
 - it was by far **cheaper**, relatively **faster** and more **universal**
- ★ Microsoft started **licensing MS-DOS to everyone** who was producing IBM clones
 - at this point, **IBM becomes largely irrelevant** in this game.

Opposite philosophies

- ★ In the 1990s, **Microsoft** and **Apple** followed completely **opposite** strategies
- ★ The MS-DOS platform targeted to cover as **wide** as possible all hardware in the PC market
 - ◆ Microsoft **focused** on what it knew best – writing software
 - ◆ MS-DOS was more universal but due to hardware variability it was also **more unreliable** (compatibility issues)
- ★ Apple's platform was **tightly integrated** to the hardware
 - ◆ Apple ensured **quality** and **reliability** for the bundled system
 - ◆ In mid-90s, Apple **tried to license** its OS – it **stopped** because the revenues did not cover the engineering costs.

Killer apps

- ★ Microsoft developed a **four-sided** model
 - applications – peripherals – hardware – end users
- ★ Apple insisted on the **two-sided** model
 - applications – end users
- ★ The **ultimate battle** was given for the “**killer apps**”
 - applications that **drive end-user demand** for the platform
- ★ Apple's sales were driven by **VisiCalc** – Microsoft's by **Lotus 1-2-3**
 - ◆ Initially, **neither** company **actively encouraged** killer apps
 - ◆ Later, both **realized** that it made sense to make it as **attractive** as possible to write software for their platforms.

Cost for developers

- ★ It is obvious that Apple and Microsoft would **benefit** from **stimulating** app development
 - both companies **invested billions** in today's values to support large or small developers with services
- ★ It is less obvious that the profit maximizing strategy involved **giving away** developer services
- ★ By 1990, Microsoft had 71M users and Apple had 5M
 - ◆ Developers **benefit from participating** in those platforms
 - ◆ Apple and Microsoft could, in theory, have **charged developers** for access once they had established a **critical mass** of developers.

The hardware side

- ★ **Apple** developed its own hardware
- ★ **Microsoft** considered hardware to be a **side** of its platform
 - ◆ This was true even though MS's OS **was an input** for OEM PC's sold in the market
 - ◆ OEMs were just a **distribution channel** for DOS and **Windows** later
- ★ Microsoft **worked closely** with hardware Mfs
 - ◆ In the production of device **drivers** for the “plug-and-play”
 - ◆ In the **development of the CD-ROM** in the end of 90's with a humongous investment of \$200M – Microsoft had **foreseen** the future of the PC as a media center (!).

Competition in the hardware front

- ★ In 1985 Bill Gates sent a letter of advice to John Sculley
"Apple should license Mac OS to other manufacturers in order to create its own standard [...] this will result in incredible momentum for [Apple's] architecture"
- ★ Bill Gates was **worried** for Apple's future
 Microsoft was a **major application developer** for the Apple platform and sought to **hedge** its bets on its application and OS business
- ★ Apple **never got** to support 3rd-party hardware
 in the end of 1990s when its hardware department was falling back the company came to the **verge of bankruptcy**.

Pricing strategies

- ★ Multi-sided market theory is built on the premise that **pricing is a critical element** in any strategy to maximize platform value
- ★ Microsoft's platform earned its revenue from **end-users**
 - ◆ Directly through the **retail channel**
 - ◆ Indirectly through **OEM sales** who pass on the licensing charges to end-users
 - ◆ Microsoft effectively had **losses on both sides** of developers and hardware Mf's
- ★ Apple's platform adopted a **similar** pricing structure
 - ◆ Bundled **hardware** provided **additional revenues** for the company.

Video game platforms



- ★ Up to the 1970s consoles played a single game that was **hardwired** into the circuitry
- ★ In 1976 **Fairchild** introduced **Channel F** that supported games stored in **interchangeable cartridges**
 Atari followed in 1977 with a better console, the VCS
- ★ In 1979, several Atari programmers defected to found **Activision** with the intention to produce games for the Atari VCS 2600 console
 Activision's attempt was an **overnight success** and this **encouraged** more developers to join the industry.

A different platform



- ★ In the mid-1980s **Nintendo changed the game** entirely
 - ◆ Introduced a **security chip** that locked out unlicensed games
 - ◆ Persuaded developers **to join** the NES platform and convinced them **to pay** royalties.

Competition today



- ★ The same platform competition model is **followed today**
 - ◆ A **new fierce round** of competition takes place every 4 - 5 years when new models are released
 - ◆ The **two most successful** platforms typically end up with more than **80%** of the market, and one platform generally **prevails**
 - ◆ 50% of sales come within **3 months** of the introduction of a new model, and 80% within **9 months**
- ★ Having a **solid lineup** of games available **at launch** is necessary for success.

Pricing structure



- ★ In the video games industry:
 - ◆ End-users end up paying **below the marginal cost**
 - ◆ For **example** in 2003, Microsoft had dropped the price of the Xbox to \$179, for a loss of around \$100 per console
- ★ Console makers then **recover fixed costs** with:
 - ◆ **Revenue** from games produced **in-house**
 - ◆ **Royalties** from games sold by **independent** developers
- ★ This is the **exact opposite** of the PC model
 which is quite **remarkable** since consoles are **technologically equivalent** to OS integrated with a hardware platform.

Rochet & Tirole (2004)

- ★ Two **sides** of the market $i \in \{D, S\}$ and a **monopoly platform**
- ★ The platform incurs a **fixed cost** C^i per side i and a **marginal cost** c per transaction
- ★ Each user i incurs a **benefit per transaction** b^i and a **fixed benefit** B^i for joining the platform
- ★ Each user i pays a **membership fee** A^i and a **transaction fee** a^i
- ★ There is **no additional payment** between end-users
a **more advanced version** of the model incorporates end-user payments

Decision to join

- ★ The total **number of transactions** is $N^D N^S$
where N^i is the number of **users from side** i
- ★ User i **will join** the platform iff

$$(b^i - a^i)N^j + B^i - A^i \geq 0 \Rightarrow$$

$$b^i + \frac{B^i - C^i}{N^j} \geq a^i + \frac{A^i - C^i}{N^j} \equiv p^i$$
 where p^i is the “**side-half-price**”
- ★ The **number** of side i users **who join** the platform is

$$N^i = \Pr\left(b^i + \frac{B^i - C^i}{N^j} \geq p^i\right) \quad (\Sigma 1)$$

notice that N^i depends on N^j

Profit maximization

- ★ $\Sigma 1$ is a 2×2 system that can yield the **side-demands**

$$\begin{cases} N^D = n^D(p^D, p^S) \\ N^S = n^S(p^D, p^S) \end{cases}$$

- ★ The platform's **profit** then is

$$\pi = (p^D + p^S - c) \cdot n^S(p^D, p^S) \cdot n^D(p^D, p^S)$$
- ★ Maximizing π s.t. a **fixed price** $p \equiv p^D + p^S$ we obtain

$$\frac{p - c}{p} = \frac{1}{\varepsilon_D}$$

that is, if we **exogenously impose** a fixed price p (price neutrality) **simple monopoly** is the case

Pure usage pricing

- ★ If $B^i = B, \forall i$, then the platform **does not need both instruments** a^i and A^i to optimize
- ★ It will be optimal to charge **only usage fee** a^i
usage pricing will be **closer to MC** than membership fee
- ★ With the logic used above, we obtain

$$\frac{p^i - c + p^j}{p^i} = \frac{1}{\varepsilon_D^i}$$

notice that the MC is alleviated by p^j because the incidence of a transaction at p^i will also result in receiving p^j from the other side

Pure membership pricing

- ★ If $b^i = b, \forall i$, then the platform again **does not need both instruments** a^i and A^i to optimize
- ★ If we additionally **assume** that $c = 0$, there is no need for **usage pricing** as MC varies with N^i only
- ★ In this case we obtain $p^i = A^i/N^j$

$$\frac{p^i + b}{p^i} = \frac{1}{\varepsilon_D^i}$$

that is, MC ($c = 0$) is alleviated by b because a transaction at p^i allows for an increase b per i in the membership fee of j

Thank you!



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