IPS
Class
PLATFORM BUSINESS II

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Platform businesses such as Google, Facebook, Amazon, have become VERY LARGE FIRMS (in terms of revenue, market capitalisation, but they have much fewer employees than big firms of the second and third industrial revolution)

➔ **Are they monopolies that impede entry of new firms (SMEs) or predate smaller firms???**

We will see here different aspects:

1. Innovation and monopoly: how GAFAM innovate (ensure market power) by acquiring smaller innovative firms
2. Are big platforms too big? The Economics of platforms
3. The power of big data through algorithm: large platforms have large amounts of big data and can use them to preserve market power through algorithms; Antitrust and regulatory issues

1. **Innovation and monopoly: how GAFAM innovate (ensure market power) by acquiring smaller innovative firms**

⇒ Overall spending on tech acquisitions topped $170 billion in 2014, up 54% from the previous year and more than double the amount spent in 2010!!!

= strategy to increase innovation for the large Silicon Valley firms is to buy startups (i.e. buy innovation)

i.e. large firms with big market power buy innovative SMEs

Example: Google

From Android To Waze: Google's 12 Best Acquisitions Of All Time

Alphabet (formerly Google) has made a number of notable acquisitions over the years, which have allowed Google to expand into new industries.

Few companies are more aggressive than Google when it comes to acquisitions.

It has acquired companies in a number of far-flung industries, ranging from robotics and artificial intelligence to health tech and wind power.

Not all acquisitions have worked out successfully (e.g. Nest), but here are some positive examples:

1. Android

= one of the best tech acquisitions of all time. Purchased for an estimated $50M in 2005, the Android mobile operating system is today installed on more than 80% of the world's smartphones.

Android is key as a "rainmaker" for Google, helping drive activity on search and email that Google can then monetize.

Google does not earn profit from the operating system itself but from the searches, gmail and other Google applications that are tied to Android.

2. Applied Semantics

The Applied Semantics' webpage-scanning technology was integrated into Google to create AdSense, a product that allows advertisers to extend their search campaigns by placing text, display, or link ads on websites that prominently feature relevant keywords.

Today, AdSense is a driving force behind the company's monetization of its Google Network Member sites, a category that accounted for 20% of Google's revenue in 2015.

3. YouTube

Google purchased YouTube for $1.65B in 2006.

The video platform is estimated to have generated around $6B in revenue in 2015.

Though YouTube is not yet profitable, the company is extremely valuable to Google because it is growing rapidly as viewing habits continue to shift from television to online video. On top of that, YouTube serves important strategic purposes in bolstering Google's search offerings.

4. Keyhole, Whereto, Zipdash

= 3 startups acquired by Google in 2004

= specialised on mapping features that together created **Google Maps**.

Note: Keyhole was founded by a former employee of Google

Google maps today = 1 billion users

= revenue through the sale of location-based ads

= part of the groundwork for Google's self-driving cars operation

= adds to the ubiquity of Google's services

5. Urchin Software

Google acquired Urchin Software in 2005 for an undisclosed sum, and the deal would ultimately help shape the world of online publishing.

Urchin would grow into the **web-hosted Google Analytics platform**, which strengthens Google's search business by helping websites understand where their traffic is coming from.

6. Waze

Google acquired it for about $ 1 billion (!)

= **mobile GPS navigation app**

Impact on Google:

Using Waze, Google Maps became more accurate in predicting travel time and suggesting navigation routes

7. DeepMind

Google paid $500M in 2014 to acquire the **artificial intelligence** company, which specializes in creating machine-learning algorithms for simulations, e-commerce, and games.

Google does not use directly yet but it is surely expecting to that artificial intelligence will become strategic in the years to come…

8. Titan Aerospace

= **solar-powered, high-altitude drone company** acquired in 2014 for an undisclosed sum. One of the possible uses for this technology would be to bring internet service to underdeveloped corners of the globe.

Titan's drones are included in Google's Project Skybender tests, aimed at checking whether these drones can be used to deliver **5G service** from the air and become the infrastructure for 5G networks globally.

Same M&A strategy for other firms in Silicon Valley:

Facebook: acquired businesses adjacent to its core product (WhatsApp for $22 billion) and far-flung from social networking (Oculus VR for $2 billion).

Microsoft acquired Minecraft developer Mojang ($2.5 billion)

Yahoo acquired Tumblr ($1.1 billion)

Amazon acquired the video game streaming site Twitch ($970 million)

Apple acquired 30 companies in 2015

Examples of acquisitions in 2019

Google:

Fitbit for 2,1 bn $ (digital fitness)

Elastifile (startup specialised in cloud storage)

Looker (Big data analytics) for $ 2,6 bn

Facebook: CTRL-Labs (brain – computer interface) + Chainspace (startup specialised in blockchain)

Other examples in 2019

Microsoft: acquired a cloud specialist + Promote IQ specialised in retail (useful to develop the agreement made with Walmart)

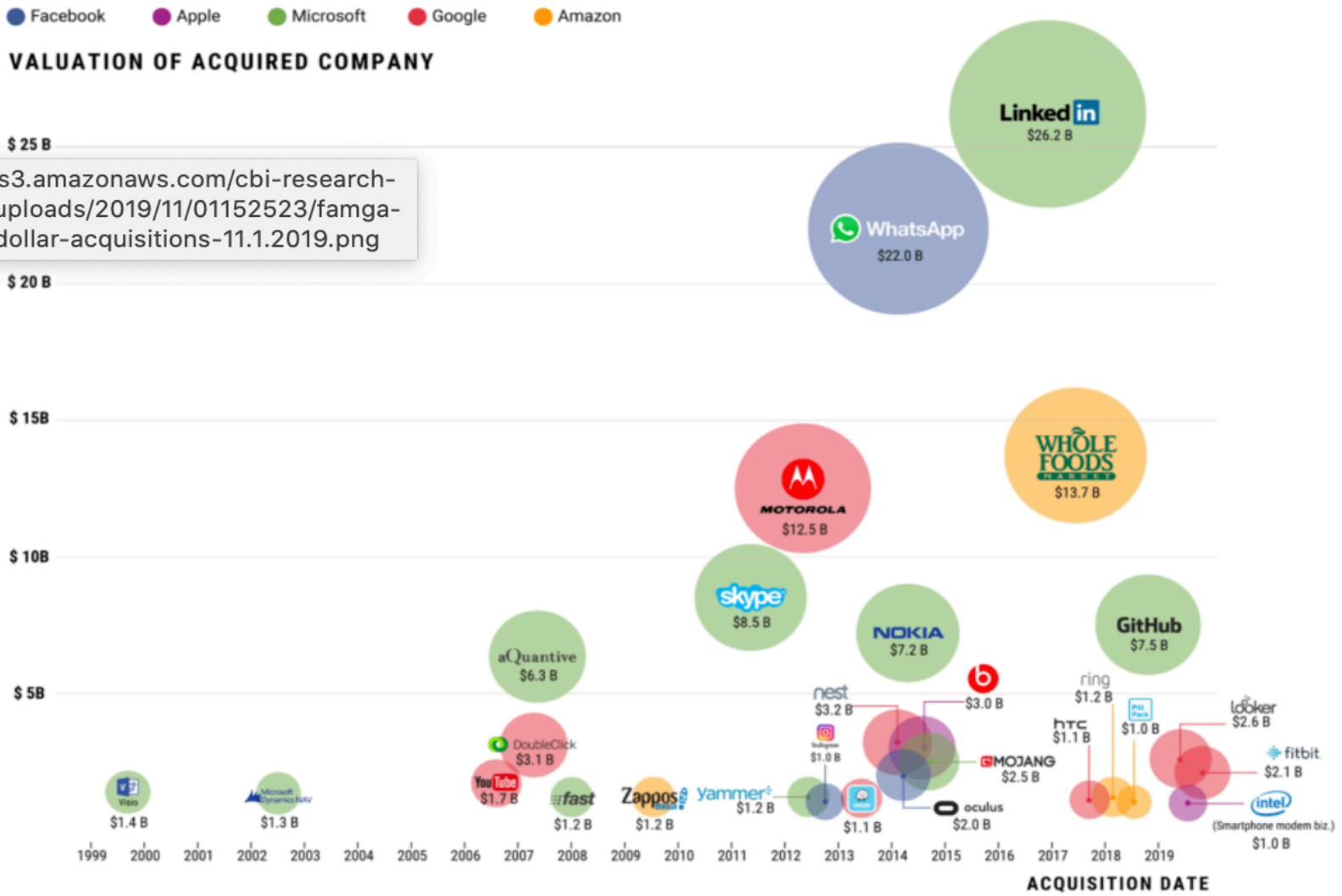
UBER acquired rival Careem for 3,1 bn $ (Careem is diffused in the Middle East)

AMAZON acquired in 2019:

- 3 startups providing Cloud services: CoudEndure, E8 Storage, INLT
- Eero: producing home wifi (heldpful for Amazon to ease the installation of smart systems in homes)
- TSO Logic: big data analytics
- Canvas Technology: robotics for warehouses
- Sizmek (advertising online services)
- Bebo (social network)
- IGDB: a videogame database

TIMELINE OF TECH GIANTS' BILLION-DOLLAR ACQUISITIONS

Every $1B+ acquisition made by Facebook, Amazon, Microsoft, Google, and Apple.
Bubble size represents maximum valuation.



https://s3.amazonaws.com/cbi-research-portal-uploads/2019/11/01152523/famga-billion-dollar-acquisitions-11.1.2019.png

Small firms and Large platform companies

Large platform companies such as Google (Alphabet), Amazon and Apple increase innovation by acquiring new startup firms that launched a business on the basis of an innovation: Waze, Keyhole, DeepMind, are examples.

In the Silicon Valley entrepreneurship dynamics is high

Young engineers who come up with innovations find it easy to create a startup, because **venture capital** is abundant.

Large firms acquire their firms and try to keep their staff in.

Startup founders, who often think of themselves as **entrepreneurs before engineers**, are notoriously difficult to keep at large firms long. Partly, this is cultural: striking out on one's own, idea in hand, is a fundamental part of the Silicon Valley ethos. The widespread availability of funding doesn't hurt, either.

So large firms struggle to keep the expertise they may have spent millions acquiring.

“**When a firm is making a tech acquisition, they’re buying the talent as much as they’re buying the technology**,”

says Brian JM Quinn, a law professor specializing in mergers and acquisitions at Boston College.

A TIME analysis of startup founders' **LinkedIn** profiles found that about two-thirds of the startup founders that accepted jobs at Google between 2006 and 2014 are still with the company.

Amazon has retained about **55%** of its founders over that time period, while Microsoft's rate is below 45%.

Facebook, with a **75% retention rate** for founders, is beating its older competitors, but the company only began acquiring companies in significant numbers around 2010 or so.

Google stands out among this cohort in large part because of the massive number of acquisitions it's conducted.

Overall at least **221 startup** founders joined Google's ranks between 2006 and 2014.

Yahoo, the next closest competitor, added at least 110 founders to its employee roster in that time.

Many of Google's most well-known products, including Android, YouTube, Maps, Docs and Analytics, have originated from acquisitions.

However, it's not easy to keep the young entrepreneurs in the large firms.

Example:

Uri Levine was the only one of Waze's three founders who chose not to join Google when the traffic app was acquired for $1 billion in June 2013.

Instead he launched a new startup—his **sixth**—called FeeX, which aims to help people reduce investment fees in their retirement accounts. "Entrepreneurs, they are driven by a passion for change," Levine says. "As soon as you become part of a large organization, you cannot change anymore."

Google's also experienced failures in acquisitions

Google acquired Motorola Mobility for $12.5 billion in 2013.

However, Motorola's phones failed to gain traction, the subsidiary racked up $1.4 billion in losses for Google, and the company offloaded the handset division to Lenovo for $2.9 billion in 2014.

Google defends the deal as a smart acquisition because of the **patent portfolio** that Google acquired, helping the company defend itself from **lawsuits** by Apple and Microsoft.

Why so much money spent on acquisition of startups?

Why is innovation so important?

Because there is a first mover advantage that all companies want to take by being the first to launch the innovation: **WINNER-TAKE-ALL**

=> **Economics of two-sided platforms confirm this**

HOWEVER

The large platforms have a dominant position that allow them to finance the acquisition of competitors

Is it abuse of dominant position? In the sense that the acquisition raise their market power and their dominance?

The antitrust authorities are now investigating on this issue… in the USA the Federal Trade Commission is inquiring since the summer of 2019; in Europe, authorities have been more suspicious (see later in this and next class)

2. Are big platforms too big? The Economics of platforms

Platform businesses offer their service to two groups of customers, which they help meet or interact.

Platforms help these customer groups minimise transaction costs.

Examples include advertising-supported media in old media industries or software platforms and web portals.

Since these businesses offer service to two independent groups of customers, they are called **two-sided markets (Rochet and Tirole, 2003, 2006) or two-sided platforms (Evans and Schmalensee, 2007).**

Network Effects

- Key idea in the economic analysis of platforms is that they are characterized by **network effects**

- Examples
  - Developers want to create products for Windows, iPhone, Android because of consumer base. Consumers are attracted in part because of the applications.
  - People want to have Visa cards because they are widely accepted, and merchants want to accept them because most people have them.
  - Traders want to trade in markets where they can easily find counter-parties, and where the market is liquid.

EXAMPLE

Consider a nightclub, which provides a platform where men and women can meet and search for interactions and potentially dates. The club needs to get two groups of customers on board its platform: it needs to get both men and women to come.

Moreover, the relative proportion of men and women matters. A singles club with few women will not attract men, and a club with few men will not attract women.

Pricing is one way to get the balance right. The club might want to offer women a break if they are in short supply (through a lower price or free drinks).

Or it might want to ration the spots to ensure the appropriate number of men; popular clubs typically have queues waiting outside, and women are picked out of line disproportionately.

There are network effects: the utility of each group of users increases as the number of users in the other group rises

In general, **exchanges** (such as dating clubs, but also stock markets, employment agencies, auction houses and internet sites) provide participants with the ability to search over participants on the other side and the opportunity to consummate matches.

Having large numbers of participants on both sides increases the probability that participants will find a match.

Depending on the type of exchange, however, a larger number of participants can lead to congestion. That is the case with physical platforms such as singles clubs or trading floors.

Moreover, participants may derive some value from having the exchange prescreen participants to increase the likelihood and quality of matches.

Some exchanges charge only one side. For example, only sellers pay directly for the services provided by eBay.

Other exchanges charge both sides, although the prices may bear little relation to side-specific marginal costs. Internet matchmaking services charge everyone the same, for instance, while physical dating environments sometimes charge men more than women.

Other example:

Advertising-supported media such as magazines, newspapers, free television, and web portals are based on a two-sided business model. The platform either creates content (newspapers) or buys content from others (free television). The content is used to attract viewers. The viewers are then used to attract advertisers.

There is a clear **indirect network effect** between advertisers and viewers—advertisers value platforms that have more viewers (although viewers might not value having more ads)

Software platforms

A software platform provides services for applications developers; among other things, these services help developers obtain access to the hardware for the computing device in question. Users can run these applications only if they have the same software platform as that relied on by the developers.

Software platforms facilitate a market for applications by reducing duplicative costs. Application programmes need to accomplish many similar tasks.

Rather than each application developer writing the code for accomplishing each task the software

platform producer incorporates code into the platform. The functions of that code are made available to application developers through an application program interface (API).

The user benefits from this consolidation as well since it reduces the overall amount of code required on the computer, reduces incompatibilities between programs, and reduces learning costs.

Software platforms

Hence software platforms:

- Reduce the cost and increase the supply of applications
- increase in the value of the software platform to end users
- positive feedback effects to application developers.

⇒ **The fundamental role of a two-sided platform is to enable parties to realize gains from trade or other interactions by reducing the transactions costs of finding each other and interacting**

The theoretical economics literature on two-sided platforms is relatively new.

Economists have derived many results based on stylized models that apply to some of the industries described above.

The precise results are sensitive to assumptions about the economic relationships among the various industry participants.

Even for these special cases it has turned out to be challenging to derive results without making further assumptions about the precise nature of the demand, cost, and indirect network effects

Nevertheless, several principles have emerged that seem to be robust.

They depend on the assumptions that:

- the platform has two groups of customers,
- there are indirect network externalities
- the customers cannot solve these externalities by themselves.

Consider a platform that serves two customer groups A and B. It has already established prices to both groups and is considering changing them.

If it raises the price to members of group A fewer As will join.

If nothing else changed the relationship between price and the number of As would depend on the price elasticity of demand for As.

Since members of group B value the platform more if there are more As fewer Bs will join the platform at the current price for Bs.

That drop-off depends on the indirect network externality which is measured by the value that Bs place on As.

But with fewer Bs on the platform, As also value the platform less leading to a further drop in their demand.

There is a **feedback loop** between the two sides.

An increase in price on one side induces a decrease in demand on that same side (effect of price elasticity of demand) and on

both sides as a result of the indirect effects from the externalities.

Formally, let

demand functions: $Q^A = D^A(P^A,Q^B)$ and $Q^B = D^B(P^B,Q^A)$.

(participation in one group depends on price charged to that group and on the demand – volume of the other side)

Let $e^I = -(\delta D^I/\delta P^I)(P^I/Q^I)$, for I = A,B. These are the own-price elasticities for each group, holding constant participation by the other (i.e., ignoring the externalities linking the two groups).

Let

$\theta^I_J = (\delta D^I/\delta Q^J)(Q^J/Q^I)$

for I,J = A,B and I ≠ J.

These elasticities measure the strengths of the externalities connecting the two groups: they should be positive in the two-sided platforms

$E^I = -(dQ^I/dP^I)(P^I/Q^I)$ for I = A,B. These are the ordinary ownprice elasticities, computed assuming other prices remain constant but allowing participations (quantities) to vary

Differentiating both demand functions totally with respect to either price, and solving, yields:

$E^I = e^I/(1-\theta^I_J\theta^J_I)$; I,J = A,B, I ≠ J.

Even if the As are not particularly price-sensitive, and as long as the externalities between the groups are strong (in either direction!), participation by group A may be highly sensitive to the price its members are charged, and similarly for group B. Even a small response by group A to a price change will trigger a response by group B, which in turn will produce a response by A, and so on.

Knowing the previous results**, the platform of course would like to find the prices that maximize its profits.**

For a single-sided business that would occur by selecting the output at which marginal revenue equals marginal cost and then charging the corresponding price for this quantity from

the demand curve. (Lerner formula)

For two-sided platforms three results appear to be robust:

1) The optimal prices depend in a complex way on the **price sensitivity of demand** on both sides, the nature and intensity of the **indirect network effects** between the two sides, and the **marginal costs** that result from changing output of each side.

2) The profit-maximizing, non-predatory price for either side **may be below the marginal cost** of supply for that side or even negative.

3) The relationship between price and cost is **complex**, and the simple formulas that have been derived for single-sided markets do not apply.

For many platforms it is possible to charge **two different kinds of prices**: an access fee for joining the platform and a usage fee for using the platform.

For instance, dating clubs have access and usage fees; Online newspapers have access fees but no usage fee;

In shopping malls, shoppers have no access nor usage fee, while shops have access fees and no usage fees.

Platform Pricing Examples

- Google and search engines
  - Free for consumers (not just search but additional services: email, translation, analytics, docs).
  - Advertisers have to pay, and less “relevant” advertisers have to pay a premium in auction.
- eBay, Amazon and e-commerce platforms
  - Free for buyers, but sellers have to pay commission.

- Financial exchanges
  - Traders are paid to submit “standing orders”, but have to pay when they submit “crossing orders”.

Shopping mall

Shoppers would prefer to get to stores in the least amount of time. Merchants would like to maximize the amount of foot traffic outside their stores and therefore the number of potential shoppers.

Shopping malls are sometimes designed to encourage shoppers to pass by many stores (e.g., by putting the up and down escalators at different ends of the mall).

DETERMINANTS OF PLATFORM SIZE AND STRUCTURE

There are four main determinants:

1. Indirect network effects

Indirect network effects between the two sides promote larger and fewer competing two-sided platforms.

Platforms with more customers of each group are more valuable to the other group.

For example, more users make software platforms more valuable to developers and more developers make software platforms more valuable to users.

Example:

A payment card system whose cards are taken at more merchants is more valuable to card users (more probability of having card accepted in any shop)

Hence indirect network effects imply competition **for** the market.

First movers have an advantage, all else being equal.

2. Economies and diseconomies of scale

For many two-sided platforms there are fixed costs of providing the platform, hence scale economies over some range of output.

Example: card payment systems have to maintain networks for authorizing and settling transactions for cardholders and merchants

Software platforms: there is a fixed cost of development but a low marginal cost of providing that platform to developers and end users

3. Congestion and search optimisation

Congestion and search costs may limit the size of platforms.

At a given size expanding the number of customers on the platform (shopping mall, dating club, etc.) can result in congestion that increases search and transaction costs.

It may be possible to reduce congestion by increasing the size of the physical platform, but that in turn may increase search costs.

Hence often platforms prefer screening participants and limit their numbers.

4. Platform differentiation and multi-homing

Platforms can by choosing particular levels of quality, with consumers choosing the higher or lower quality of platform depending on the income and relative demand for quality. (e.g. upscale and downscale malls).

Horizontal differentiation can result in customers choosing to join and use several platforms (= "**multi-homing**").

Payment cards are an example of multi-homing on both sides: most merchants accept credit and debit cards from several systems, while many cardholders carry multiple cards.

Platform Competition

- Typical concern about platform markets is that people will coordinate on a "dominant" platform.
  - Competition between platforms may be "winner-take-all" (eBay in online auctions, Google in search).
- Over time, new platforms may find it difficult to enter against an existing platform with a strong user base.
  - Potential for dynamic inefficiency: people would switch if they thought others would switch, but …
  - Example: might be possible to have a better operating system than Windows, but hard to convert people because of existing applications and user base.

Summary

- Platforms are intermediaries who “make a market” for buyers & sellers, or more generally for users.
- High-level view emphasize network effects and important of assembling a user base.
- Some key ideas in thinking about platforms
  - Coordination problems in assembling users
  - Potential for “winner-take-all” and lock-in
  - Platform pricing optimally subsidizes users who “create value” for other users, and this logic may lead to very different fees for different user groups

Summary

Competition dynamics:

It's relatively easy to create a platform business (SME)

But successful SMEs are often acquired by large firms

Successful platforms become very large and gain large market power

Example Facebook = 2.5 billion users per month (statista.com)

= revenue of $ 70.7 bn (2019)

However, the «winner-take-all» effect implies that successful digital platforms really become big, and get enormous market power

➔ The large platform can use this large market power to limit competition