

Digital Transformation

Class # 5: Digital Business Models - Platforms

EPITA | Fall 2025

Valeriu Petrulian

Digital Transformation Class 5



- Admin
- Recap
- Thoughts for the day
- Preparation for final presentations

Final Presentations + Quiz

- Quiz is scheduled on January 15th from 09:00 to 09:30 am, in KB003 (amphi 3)
 - Closed-book exam
- Next session (Class 6) we shall be dividing the groups in 2 for the final presentation sessions, please be ready to do so at the beginning of next week's class

Access to the Teams group « **Digital Transformation F25** » created at the beginning of the course **shall be closed today EOB**. Students who are not members of the group at this date will not be allowed to take the quiz.

Final Presentation Sessions - Fall 25

Mon Jan 19 th		Tue Jan 20 th		Wed Jan 21 st		Thu Jan 22 nd	
DSA – 7 h					[Session 1] 09:00 – 13:00		
					[Session 2] 14:00 – 17:00		
AIS – 7 h							[Session 1] 09:00 – 13:00
							[Session 2] 14:00 – 17:00
SE – 6 h	[Session 1] 09:00 – 12:00		[Session 2] 13:00 – 16:00				
CS – 3 hours	[Session 1] 13:00 – 16:00						

Course Breakdown

EPITA Fall 2025

Class	Date & Time Topics
Class # 1	Welcome to the Digital Economy!
Class # 2	Technology Drivers # 1: Internet of Things (IoT), Blockchain
Class # 3	Technology Drivers # 2: Big Data & Artificial Intelligence (AI)
Class # 4	Social (non-technical) drivers of Digital Transformation
Class # 5	Digital Business Models: Digital Platforms
Class # 6	Beyond Products: Designing Digital Businesses, and Markets Course Wrap-Up
Class # 7	Final Presentations

Today's Reading:

- **Cigref.** *New Platform Strategies: Business platforms – strategy, design, and deployment.* December 2019 (Chapters 1 & 2)



Class # 5 Digital Platforms

The several ingredients of Digital Platforms

Digital Platforms: dive-in several examples

Digital Platforms: “The gatekeepers of the digital economy”

What do we know about digital transformation, so far?

⑧ Thesis # 8: Networks, as coordination mechanisms, are becoming central to value creation in the Digital Economy and the Network Society

⑨ Thesis # 9: Technocentric design of digital technologies leads, invariably, to the reinforcement of algorithmic agency, while sacrificing human agency

⑨“ Thesis # 9 bis: To avoid the distortion and misappropriation caused by the forces at work in today's digital world, we need both new forms of regulation and reimagination and redesign of digital technologies

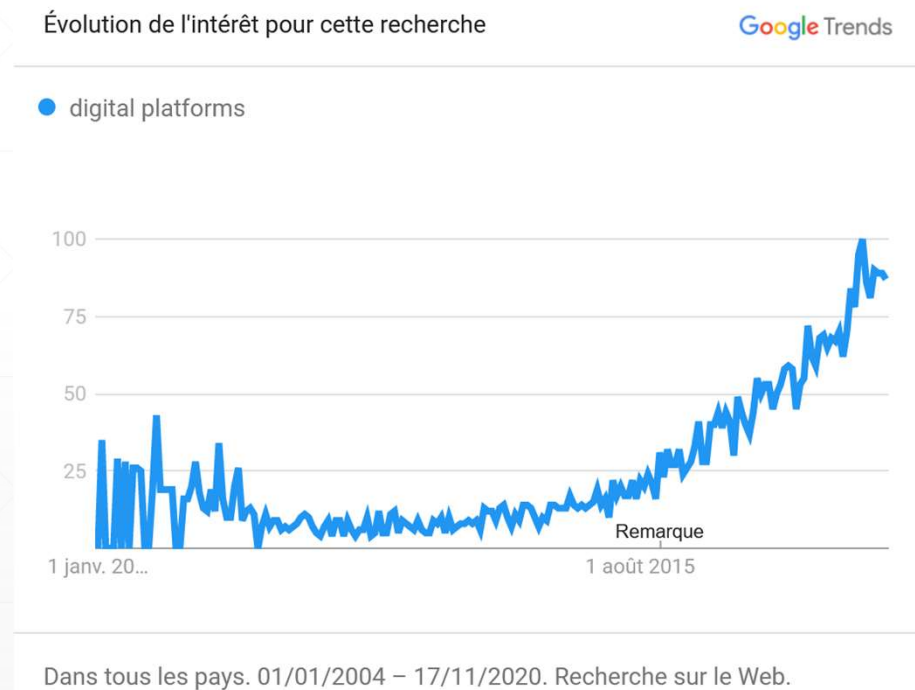
Digital Transformation Class 5

Preliminary remarks

- **In the digital economy, new Business Models emerge, e.g. « platforms »**
 - **It is this phenomenon that we shall address in this class**
- In addition, technology adoption may translate into increased usage of digital technologies across all the components of a company's business model
 - This phenomenon, called « Digital transformation of existing Business Models » shall be addressed in the final class (Class 6)

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Digital Platforms Growing interest ...



The Platform Organization Discussion



The Platform Organization Discussion



android
aws



The Platform Organization Discussion



SIEMENS

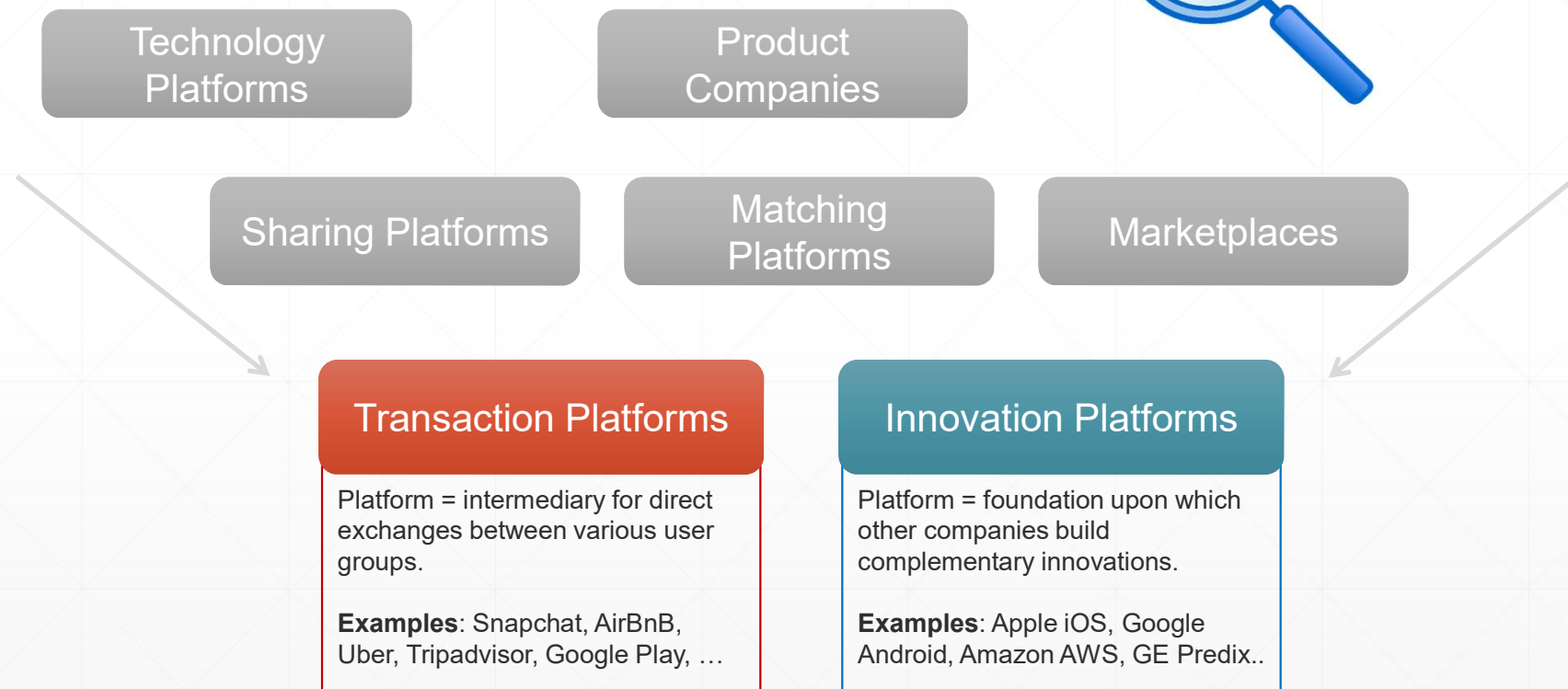


The Platform Organization

More than Platforms ?



Digital Platforms - 2 main categories



The 2-category platform classification is proposed by Cusumano, Gawer, Yoffie in *The Business of Platforms* (2019)

Platforms

Definitions

- **“... a new business model that uses technology to connect people, organizations, and resources in an interactive ecosystem in which amazing amounts of value can be created and exchanged.” (Parker, Van Alstyne, Choudary)**
- **“Multi-sided platform (MSP): an organization that creates value primarily by enabling direct interactions between two (or more) distinct types of affiliated customers”. (Hagiu, Wright)**
- **“A platform is a product that serves or enables other products or services.” (Gartner)**

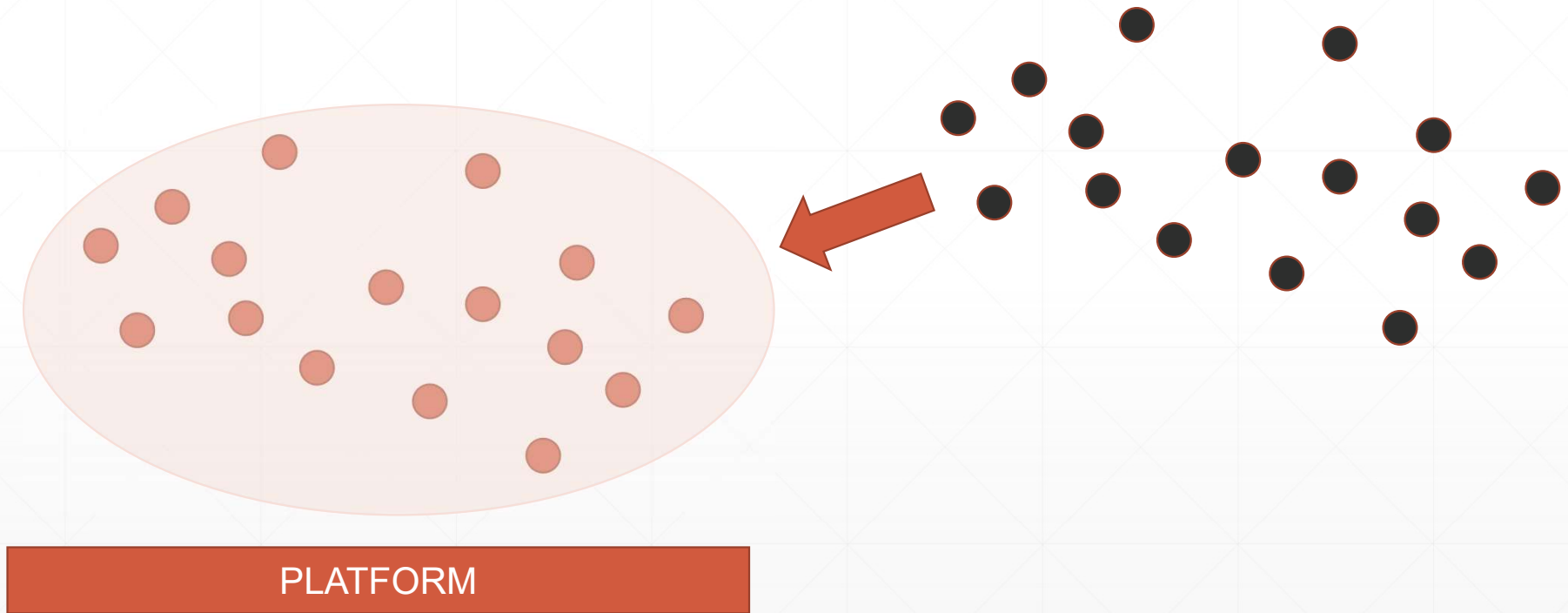
The Platform Organization

Platform Ingredients

1. Several types of network effects
2. Platform ecosystems
3. Two-sided, or multi-sided, markets
4. Economies of scale

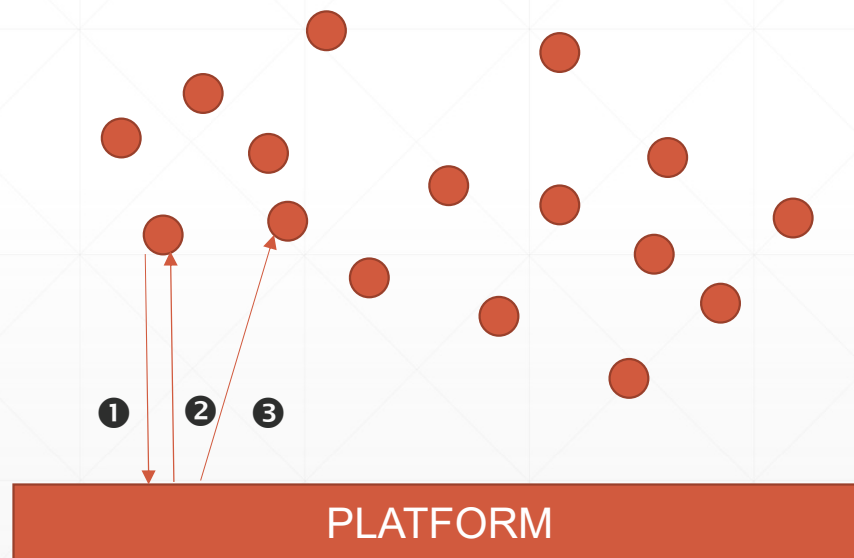
Platform ingredients

Network effects



Platform ingredients

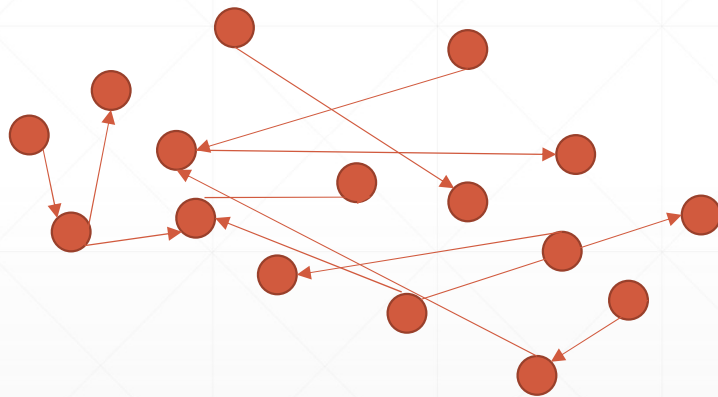
Network effects – Interactions through the platform



- In some cases, interactions can happen only through the platform
 - 1 – user interacts with platform
 - 2 – platform responds to user, or
 - 3 – platform interacts with another user

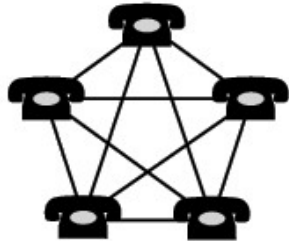
Platform ingredients

Network effects – Interactions between the users

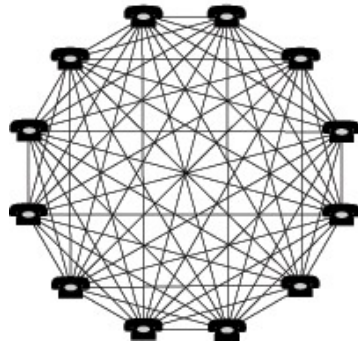


- In some other cases, interactions may take place between the users
- In this case, the platform becomes the medium allowing user interactions to take place

PLATFORM



https://en.wikipedia.org/wiki/Network_effect#/media/File:Network_effect.png



- The utility for a network user is a function of the number of its users (positive network externalities).

Networks

Direct network effects

Although a concept used primarily in science and technology, “Network” has equally gained importance in social sciences (sociology and economics).

In Economics, one speaks of “network effects” or network externalities. These may be:

Positive: for example, the utility for a telephone user increases with the number of users connected to the network

Negative : when the combined (or simultaneous) usages of the network leads to congestion phenomena.

Platform ingredients

Direct network effects

- Direct network effects increase the perceived value of the platform as more users will join because they believe that by joining the platform they will be able to interact with a larger number of other platform users
 - In other words, joining the platform with the largest number of users is perceived as an upfront value by prospective users
- **NB 1.** This type of network effects exist independently of the pricing strategies of the platform company
- **NB2.** The economic good (product or service) displaying network effects is called a “**network good**”

Platform Ingredients

Direct Network Effects

- “The value of a network is a function of the number of its users”
- Direct network effects apply to goods, services or technologies whose usage value resides in the fact that they allow communication, interaction and synchronization between the users of the network
- Such a definition emphasizes the « **mediation** », or « **intermediation** » role of a network

Examples:

- telecom networks,
- social networks,
- instant messaging services

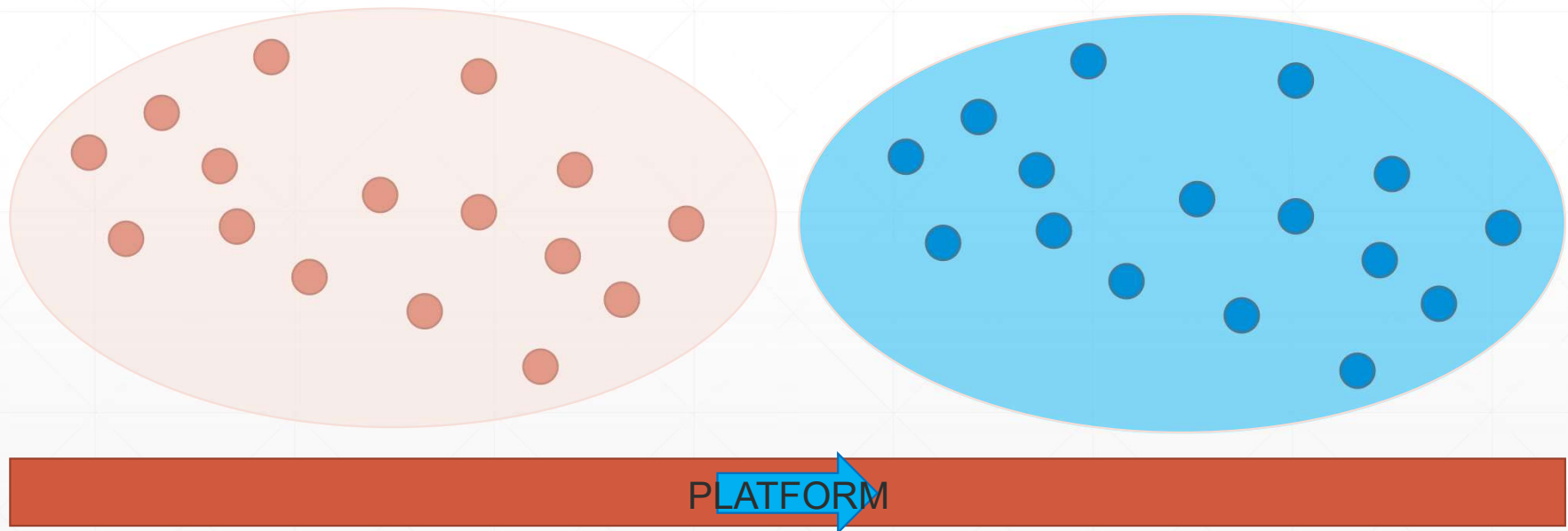
Underlying principles (see Class 1)

- Metcalfe’s Law
- Reed’s Law

Platform ingredients

Platform ecosystems

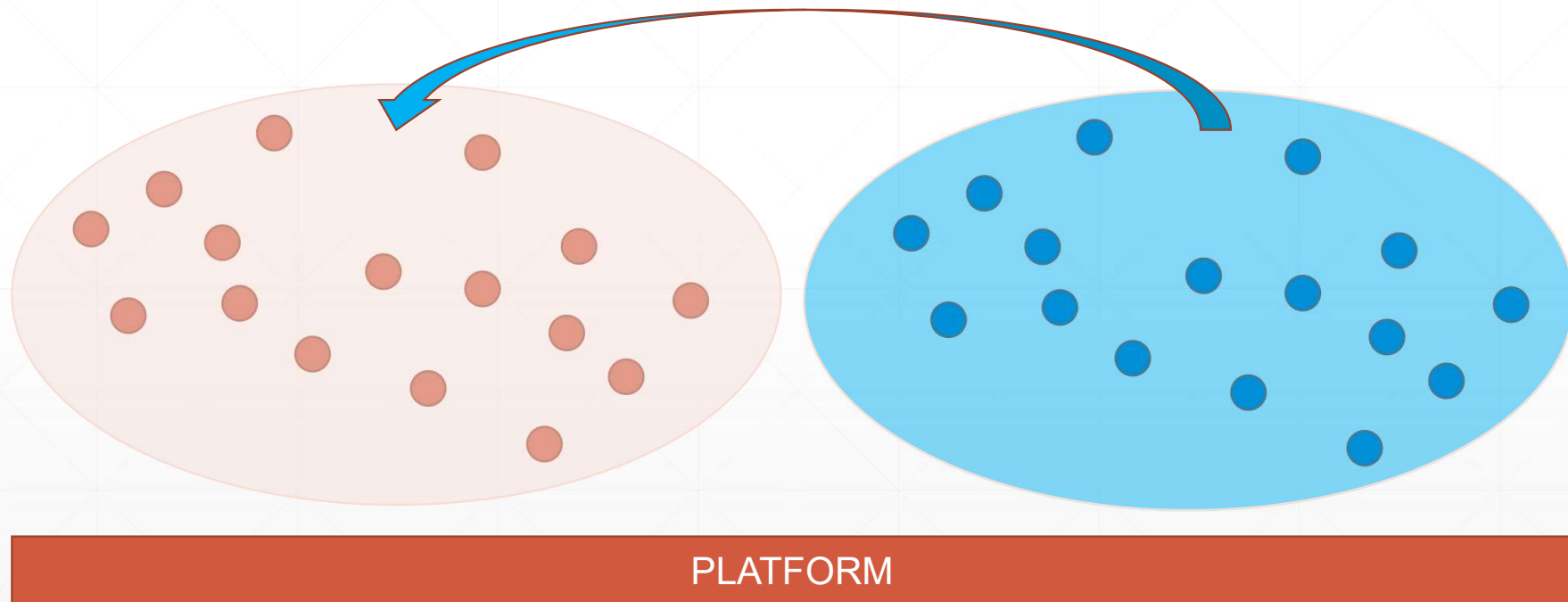
In some circumstances, the platform may decide to attract and/or to host more than one member group, forming platform ecosystems



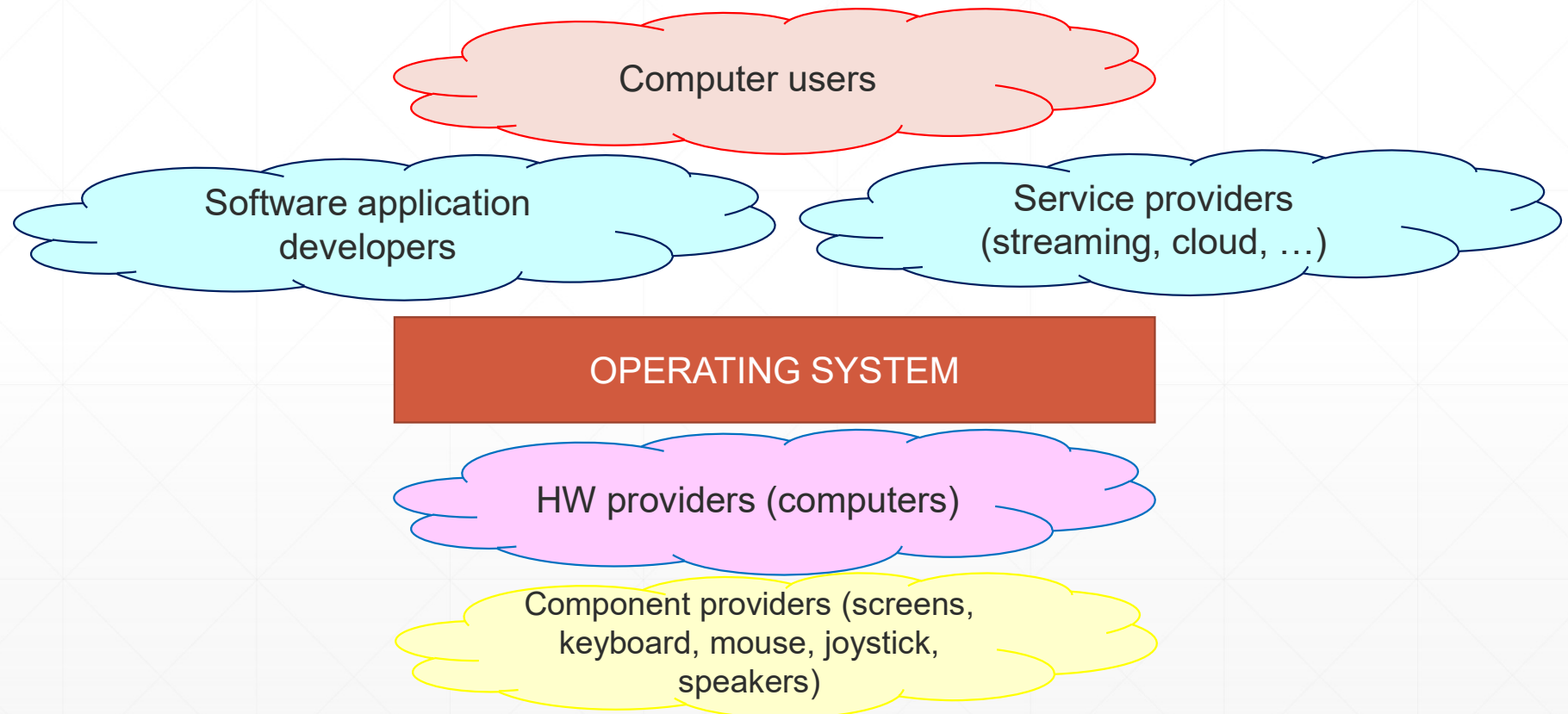
Platform ingredients

Indirect network effects (cross-group effects)

When two or more distinct groups join the platform, positive reinforcement mechanisms may arise between the various groups, the attractiveness of the platform is enhanced by the value users in one group perceive in having other, similarly larger group(s) joining the platform. This is known as **indirect network effects or cross-group effects**



Platform Ecosystem Computers - Discussion



Platform Ingredients

Platform Ecosystems

- Examples:
 - Audio content: Spotify
 - Video content: Netflix
 - Videogames: PlayStation, Xbox
 - Publishing: Amazon Kindle reader

Platform ecosystem

From Wikipedia, the free encyclopedia

Many [markets](#) are structured as **platform ecosystems**, where a stable core (such as a smartphone operating system or a music streaming service) mediates the relationship between a wide range of complements (like apps, games or songs) and prospective end-users.^[1]

https://en.wikipedia.org/wiki/Platform_ecosystem

Platform ingredients

Platform ecosystems

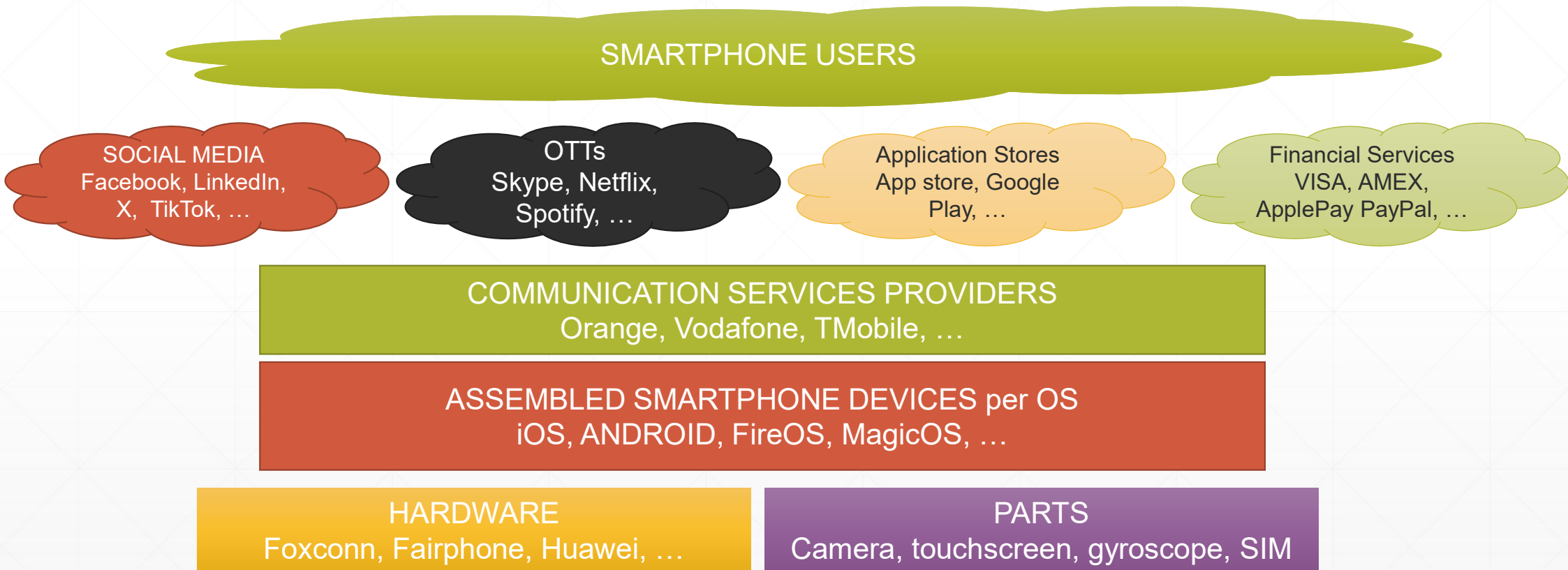
GAMES

- Game players
- Game studios
- Game platforms (ex: Steam)
- Game developers
- Hardware (game console) manufacturers

MEDIA

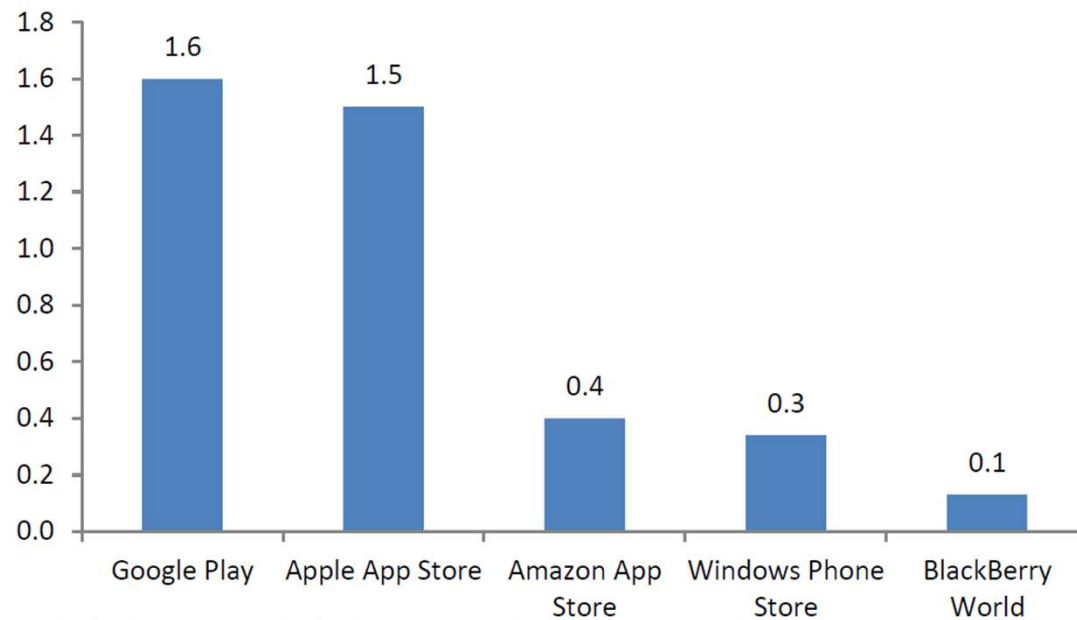
- Readers
- Writers (content producers)
- Advertisers

Platform Ecosystem Smartphone – Discussion



Platform Ingredients

Ecosystems Illustration - Application Stores



Number of apps available in leading app stores as of 2015 (mil)

Source: Néstor Duch-Brown; The Competitive Landscape of Online Platforms; JRC Digital Economy Working Paper 2017-04

Platform Ecosystem Gaming - Discussion



GAME PLAYERS

E-Sports, cosplay artists

Streaming services (Twitch)

Gaming Arenas

Software developers
(Discord, OpenAI, ...)

Game publishers
(Ubisoft, Activision, ...)

Game developers
studios (Blizzard,
Valve, ...)

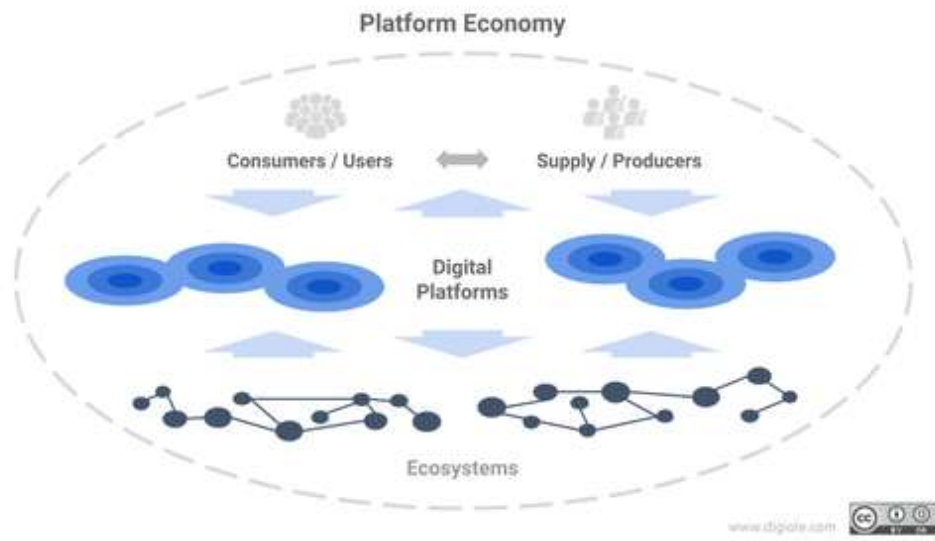
GAMING CONSOLES
SONY, MICROSOFT, NINTENDO, ATARI, SEGA, NVIDIA, ...

Accessories providers (gaming
mouse, joystick, speakers, gear,
...)

Operating systems (Linux for
PlayStation, Nintendo 3DS, Wii
U system software, ...)

Platform Ingredients

Platform Ecosystems



https://en.wikipedia.org/wiki/Platform_economy

User Events & Conferences:

- Apple Keynote
- Salesforce Dreamforce
- Microsoft Ignite

Developer Events & Conferences:

- Apple WWDC
- Facebook F8
- Google I/O

Platform Ecosystem

Interoperability – Cooperation - Competition



Source: <http://content.time.com/time/covers/0,16641,19970818,00.html>

- Opening the platforms
 - APIs and SDK
- Allowing competitive products to be hosted on the platform
 - MS Office documents read/write by Apple software
 - Google maps available on App Store
- Competition may happen between ecosystems (Android-iOS) and within the ecosystem (Amazon and the hosted merchants)

Platform Ingredients

Platform Ecosystems

COMPATIBILITY

- The strategic choice of a platform in setting or choosing the underlying technology standard
- Examples:
 - iOS or Android?
 - Google Search or Bing?
- See Class 2 for discussion of choices in standard-setting strategies

LOCK-IN

- « In economics, **vendor lock-in**, also known as **proprietary lock-in** or **customer lock-in**, makes a customer dependent on a vendor for products and services, unable to use another vendor without substantial **switching costs**.” (Wikipedia)
- See Class 2 for a discussion of lock-in effects and associated switching costs

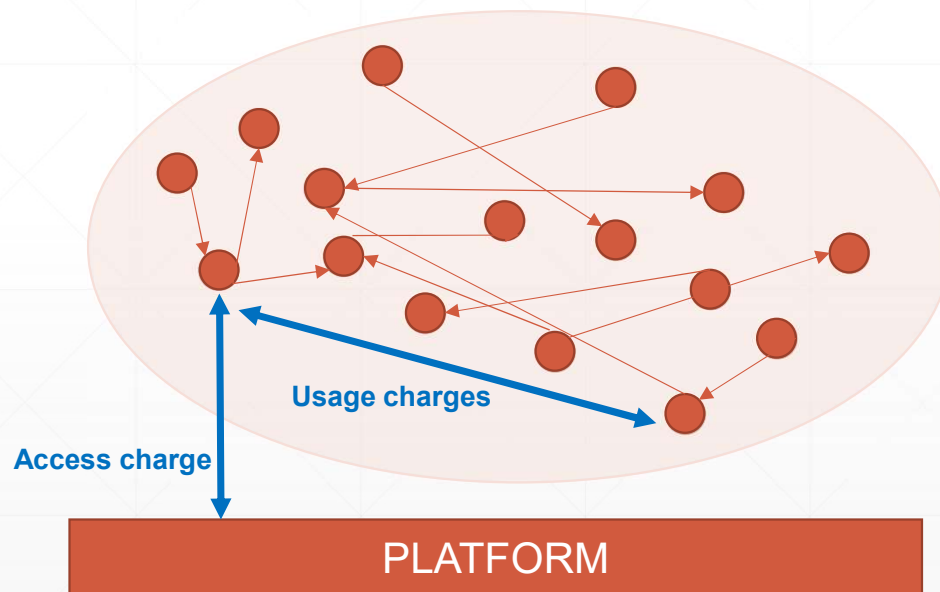
Platform Ingredients

Platform Ecosystems – Their primary role

- Platform ecosystems foster **innovation**:
 - By allowing additional functionalities/services to be added to the platform
 - By increasing the value of the platform's content
 - By opening the platform development to the outside world
- ... thereby **increasing the attractiveness of the platform**

Platform ingredients

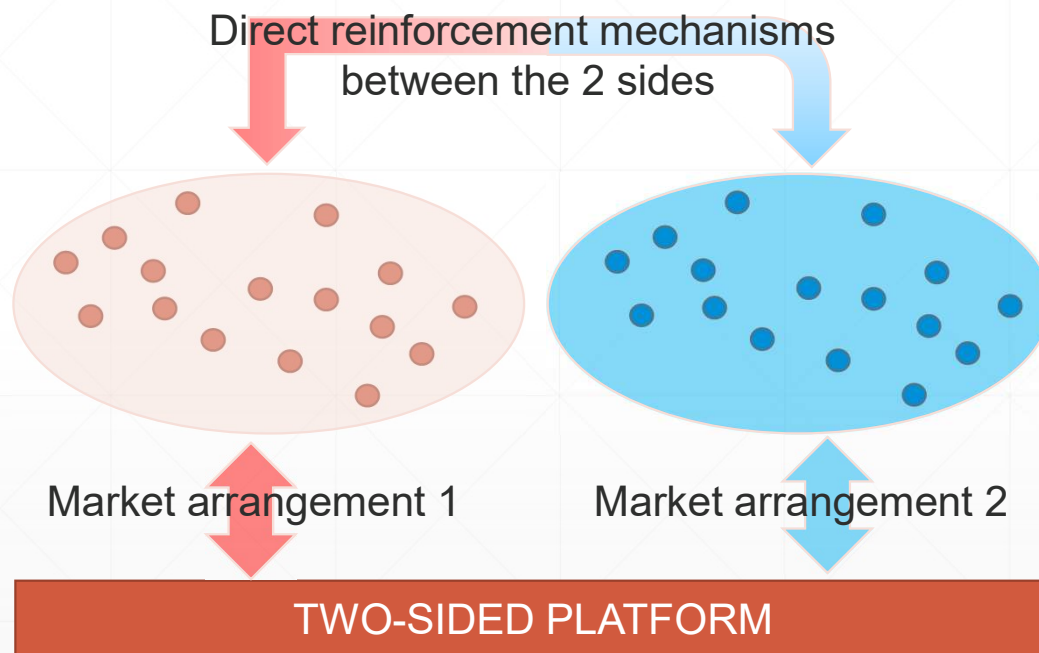
Introducing market arrangements



- When the platform company decides to charge money for its products/services in a single member group setting, it may do so in the following ways :
 - Membership fees for users (access charges)
 - Fees for interactions among users (usage charges)
 - Or a combination of these

Platform ingredients

Cross-network effects and two-sided markets



Two-sided platform:

1. Each member group is a customer of the platform
2. The platform allows direct interaction between the various member groups

Source: Hagiu, Wright (2011)

The Platform Enterprise

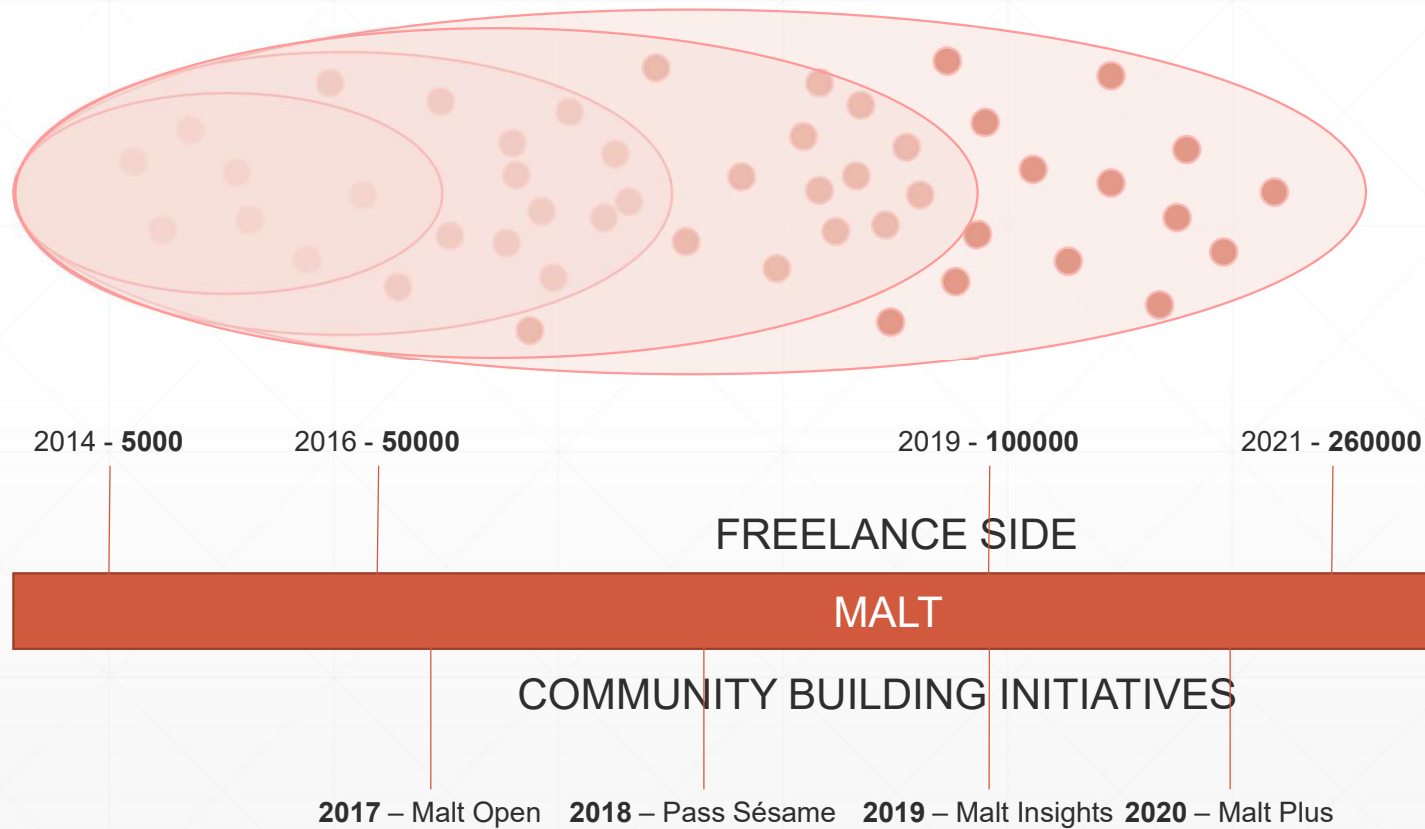
Malt - Discussion



- Launched in Paris in 2013 (initially called Hopwork)
- Platform for the freelance market (independent professionals – iPros)
- Focus on technology and digital services (software development, web design, ...)
- Fees as % of engagement between freelance and client company

The Platform Enterprise

Malt - Discussion



Platform Ingredients

Multi-sided platforms

- Cross network effects are mutual reinforcement effects happening between 2 (or more) distinct types of member groups. The distinct types of member groups usually form 2 (or more) distinct markets
- Such an institutional arrangement is called in economics a « **2-sided market** » (or « **multi-sided market** »). A platform supporting such an arrangement is called a **multi-sided platform**
- Examples:
 - Readers of a print-media and advertisers
 - Developers of software applications and users of the same software applications
 - Credit card holders and merchants accepting payments by credit card

The ultimate marketplace

ebay – Class discussion



- Founded in 1995 by Pierre Omidyar
- Initial idea: a platform where individuals could buy and sell items to each other directly
- Pivot: ability to facilitate auctions
- 2002 – PayPal acquisition
- 2005 – Skype acquisition (sold to Microsoft in 2011)
- Today's mission statement: *"to provide a global online marketplace where practically anyone can trade practically anything, enabling economic opportunity around the world."*

The ultimate marketplace

ebay – Class discussion



REVENUE GENERATION

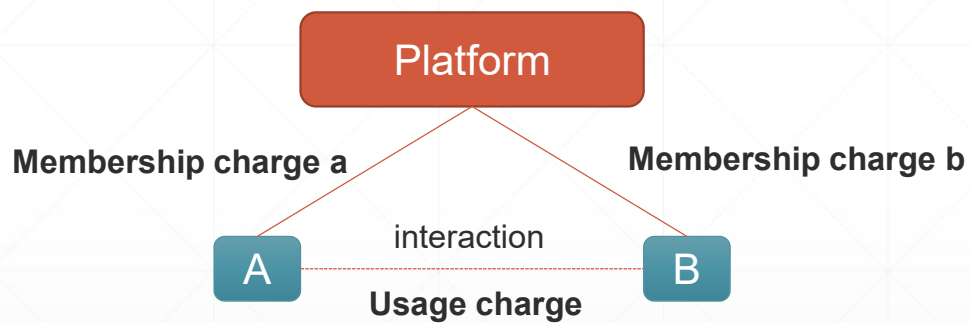
- **Listing fees:** sellers' fee to list their items for sale;
- **Final value fees:** a percentage of the final sale price when a sale is concluded;
- **Promoted listings:** an additional fee for sellers to have their listings appear higher in search results;
- **eBay Plus subscription:** a paid subscription service;
- **Advertising:** display of product ads leading to external online retail websites;
- **StubHub:** online ticket marketplace

CUSTOMER USER GROUPS

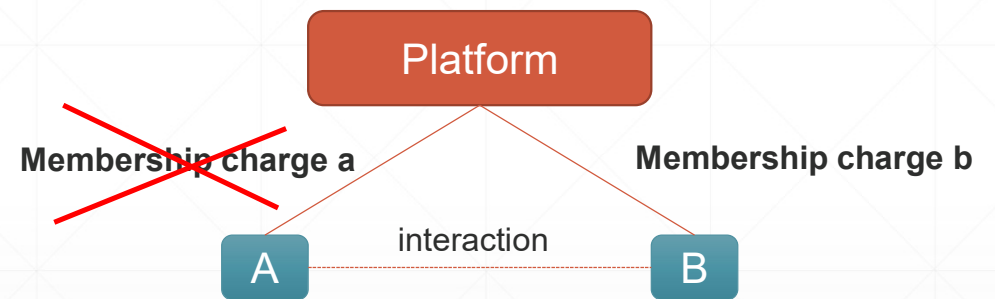
- **Buyers:** individuals or businesses that use eBay's platform to purchase goods from sellers;
- **Sellers:** individuals or businesses that use eBay's platform to sell goods to buyers;
- **Advertisers:** These are businesses that use eBay's platform to promote their products to a large audience of potential customers (featured listings or classified ads).

Two-sided markets

With transactions on both sides and with asymmetry

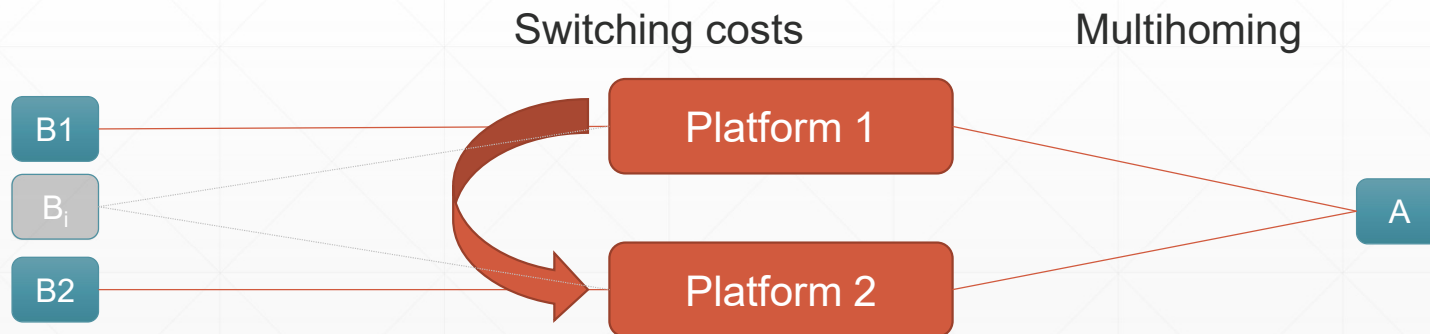


Mobile communications services,
Credit cards,
games and app stores



Internet search – advertisement,
Free magazines

P2P relationships and several Multi-sided platforms

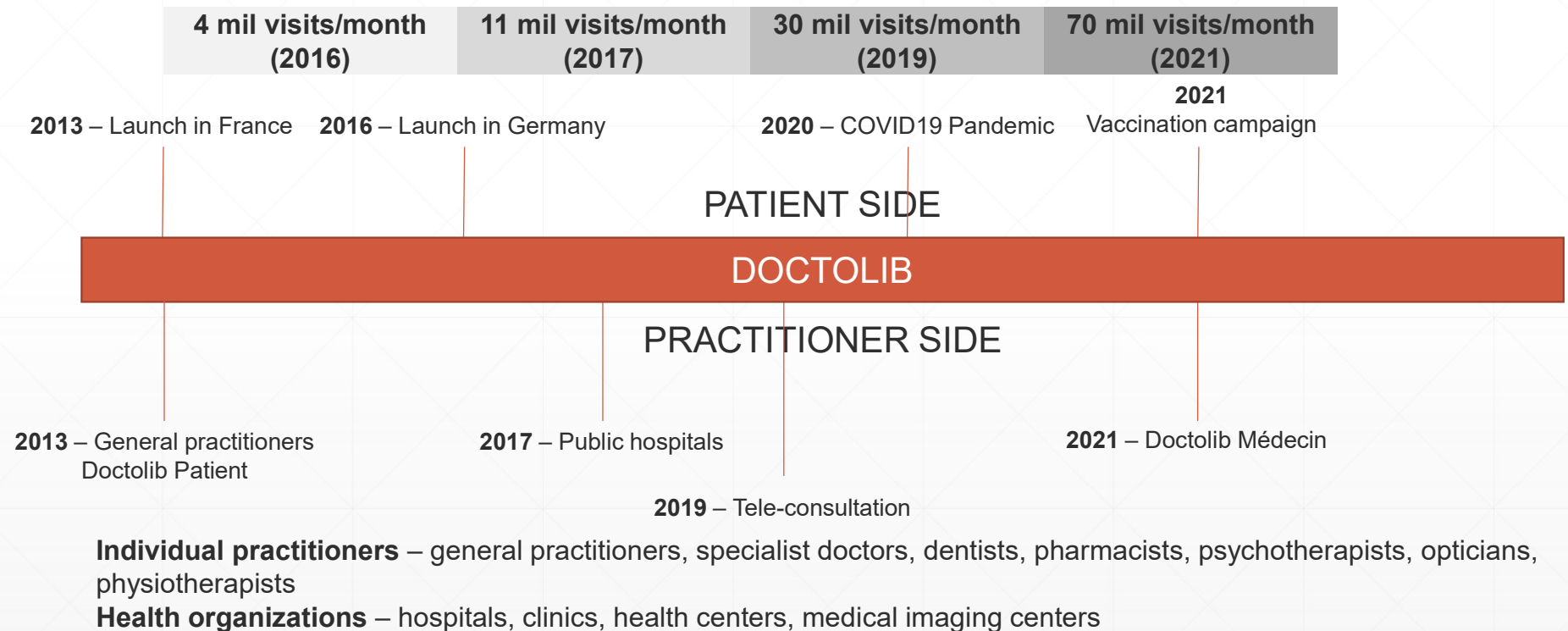


The Platform Enterprise Discussion - Doctolib



- French-German company established in 2013
- Services
 - Initial – taking medical appointments
 - Since 2019 – remote medical consultation including prescription
- Subscription-based service for medical practitioners, free for patients (as of 2020)

The Platform Enterprise Discussion - Doctolib



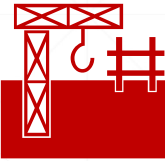
The Platform Enterprise Discussion – Uber



Uber

- Established 2009-2010 in San Francisco
- Services
 - Car-hailing (intermediated P2P)
 - UberVan, UberBerline, UberX, UberPop, UberGreen, ...
 - Uber Eats
 - Uber Jump (bicycles)
 - Uber Copter
 - ...

Class Assignment



Based on today's reading, imagine you are the Chief Innovation Officer at a large organization in one of the industries listed below and you want to launch your organization's platform. Please **either** describe your platform's ecosystem structure **or** determine how many markets (sides) your platform will have and from which side(s) you will choose to generate revenues.

1. Media industry – newspapers, TV, radio, ...
2. Music industry – audio streaming services
3. Game industry
4. Computer & High-Tech industry
5. Manufacturing industries – industrial equipment
6. Manufacturing industries – consumer goods
7. Banking, financial services
8. Cosmetics and beauty products
9. Higher Education – business & engineering schools, universities

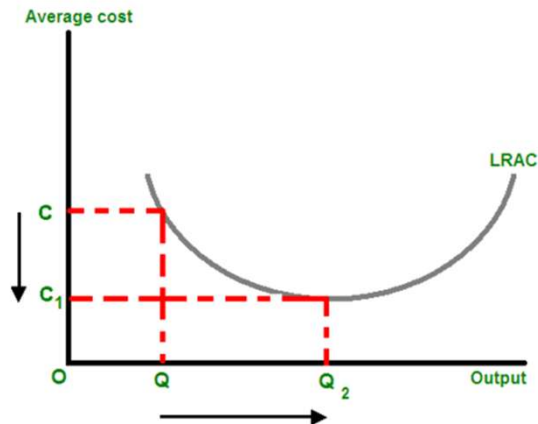
Platform Ingredients

Economies of scale

While previous ingredients (2-sided markets, networks effects, and ecosystems) describe the platform's environment, economies of scale describe the internal side of the platform

- “The simple meaning of economies of scale is doing things more efficiently with increasing size.” (Wikipedia)
- « A proportionate saving in costs gained by an increased level of production.” (Oxford English Dictionary)

NB. In general, economies of scale require **considerable** upfront investments.



https://en.wikipedia.org/wiki/Economies_of_scale

On peut formaliser cette définition en écrivant:

$$C(X_1, X_2) < C(X_1, 0) + C(0, X_2)$$

Où C représente la fonction de coûts, X_1 et X_2 les deux biens produits.

https://fr.wikipedia.org/wiki/%C3%89conomies_d%27envergure

Economies of scale and Economies of scope

“**Economies of scale** (can be internal or external) are cost advantages that enterprises obtain due to size, output, or scale of operation, with cost per unit of output generally decreasing with increasing scale as fixed costs are spread out over more units of output.”

Economies of scope (John C. Panzar and Robert D. Willig, 1977, 1981) are economies that are generated through diversification of products (output).

Platform Ingredients

Putting it all together

In some cases, the combination of direct and indirect network effects and economies of scale lead to situations of **market tipping**

- **Tipping** = « *the tendency of one system to pull away from its rivals in popularity once it has gained an initial edge* » (Katz, Shapiro)

When markets tip, the popular product is adopted at incredibly high rates and pace and the producing company (platform) acquires a dominant position in the market

The situation is described as « **winner takes all** »

What is Google's middle name?

Discussion



Established in 1998

- Search + Advertising
- Android + hardware OEMs + Play store
- Google Apps + Google cloud
- YouTube + content producers
- ... (what next?)

The Platform Organization

Digital technologies as platform assets

PLATFORM CORE

- Operating systems
 - Ex: Microsoft Windows, Apple iOS, Google Android
- Office Applications (B2C)
 - Office suite, Teams, Gmail, ...
- Business Applications (B2B)
 - Azure Cloud, salesforce, ...

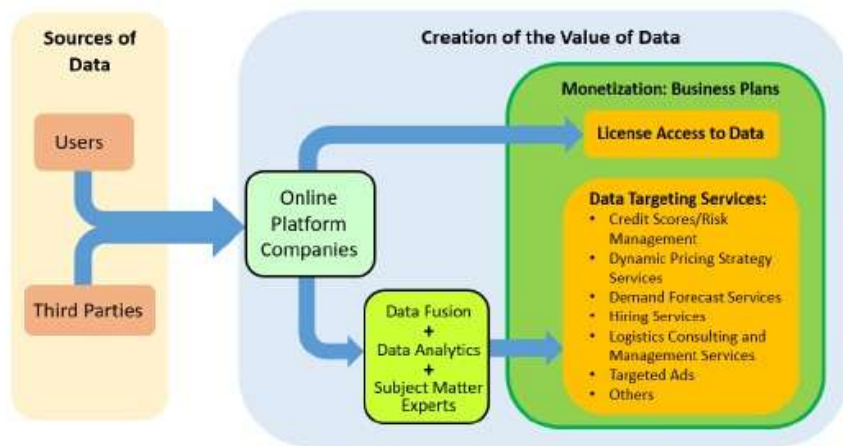
MARKETPLACE, INTERMEDIATION

- PageRank (Google Search) – classification of search results algorithm
- Cassini – ebay's search and display results algorithm
- Best Match – ebay's matching buyer's criteria with product offering algorithm
- Amazon's A9 algorithm – product ranking with strong sales history

The Platform Organization

Data as platform asset

VALUE CREATION FROM DATA ...



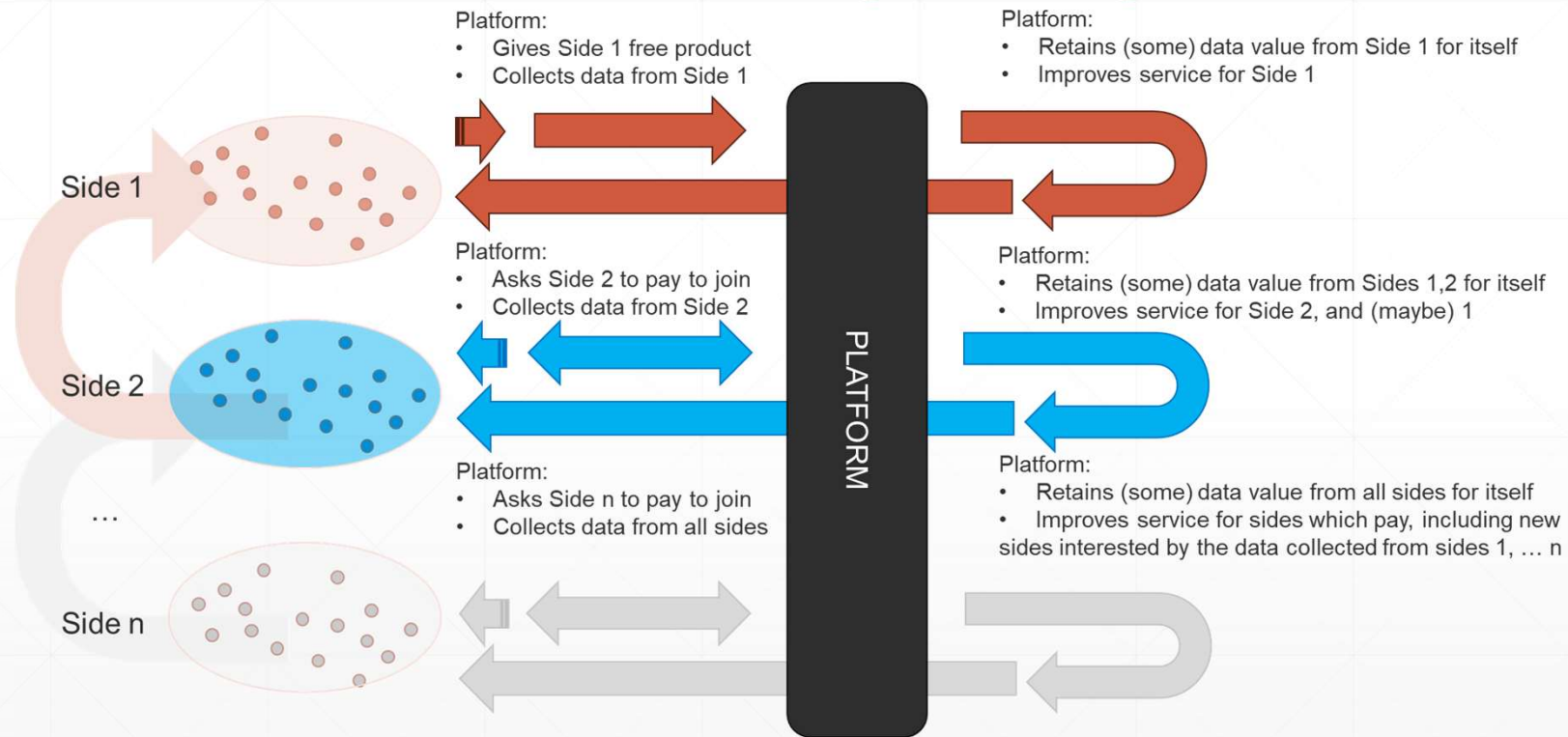
... EXPLAINED

1. Platform companies exchange “free” digital goods and services for consumer data
2. Platform companies collect data from users and third parties, and monetize the data through either i) license access to the data, or ii) provide data targeting services

Source: W.C.Y. Li, M. Nirei, K. Yamana. *Value of Data: There's No Such Thing as a Free Lunch in the Digital Economy*. RIETI Discussion Paper Series 19-E-022 March 2019

The Platform Organization

Value creation and sharing – Long term view



The Platform Organization

Value creation and sharing

PLATFORM DECAY...

- Over time, some user groups of two-sided platforms may face decline in quality
- Initially, vendors create high-quality offerings to attract users from the first side, then they degrade those offerings to better serve customers from the second side, and may, at some point in time, degrade their services to users of the first two sides to serve the needs of a third side...

... EXAMPLES

Internet search

- Internet search results initially were relevant and with minimum ads for side 1 (internet users), then later degraded through increased sponsored ads, search engine optimization, benefitting side 2 (advertising clients)

Social networks

- Initially they were a way to stay connected with family and friends for side 1 (users), now they become sales channels, benefitting side 2 (brands) and 3 (advertisers)

The Platform Organization | Value creation and sharing | Is platform decay unavoidable ?

Based on the inherent complexity of the platform business model, illustrated in the previous discussion, some practitioners claim that the platform model is doomed*

While it is truly difficult to satisfy, over time, the needs and wants of several distinct user groups (or markets), while allowing for additional user groups to join the platform, ... it is also true that :

- Loss of quality due to value extraction/retention may occur due to abuse of dominant position,
- Value creation and sharing may be diminished by cut-throat competition, regardless of the underlying business model

... both of which could be counterbalanced by effective regulatory measures, ex ante and/or ex post.

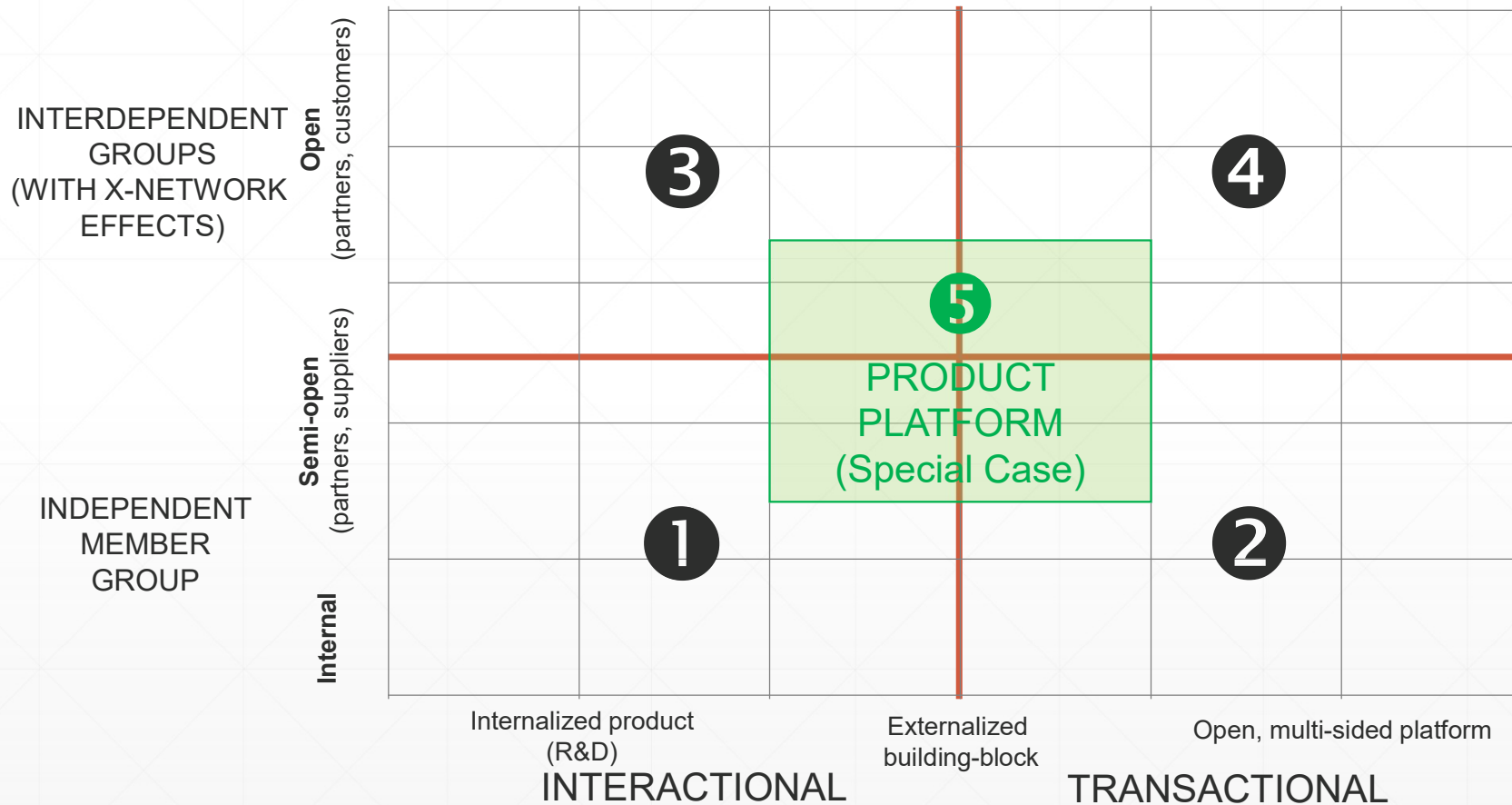
* A phenomenon some observers call « platform decay » or « platform enshittification », the latter term being coined by Cory Doctorow (2022-23)
(Source: Belleflamme, Paul. Are digital platforms bound to decay? An economic examination of the “enshittification” thesis. In: C P I Antitrust Chronicle, , no.October (2025))

The Platform Enterprise Becoming a Platform

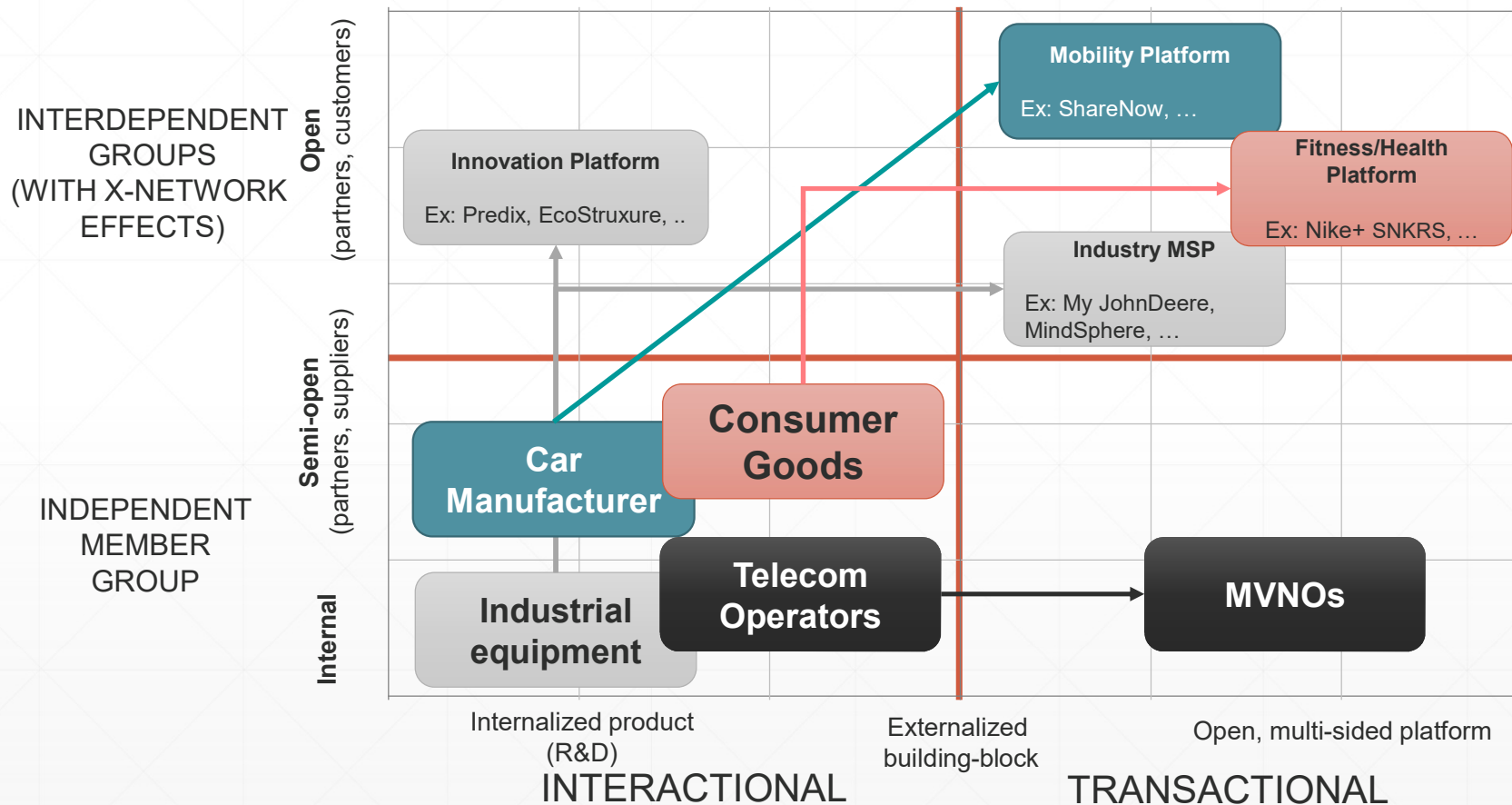
- Traditional companies, especially large, established companies have several ways to implement a platform organization
- The transformational journey may take several forms:
 - Building an **internal** platform, between sub-units of the same firm
 - Building a **semi-open** platform between the firm and its partners and suppliers
 - Building an **industry** platform, with open access to developers (i.e. community of partners who are contributing to the platform's functionalities), and clients (**users**)

Source: (Gawer 2014)

Digital Platforms - Case Study Framework



From Product to Platform – strategic moves



Digital Transformation

Summary Class # 5



- ☑ Digital Platforms are increasingly becoming the prevalent business model of the Digital Economy.
- ☑ Organizations of all industries, and backgrounds - traditional and digital-native alike, commercial or not - strive to implement the Digital Platform model
- ☑ The platform model has several ingredients:
 - Several types of network effects
 - Platform Ecosystems
 - 2 (or multi)-sided markets
 - Economies of scale
- ☑ Satisfying, over time, the needs and wants of several groups of customers affiliated to multi-sided platforms is difficult, it may result in “platform decay”
- ☑ The journey from a traditional company to becoming a Platform enterprise may have several stages, from internal usages, to halfway-platform for suppliers and partners, to open industry type of platform federating several participating groups

Digital Platforms

Concluding Thoughts

“Platforms are the gate-keepers of the Digital Economy”

Jean Tirole. *Economie du bien commun*. Presses Universitaires de France, 2016

“[...] the power of the platform — a new business model that uses technology to connect people, organizations, and resources in an interactive ecosystem in which amazing amounts of value can be created and exchanged.”

Sangeet Paul Choudary, Marshall W. Van Alstyne, Geoffrey G. Parker. *Platform Revolution*. W. W. Norton & Company, 2016

“For anyone who follows the world of business, it is now common knowledge that the most valuable firms on the planet [...] are platforms. “

Michael A. Cusumano, Annabelle Gawer, David B. Yoffie. *The business of platforms*. Harper Collins, Harper Business, 2019

Thank You!

Valeriu Petrulian