Digital Transformation

Class # 4: Digital Platforms

EPITA | Spring 2022

Valeriu Petrulian

Digital Transformation Class 4

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

Course Breakdown
EPITA Spring 2022

Class	Date & Time | Topics
Class # 1	Welcome to the Digital Economy!
Class # 2	Technology Trend # 1: Internet of Things (IoT), Blockchain
Class # 3	Technology Trend # 2: Big Data & Artificial Intelligence (AI)
Class # 4	Digital Platforms
Class # 5	Final Presentations and Course wrap-up

Today's Readings:

- **Marshall W. Van Alstyne, Geoffrey G. Parker, Sangeet Paul Choudary.** *Pipelines, Platforms, and the New Rules of Strategy*. Harvard Business Review, April 2016
- **Andrei Hagiu.** *Strategic Decisions for Multi-Sided Platforms.* MIT Sloan Management Review. Special Collection, Summer 2015

Class # 4
Digital Platforms

The several dimensions 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?

❺ **Thesis # 5:** Some technologies, called General Purpose Technologies, such as Artificial Intelligence, and specifically Machine Learning, have today relatively higher potential to bring about change.

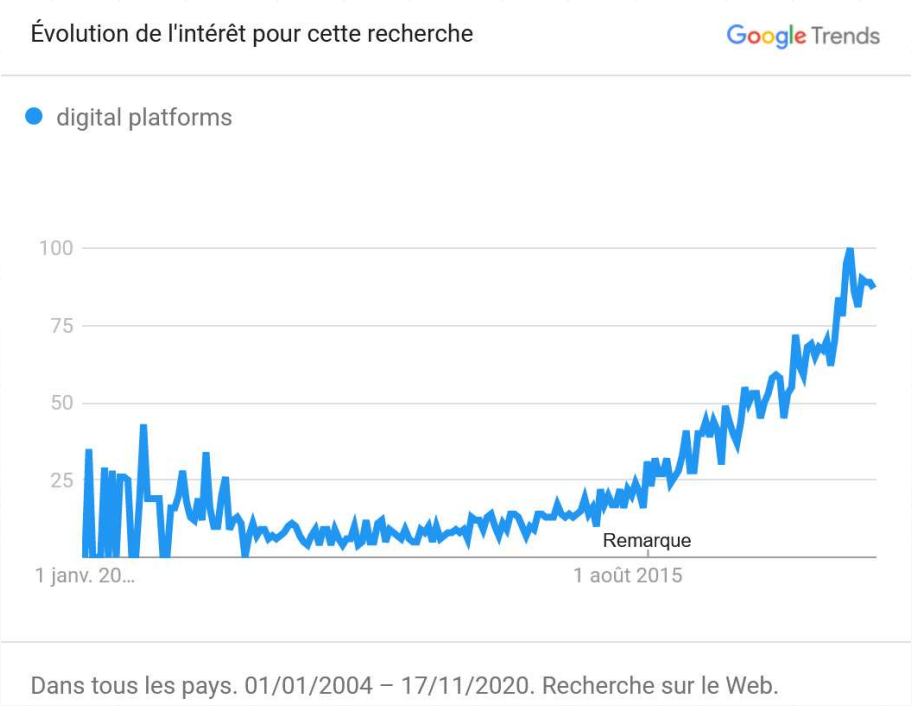
❻ **Thesis # 6:** Unlike other infrastructural technologies (IoT, Blockchain …) AI and ML's potential for change encompasses activities and processes which are usually performed by humans. Example: decision-making. With Digital Transformation, we are witnessing increased human activity embeddedness in technology.

❼ **Thesis # 7:** Some technology combinations are interesting to watch, such as: IoT and Blockchain, Big Data & AI

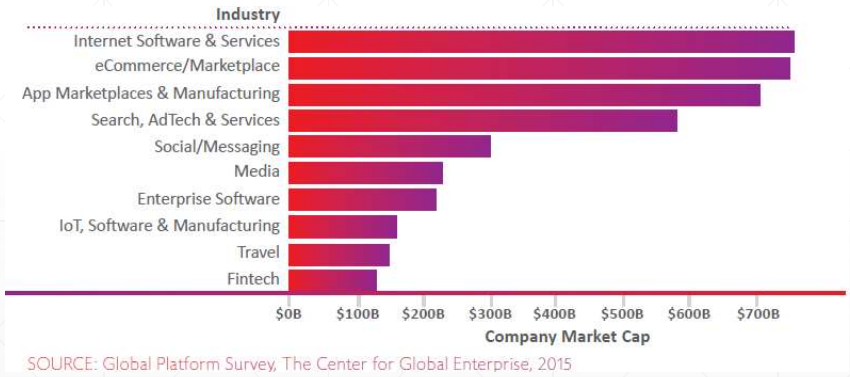
Digital Platforms
What are they?

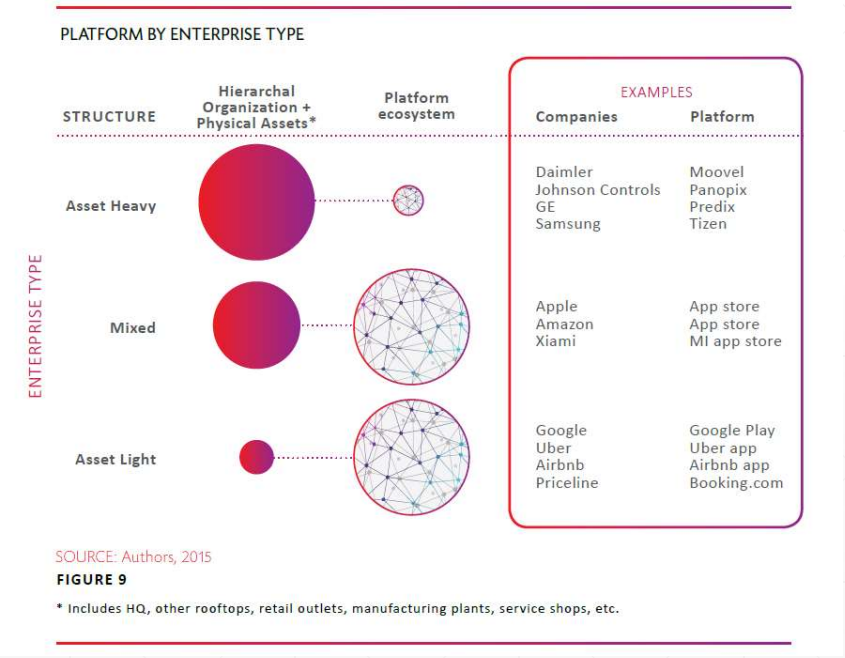
- The emergence of the Digital Economy has brought about, among other things, new business models
- While “platforms” have always existed in the economy, the combination of digital technologies and new business models have brought to the general attention the “Digital Platform” as a key player in today’s digitalized world

Digital Platforms
Growing interest …



Digital Platforms
by industry and enterprise type (2015 figures)





Source: Peter C. Evans, Annabelle Gawer. *The Rise of the Platform Enterprise. A Global Survey.* The Center for Global Enterprise, 2015

The Platform Organization
Discussion

ulule

BlaBlaCar

UBER

Doctolib

airbnb

deliveroo

CREADS

The Platform Organization
Discussion

The Platform Organization
Discussion

SAMSUNG

SIEMENS

DAIMLER

The Platform Organization
More than Platforms ?

Digital Platforms - 2 main categories

Technology Platforms

Product Companies

Sharing Platforms

Matching Platforms

Marketplaces

Transaction Platforms

Platform = intermediary for direct exchanges between various user groups.

Examples: Snapchat, AirBnB, Uber, Tripadvisor, Google Play, …

Innovation Platforms

Platform = foundation upon which other companies build complementary innovations.

Examples: Apple iOS, Google Android, Amazon AWS, GE Predix..

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)

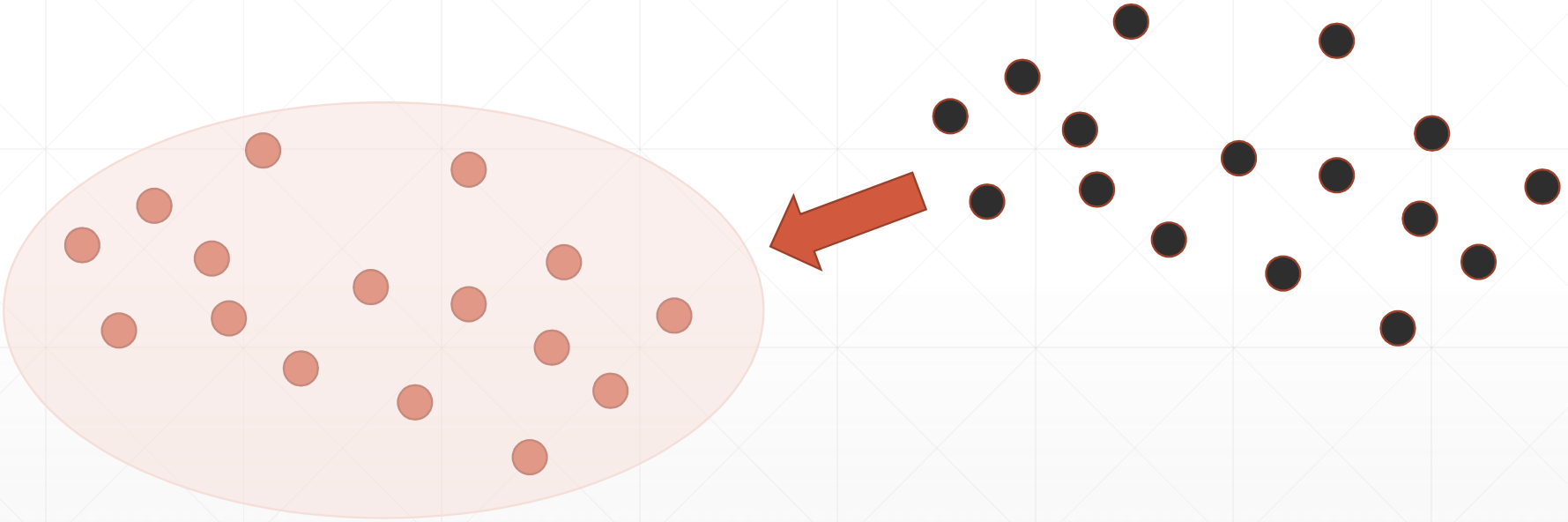
- **“Multi-sided platform (MSP): an organization that creates value primarily by enabling direct interactions between two (or more) distinct types of affiliated customers”.** (Hagiu, Wright)

- **“A platform is a product that serves or enables other products or services.”** (Gartner)

The Platform Organization
Platform Ingredients

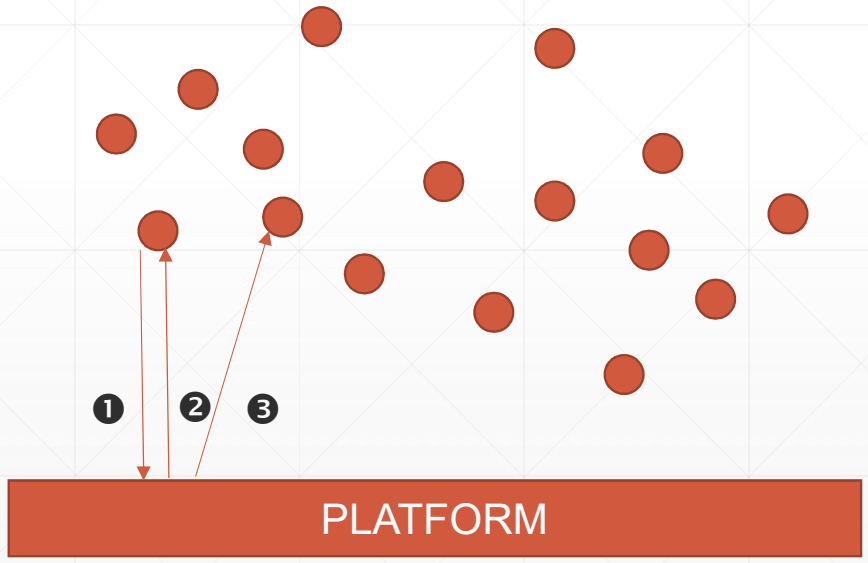
1. Several types of network effects
2. Platform ecosystems
3. Two-sided, or multi-sided, markets
4. Economies of scale

Platform ingredients
Network effects



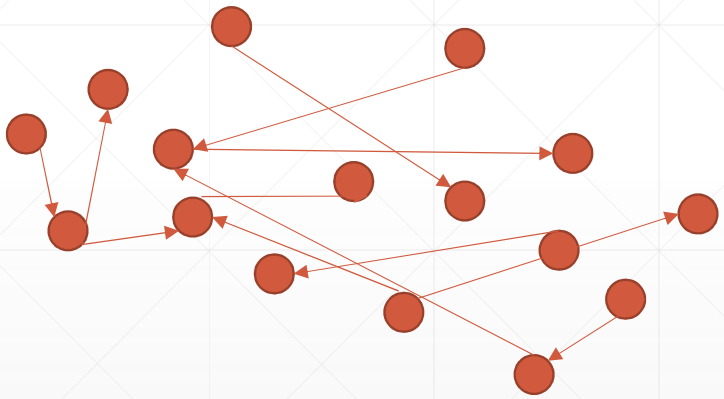
PLATFORM

Platform ingredients
Network effects – Interactions through the platform



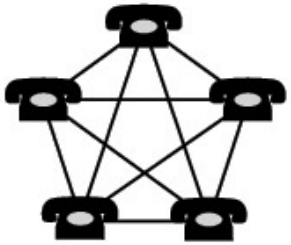
- In some cases, interactions can happen only through the platform
  - 1 – user interacts with platform
  - 2 – platform responds to user, or
  - 3 – platform interacts with another user

Platform ingredients
Network effects – Interactions between the users

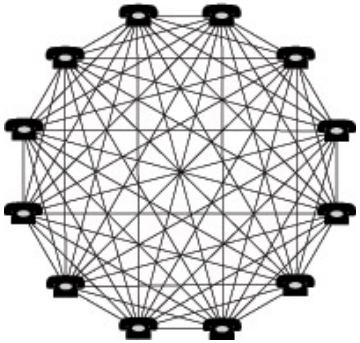


PLATFORM

- 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



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.** This type of network effects exist independently of the pricing strategies of the platform company

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:

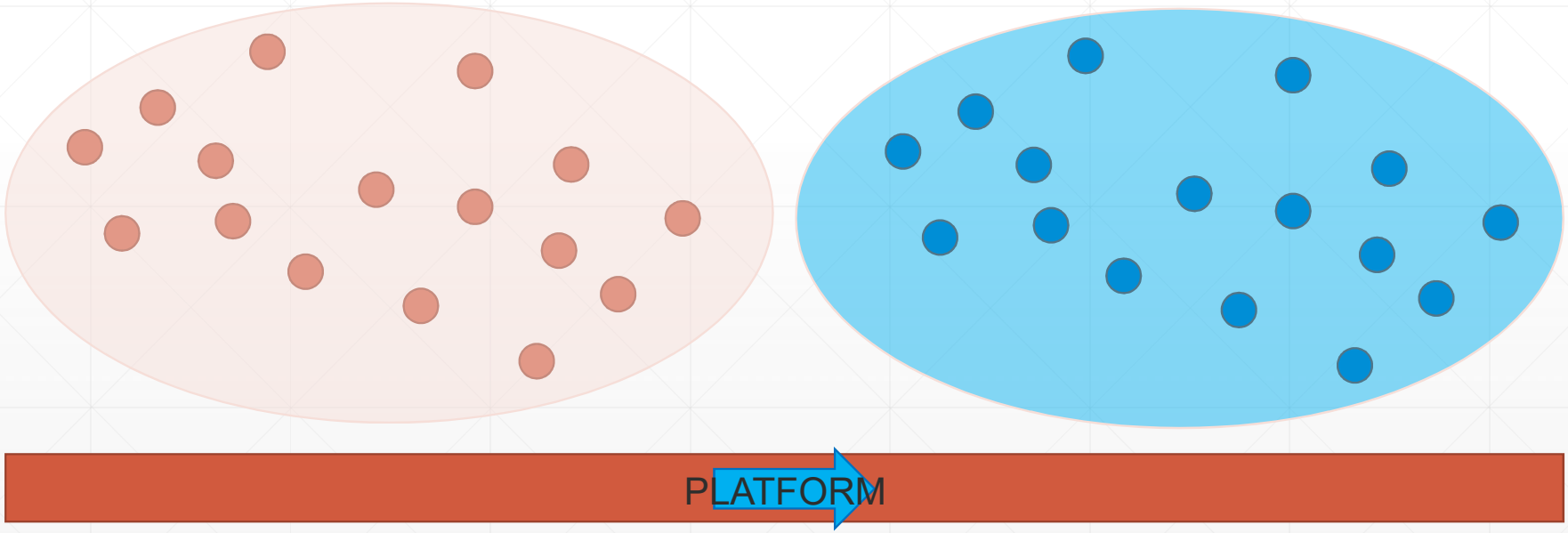
- telecom networks,
- social networks,
- instant messaging services

Underlying principles (see Class 1)

- Metcalfe’s Law
- Reed’s Law

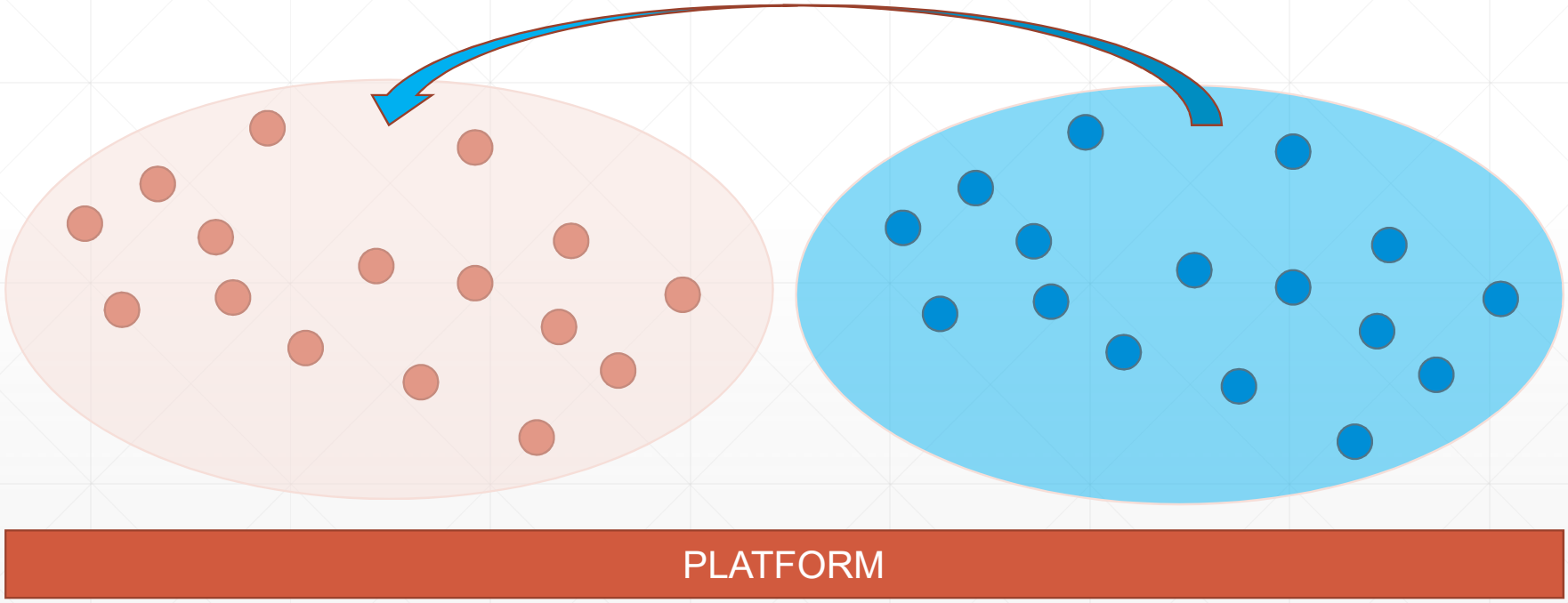
Platform ingredients
Platform ecosystems

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-network effects)

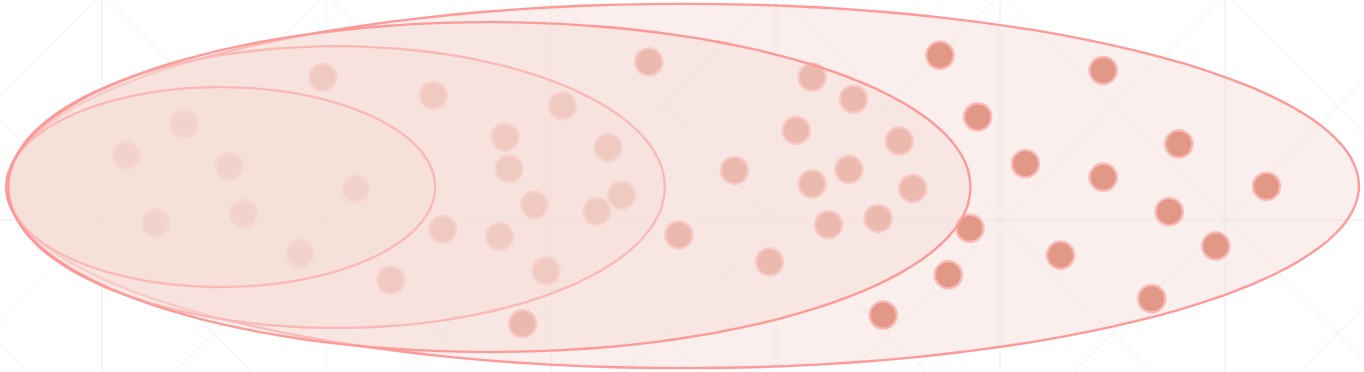
When two or more distinct groups join the platform, positive reinforcement mechanisms may arise between the various groups, the attractiveness of the platform is enhanced by the value users in one group perceive in having other, similarly larger group(s) joining the platform. This is known as **indirect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



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



2014 - **5000**

2016 - **50000**

2019 - **100000**

2021 - **260000**

FREELANCE SIDE

MALT

COMMUNITY BUILDING INITIATIVES

2017 – Malt Open **2018** – Pass Sésame **2019** – Malt Insights **2020** – Malt Plus

Platform ingredients
Platform ecosystems

SOFTWARE

- Users of business software applications
- Developers of business software applications
- Hardware (computer) manufacturers

MEDIA

- Readers
- Writers (content producers)
- Advertisers

Platform Ingredients
Platform Ecosystems

- Examples:
  - Software: Android OS
  - Video content: Netflix
  - Videogames: PlayStation, Xbox
  - Publishing: Amazon Kindle reader

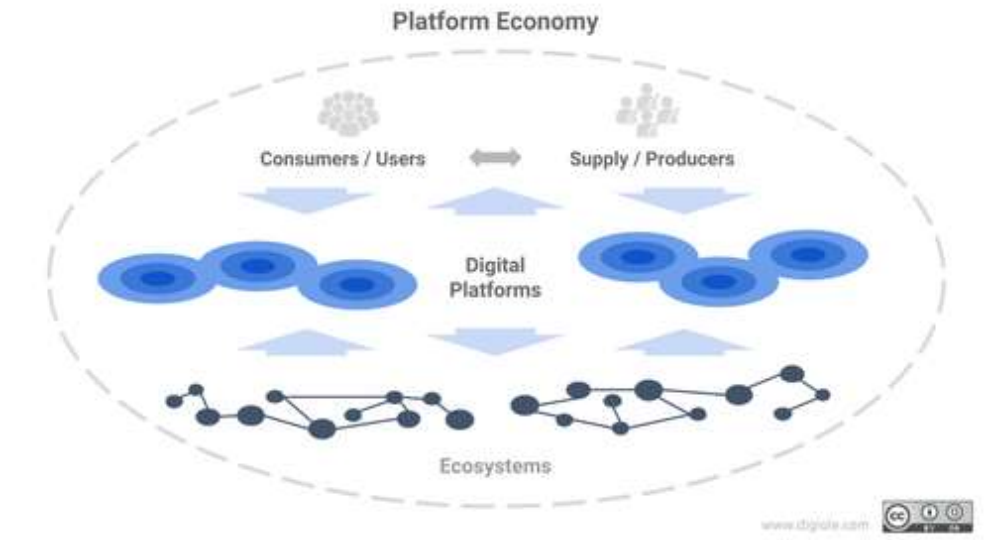
Platform ecosystem

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



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

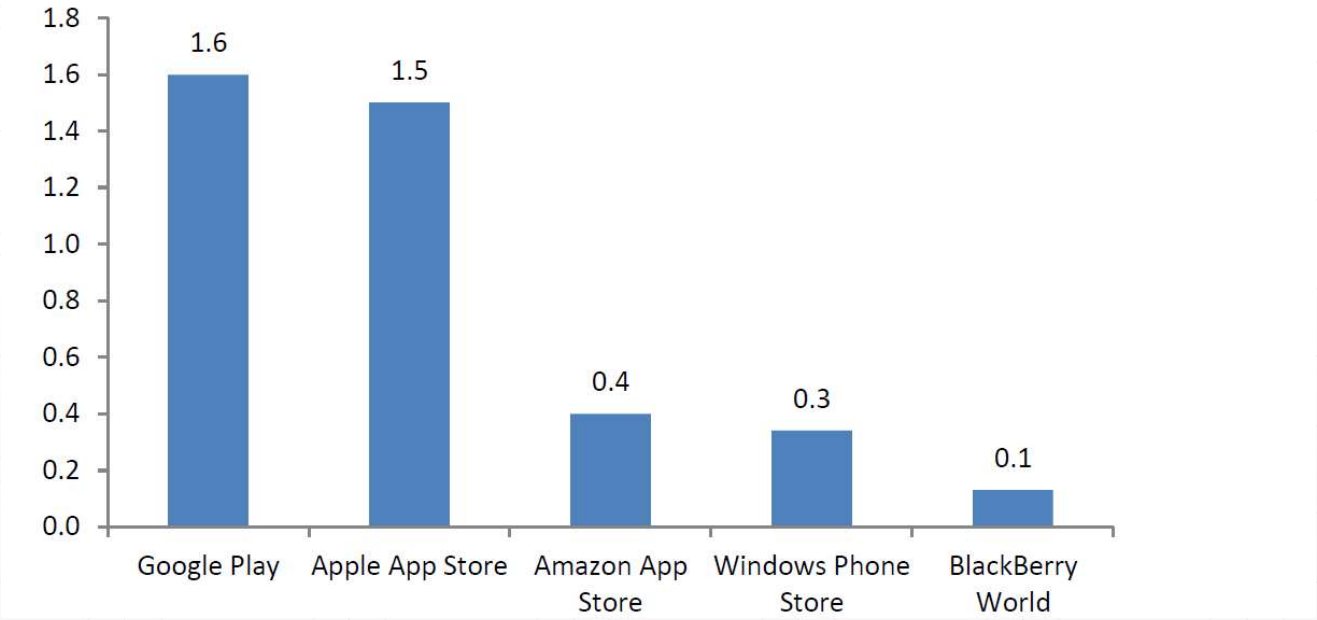
User Events & Conferences:

- Apple Keynote
- Salesforce Dreamforce
- Microsoft Ignite

Developer Events & Conferences:

- Apple WWDC
- Facebook F8
- Google I/O

Platform 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
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**

The Platform Enterprise
Réuni - Discussion

RÉUNI

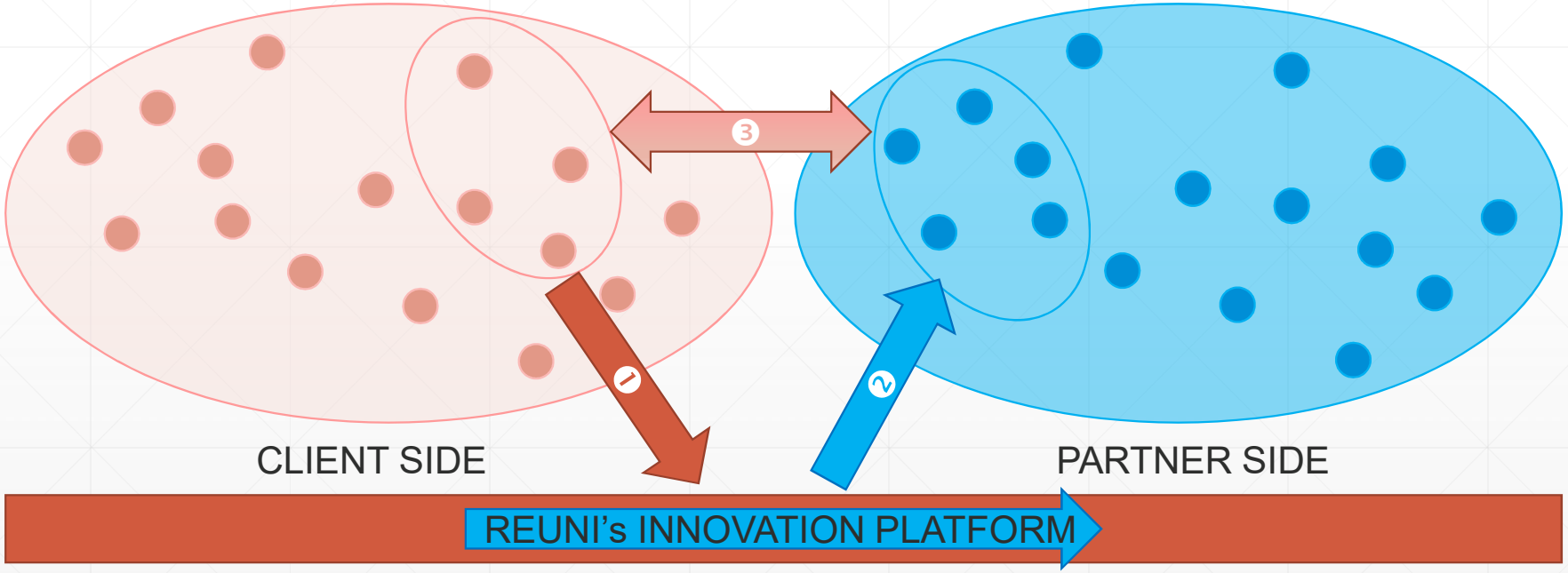
- French fashion brand created in 2019
- « *Luxury with a clear conscience* »
- Pre-ordering mechanism
- Co-creation workshops allowing:
  - To capture client demand
  - To select pool of suppliers and partners

Réuni's platform mechanism:

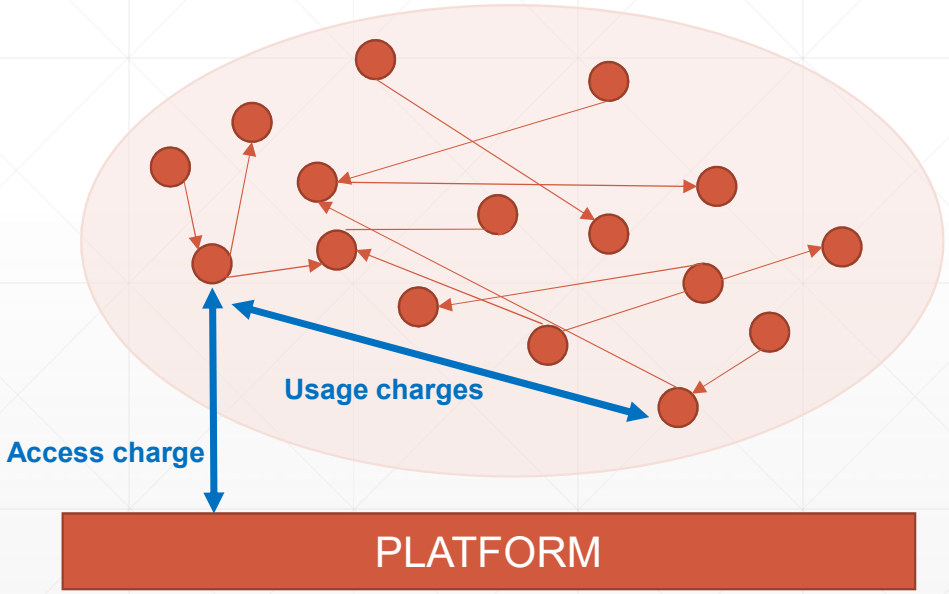
❶ Clients co-design the clothing item (for example, a jean) through open workshops

❷ Réuni finalizes the design (including **sewing pattern**) and chooses its pool of suppliers and partners

❸ Products are pre-ordered and continuous communications (via newsletters) is established between the clients and the community of suppliers

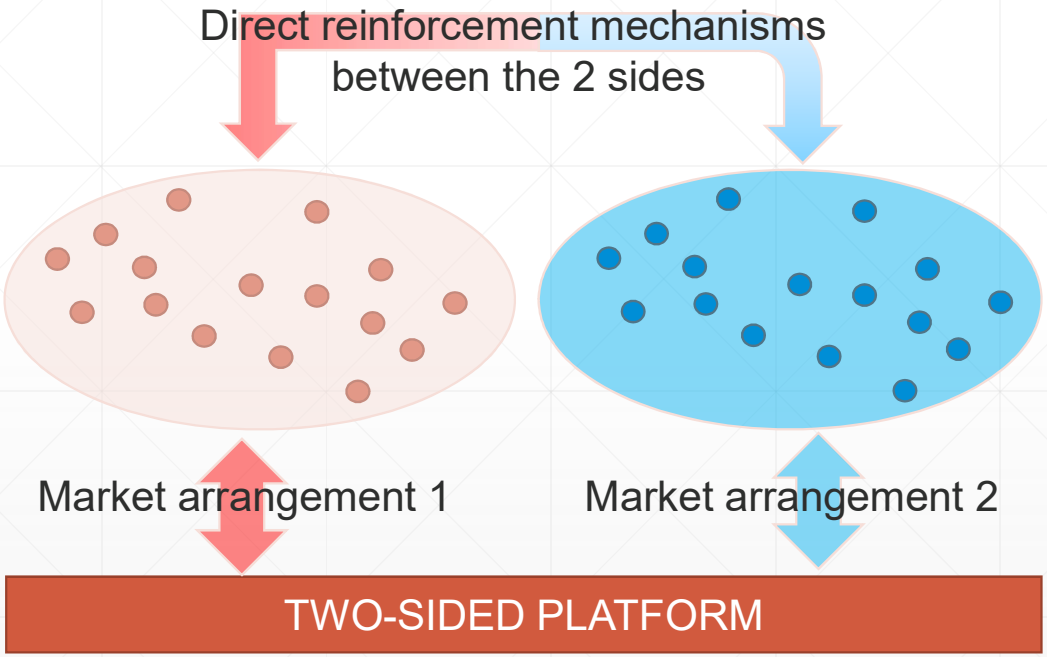


Platform ingredients
Introducing market arrangements



- 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:

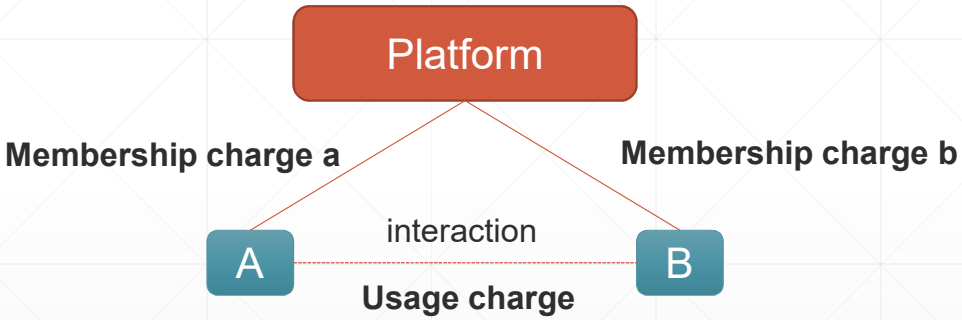
1. Each member group is a customer of the platform
2. The platform allows direct interaction between the various member groups

Source: Hagiu, Wright (2011)

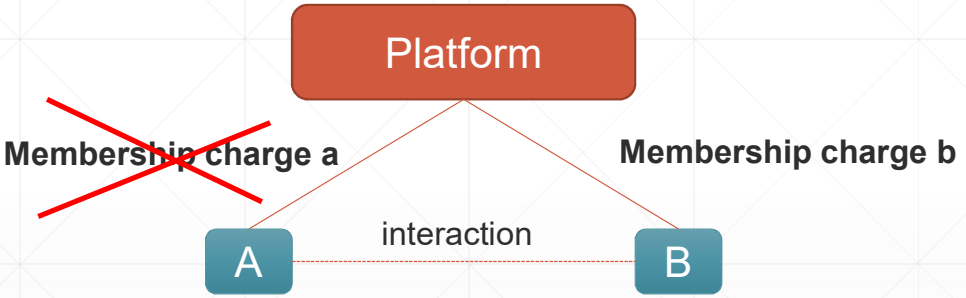
Platform Ingredients
Multi-sided platforms

- 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

Two-sided markets
With transactions on both sides and with asymmetry

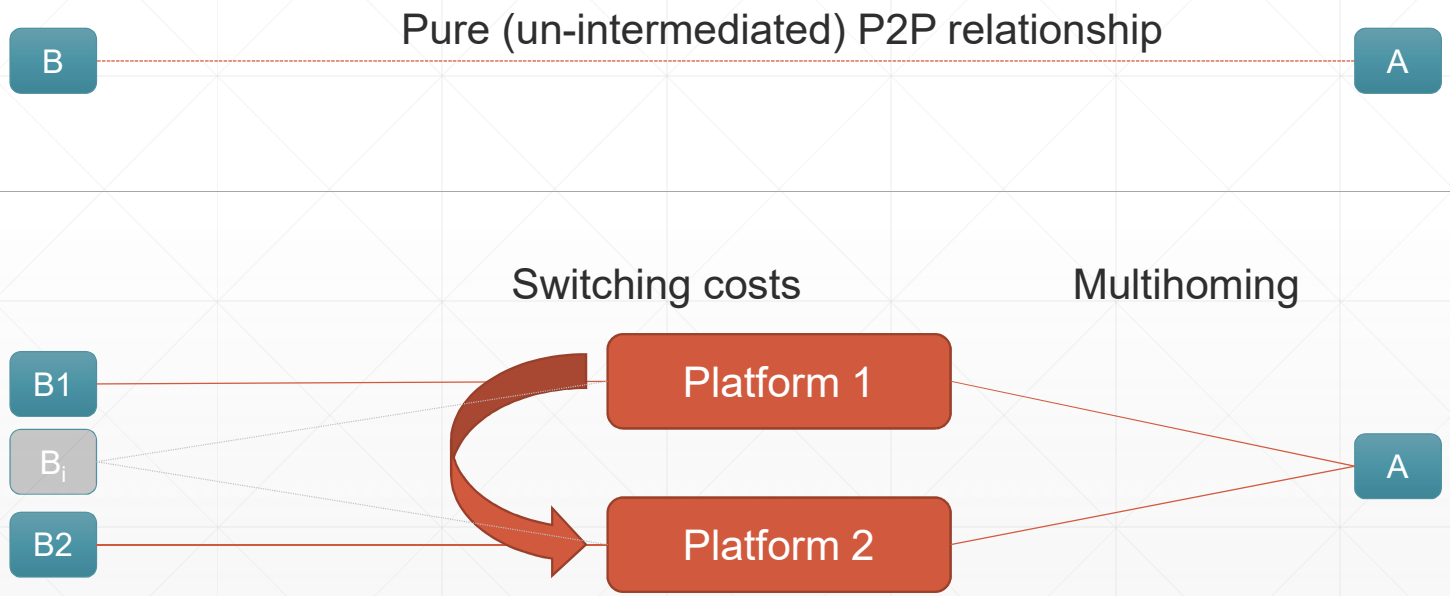


Mobile communications services,
Credit cards,
games and app stores



Internet search – advertisement,
Free magazines

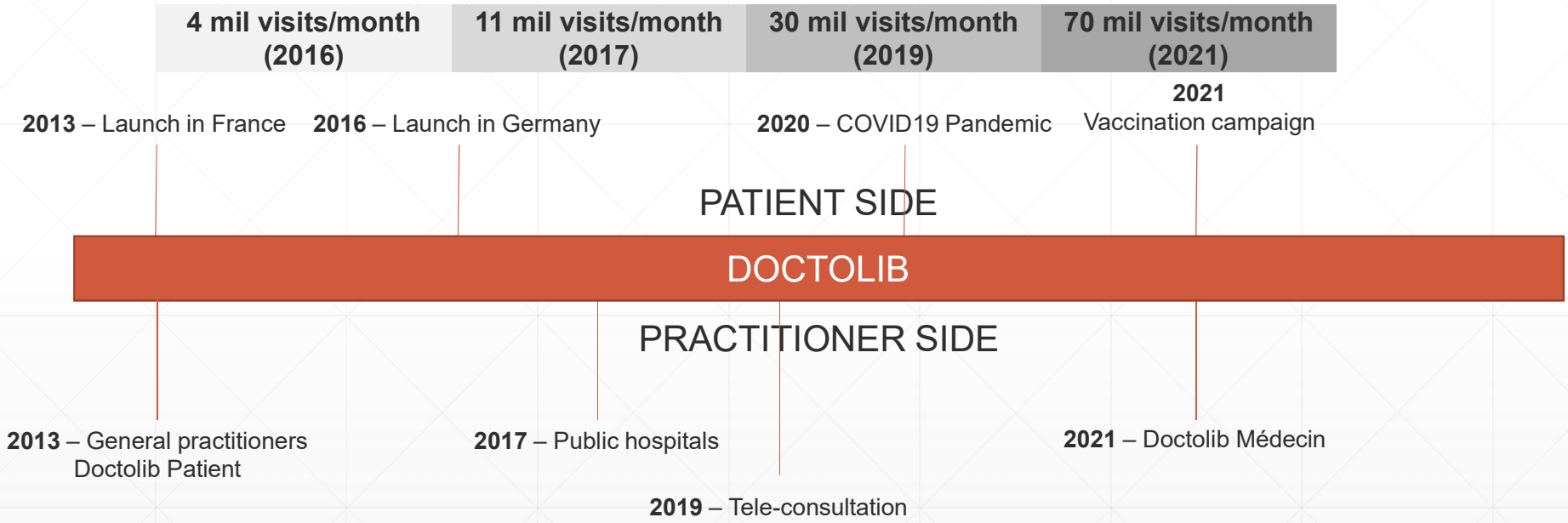
P2P relationships and several Multi-sided platforms



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

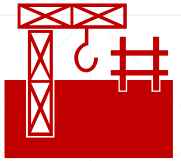


Individual practitioners – general practitioners, specialist doctors, dentists, pharmacists, psychotherapists, opticians, physiotherapists
Health organizations – hospitals, clinics, health centers, medical imaging centers

The Platform Enterprise Discussion – 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



You are the Chief Innovation Officer at a large organization in one of the sectors listed below and you want to launch your company's platform. Explain: 1) how many sides your platform will have (try at least **3**), 2) the direct mutual reinforcement mechanisms between the various sides, and 3) on which side(s) you will generate revenues, if you choose a market mechanism for your platform.

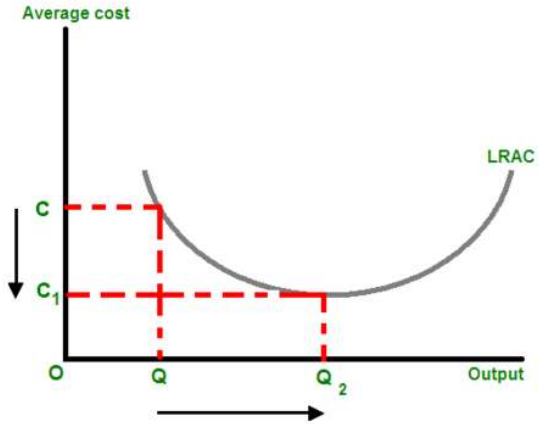
1. Media industry – newspapers
2. Media industry - TV
3. Music industry – audio streaming services
4. Game industry
5. Computer & High-Tech industry
6. Manufacturing industries – industrial equipment
7. Manufacturing industries – consumer goods
8. Banking, financial services
9. Cosmetics and beauty products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

Platform Regulation

- In previous forms, regulation of « platforms » was about:
  - Curbing the power of monopolies (example: AT&T divestiture, 1980s)
  - Opening platforms to outside competition (ex: Microsoft in the US and in the EU, 1990s)
- Today, platform regulation encompasses several objectives:
  - Fostering competition
  - Protecting customers
  - Facilitating innovation

  … as seen with the recent EU regulation « Digital Market Act »

The Platform Organization
The role of technology and data

Digital Transformation:

- Traditional companies and digital-native companies alike rely on digital technologies to reach new markets, become more customer centric, more agile, etc
- The Platform Organization model requires investment in digital technologies, specifically when coming from the “traditional” world

Digitalization:

From “enabler” to “strategic initiative”

- In organizations, digitalization may occur at two levels:
  - Assets
    - Products
    - Production and operations facilities
  - Processes

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

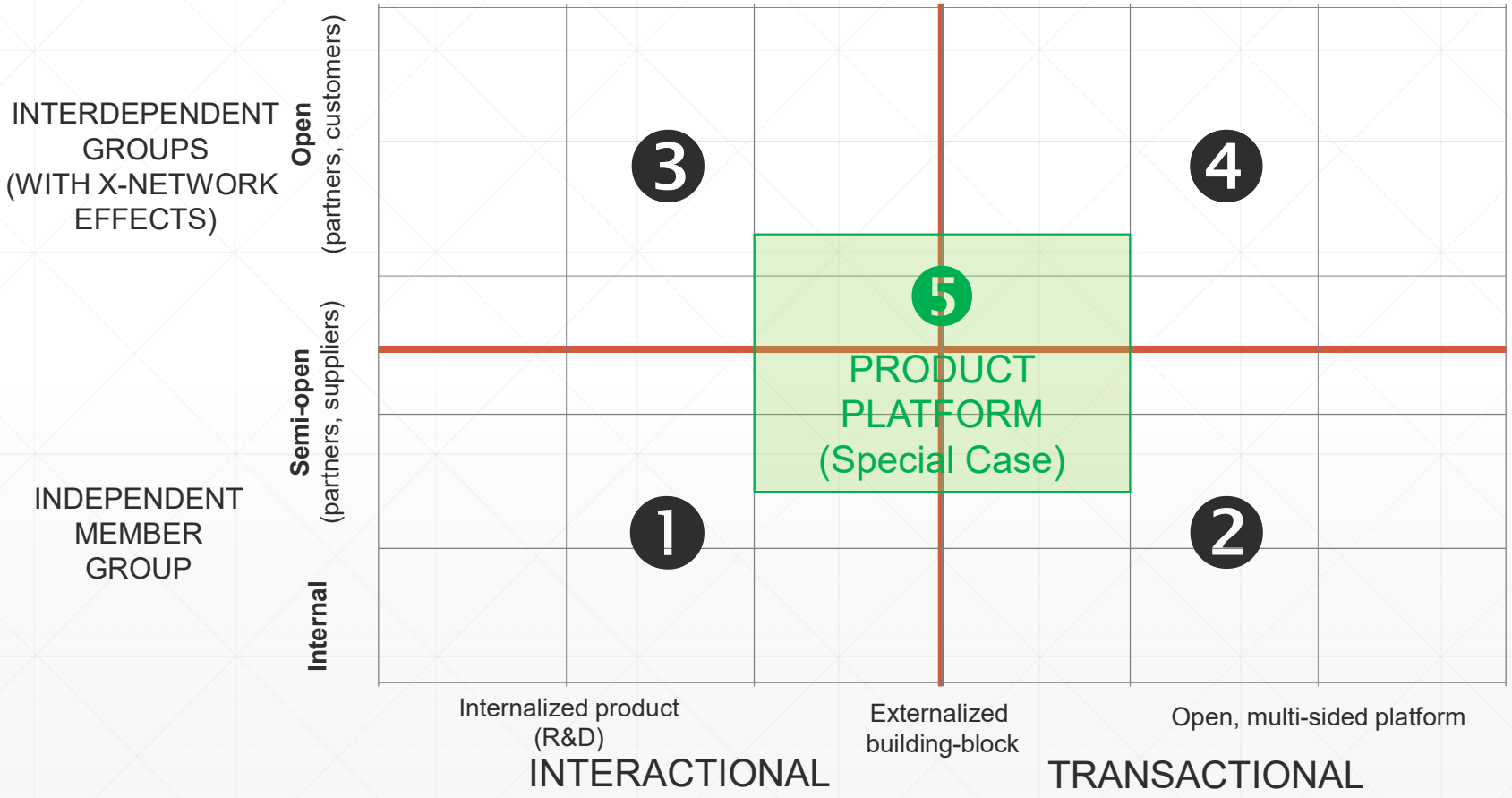
- PageRank (Google Search) – classification of search results algorithm
- Cassini – ebay's search and display results algorithm
- Best Match – ebay's matching buyer's criteria with product offering algorithm
- Amazon's A9 algorithm – product ranking with strong sales history

The Platform Enterprise
Becoming a Platform

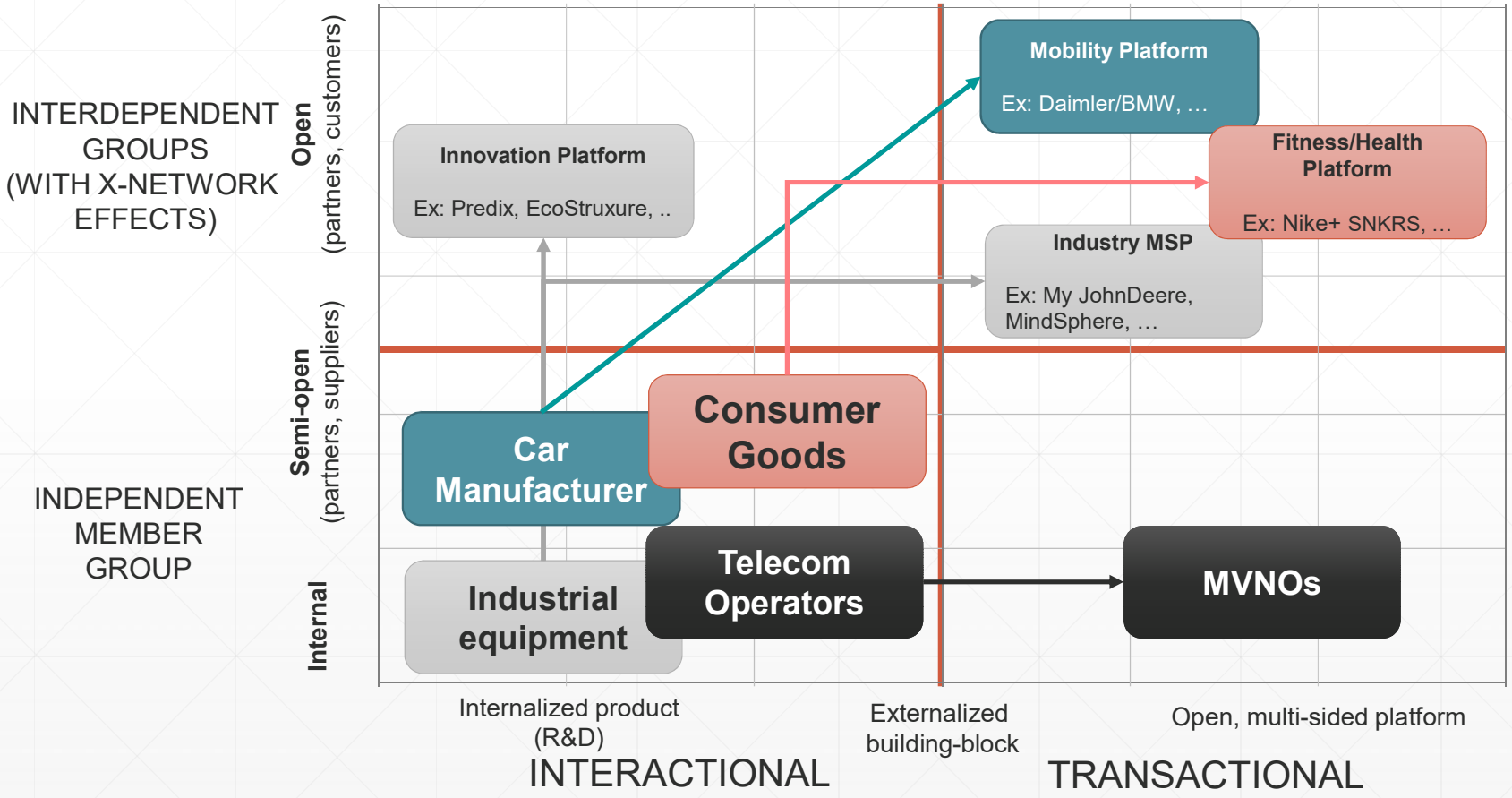
- Traditional companies, especially large, established companies have several ways to implement a platform organization
- The transformational journey may take several forms:
  - Building an **internal** platform, between sub-units of the same firm
  - Building a **semi-open** platform between the firm 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 # 4

- ☑ In the digital transformation journey, the Digital Platform is increasingly becoming a coordination model of choice in 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 digital platform model has several ingredients:
  - Several types of network effects
  - Platform Ecosystems
  - 2 (or multi)-sided markets
  - Economies of scale
- ☑ The journey from a traditional company to becoming a Digital Platform may have several stages, from internal usages, to more open platforms for suppliers and partners, to open industry type of platform federating several participating groups
- ☑ Digital Platforms call for new forms of regulation

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

Course Wrap-Up
What do we know about Digital Transformation?

❶ **Thesis # 1:** Digital Transformation is the process of technology adoption by individuals and organizations

❷ **Thesis # 2:** As technology gets adopted by a larger number of people, global infrastructures get built, supporting the entire economy and society

- Electrical bulb, dynamo => Electricity/Energy networks
- Telephone => Telecom networks
- Computer => The Internet

Course Wrap-Up
What do we know about Digital Transformation ?

❸ **Thesis # 3:** Much of the current technology adoption process is about replacing technology itself (upgrade or renewal)

- Smart phone replacing feature phone
- 5G technology replacing 4G technology
- Cloud-based software replacing on premise IT resources
- Big data technology replacing traditional storage and database systems

❹ **Thesis # 4:** In the process, transformations are happening, at all levels, and in all areas:

- New jobs, new skills
- New work relationships (Working From Home, digital free-lancing)
- New companies, new consumption habits (e-commerce), new industry relationships (digital supply chains)

… in other words, Digital Transformation creates new opportunities and new challenges

Course Wrap-Up
What do we know about digital transformation ?

❺ **Thesis # 5:** Some technologies, called General Purpose Technologies, such as Artificial Intelligence, and specifically Machine Learning, have today relatively higher potential to bring about change.

❻ **Thesis # 6:** Unlike other infrastructural technologies (IoT, Blockchain …) AI and ML's potential for change encompasses activities and processes which are usually performed by humans. Example: decision-making. With Digital Transformation, we are witnessing increased human activity embeddedness in technology.

❼ **Thesis # 7:** Some technology combinations are interesting to watch, such as: IoT & Blockchain, Big Data & AI

Course Wrap-Up
What do we know about digital transformation ?

❽ **Thesis # 8:** In the Digital Economy, platforms are becoming the business model of choice

❾ **Thesis # 9:** Networks, as coordination mechanisms, are becoming central to value creation in the Digital Economy

❿ **Thesis # 10:** It is our individual and collective responsibility to put technologies to good use and avoid technology ‘high-jacking’

Thank You!

Valeriu Petrulian