



Platforms and competitive dynamics

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INTRODUCTION

The Internet has changed radically over the past two decades. It is no longer a mere constellation of websites. Landline broadband extensively revamped the Internet's content by enabling millions of people to take part in myriad ways (blogs, videos, social media, sites enabling cooperation and sharing, etc.). Then smartphones and mobile broadband networks swept across the Internet, ushering in other uses that bear little resemblance to the Internet's earlier purpose. Even more recently, network technologies and application technologies have merged into objects and in so doing brought the digital world and data-processing algorithms to the dawn of a new day. Some now use the term "platform" indiscriminately to mean dating sites, marketplaces or mobile app stores, sometimes "collaborative" sites, sometimes even the Internet of Things.

This paper intends to shed light on the mechanisms underlying the development of these platforms. It sets out to clarify this notion based on an overview of academic research, and discusses the effects that platforms have on competition.

WHAT PLATFORMS ARE

Network information and services generates positive externalities in the economic sense of the term¹. In the information economy and electronic networks, there are various positive externalities, or **network effects**. Digital platforms rely on five distinct types of network effects. But, by themselves, these effects do not add up to a digital platform.

What some call platforms also result from **ecosystem dynamics**, which support and complete the positive externalities emerging from the networks where the economic phenomena underlying platforms originated. The fact that a mobile app or website may trigger network effects does not *per se* make that app or website a platform. Platforms result from deliberate strategies, pointed decisions on their technological components, and the value that the ecosystem's members share.

The French Conseil National du Numérique includes these two dimensions in its definition: *"A platform is a service that acts as an intermediary by enabling access to information, content, services, either published or supplied by third parties. Beyond providing a*

A platform is defined by:

1. Network effects, meaning positive externalities arising from the information economy

2. Ecosystem dynamics

¹ **Externalities** are **external effects**. They encompass the utilities or advantages that one economic agent's activity bring about for others at no cost to them – or, conversely, uncompensated disutilities or disadvantages. Source: <https://en.wikipedia.org/wiki/Externality>, which defines externality as "the cost or benefit that affects a party who did not choose to incur that cost or benefit."

technical interface, it organizes and ranks content in the aim of presenting and furnishing it to end-users. Added to this common characteristic, a platform sometimes also includes an ecosystemic dimension characterized by interrelations between converging services.²

Platforms and network effects

Five types of network effects define platforms. They are all different in nature yet complementary. For a platform to materialize, these various effects need to be present simultaneously and some of them (two-sided effects and indirect effects) need to be clearly identified as strategic levers for the company aims at becoming a platform.

Direct network effects

Direct network effects relate to products, services, technologies that have no use-value other than serving as a medium for individuals to communicate, interact, synchronize. Examples include telephone services, instant messaging services, social media, etc.

Direct network effect (def.): a network's value is proportional to the number of participants in it.

The foundation underpinning direct network effects stems from the so-called Metcalfe "law"³, which demonstrates that **a network's value is proportional to the number of participants in it⁴**. Direct network effects turn a product or service into a real "network product". The consumption utility of a "network product" therefore hinges on the number of users.

Positive feedback effects

Positive feedback amplifies network effects: a prospective buyer considering a choice of products **anticipates that the service that most people use provides the highest value**, therefore chooses the dominant platform, and thereby reinforces the direct network effect.

² CNNum, (2015), Report: "Ambition numérique: pour une politique française et européenne de la transition numérique".

³ R. Metcalfe was one of the inventors of the Ethernet.

⁴ This law verifies a mathematical function such as $F(n) = n \times \text{Log}(n)$.

This therefore favors the services that have the largest customer bases. This dynamic is even stronger when the services are not compatible with each other and/or when technical standards hinder change.

Skype illustrates positive feedback effects. We adopt it because another member of our network invites us, or to suggest it to the other people in our social circle. Positive feedback effects also encompass adoption due to word-of-mouth (virality) and recommendations between people in a same social network.

Positive feedback effects are at the core of platform prescription and adoption dynamics. That is why platforms request, manage and structure opinions about the services they provide: to enhance this effect's reach and build their user base faster.

In the tourism market, for example, hotel booking platforms such as TripAdvisor or Booking compile customer feedback because fellow travelers' firsthand opinions carry considerable weight when other travelers need to decide which travel arrangements to make. Booking generates customer reviews by automatically asking travelers to rate their hotels at the end of their stays. Today, it receives 100,000 new reviews a day. This is a key feature in its business model, and has become a strategic resource for the company (it has gathered 46 million reviews in total⁵). This direct contribution from users has a bearing on Booking's balance of power vis-à-vis hotels and other accommodation providers.

Indirect network effects

Indirect network effects kick in when a successful product or service spawns **complementary products and services**. These complementary products and services in return enhance the original product's or service's appeal. For example, Apple's mobile devices have generated indirect network effects in the form of a plethora of mobile apps and all manner of accessories (covers, amps, speakers, connectivity, headsets, etc.).

In the PC market, this network effect explains why users have flocked to Windows rather than Apple: Windows' range of software has consistently outshined Apple's, in particular in the gaming world.

Indirect and direct network effects are fundamentally different. Here, the value that every new user adds does not result from the added utility that other users may derive from interacting with him or her: it results from the fact that this new user is one more reason inciting suppliers of complementary products and services to supply their wares and thereby enhance the original product or service.

Positive feedback effect (def.): a user chooses a service by anticipating which one will be most popular (virality, recommendations, etc.).

Indirect network effects (def.): a product's or service's value results from the creation of a range of complementary products or partner services (mobile apps, accessories, etc.).

⁵ Source: 2014 Annual Report, Priceline Inc.

Most often, indirect network effects arise from companies' deliberate strategic moves. Netflix, Facebook, LinkedIn or Spotify allow software developers to access their platforms, in particular via APIs (Application Programming Interfaces) or SDKs (Software Development Kits) because they want to enhance their appeal by providing complementary products and services, developed by outside parties who were able to access its data and features.

Creating indirect network effects is tantamount to creating an ecosystem of partners. This strategy is increasingly leading companies to allow other parties to access their technical platforms through APIs, SDKs, open data or the three channels combined. Questions such as how far they should open their platform, how they should control access to it, and how they should qualify and select partners, are therefore at the core of their strategies.

Opening up access to a platform is only the first step. Triggering indirect network effects and two-sided network effects (see following section) involves reaching out to partners, publishers and developers, entering into partnership agreements with players in other business sectors (for example with banks, as Apple did to set up its Apple Pay mobile payment service), sometimes coproducing, and in all cases encouraging potential partners to build a wealth of appealing applications, in the hope that those applications will give the platform a competitive edge and, of course, attract additional revenue streams.

The annual developer conferences that these platforms host (Google I/O, Facebook F8, Apple WWDC, etc.) are as momentous as their meetings to present their financial results. In other words, their ecosystems play a vital role in their value-creation drives.

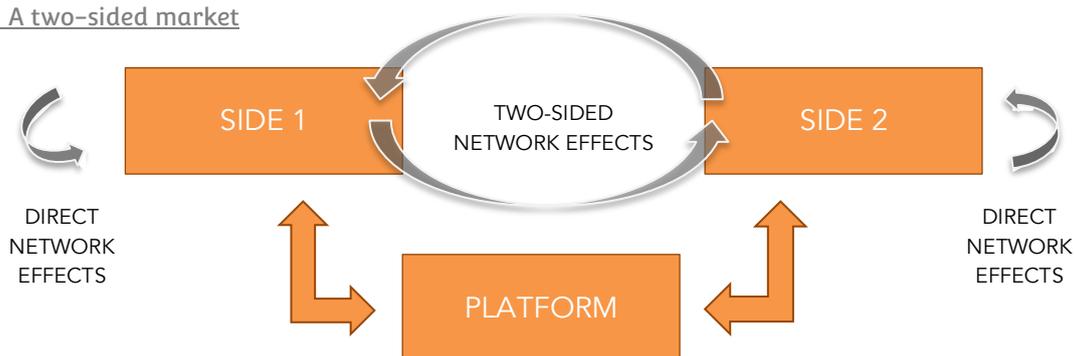
Two-sided network effects

Two-sided network effects occur in intermediation platforms connecting two or more types of complementary and interdependent agents (buyers and sellers, advertisers and audiences, recruiters and job-seekers, developers and users, etc.).

A platform's utility for the agents on one side hinges to the number of agents on the other side. So advertising space on a TV channel will be more appealing to advertisers if that channel attracts large audiences.

Two-sided network effects (def.) occur in a platform serving a two-sided market. If the number of agents on Side 1 grows, the number of agents on Side 2 will do the same, and vice-versa.

Fig. 1: A two-sided market

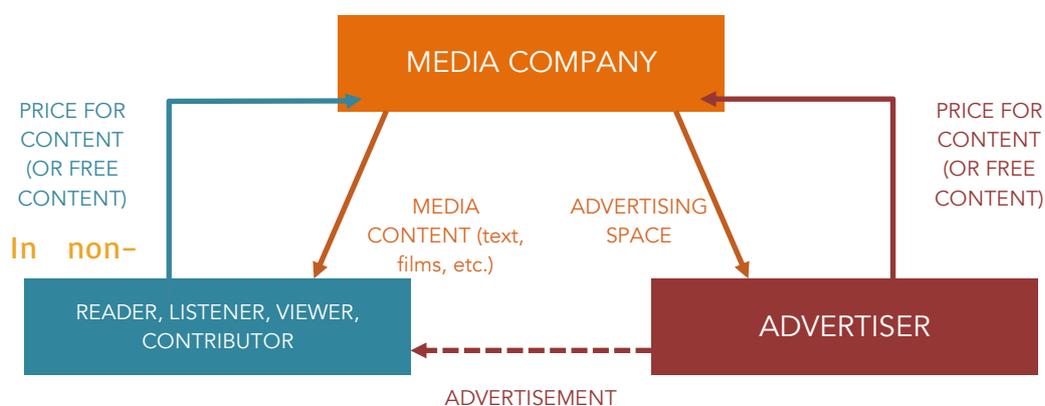


Companies generally use a technology platform (for their advertising network, dating site, real estate ad site, preowned vehicle ad site, other classified ad site, online auction site, job site, etc.) that brings together consumers and providers in a same forum. When this happens, it is a two-sided market.

Two-sided network effects and two-sided markets

Two-sided markets can be transactional or non-transactional:

Fig. 2: A non-transactional two-sided market



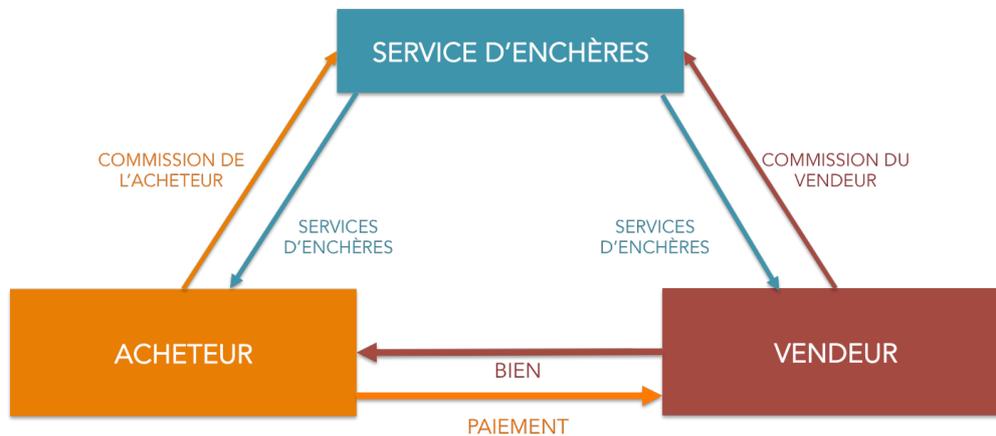
In non-transactional two-sided markets, the two sides of the market do not transact. They may interact, but their interaction is difficult to observe, and charging fees for the transaction or interaction, or for both, is unfeasible. Here, two-sided charging can mean charging both sides or deciding to only charge one (see following section).

The textbook example of a **non-transaction two-sided market** is the media (a free TV channel for instance). In this case, the viewer and the advertiser do not interact (see Figure 2).

Usually, platforms hosting User-Generated Content (UGC) such as Facebook, YouTube, SlideShare, etc. are non-transactional two-sided markets.

In **transactional two-sided markets** (see Figure 3), the players on both sides transact directly, and their transactions are observable. So the people organizing the market are able to charge users for accessing the platform, and for using it, i.e. apply a two-part tariff.

Fig. 3: A transactional two-sided market



Service d'enchères: Auction service
Commission de l'acheteur: Buyer's commission
Commission du vendeur: Seller's commission
Acheteur: Buyer
Vendeur: Seller
Bien: Good
Paieiment: Payment

The rationale at work in two-sided markets and user multi-homing

Economic analysis sheds light on two-sided markets' distinctive features. They relate to two-sided network effects, which intertwine with the network effects discussed above.

1. **A two-sided platform's overriding goal is to attract agents in both categories, with a pricing policy geared to do so.** If charging both sides is an option, one side will invariably prove more lucrative than the other. A platform can also opt to allow both sides to use it free of charge and derive financing elsewhere (typically from advertising). In most cases, however, two-sided platform economics involve charging one side (the profit-making segment) and subsidizing the other (the loss-leader). With time, or due to technological breakthroughs or other strategic considerations, financing models can change direction and the profit-making segment can swap places with the loss-leader. Meetic, for instance, at first only charged men but, when it had enlisted a similar number of men and women, it changed its policy and started charging both the same dues.
2. **Multi-homing** occurs when a user simultaneously sources the same service on more than one platform. **Multi-homing on one side undermines the platform's market power on the other side.**

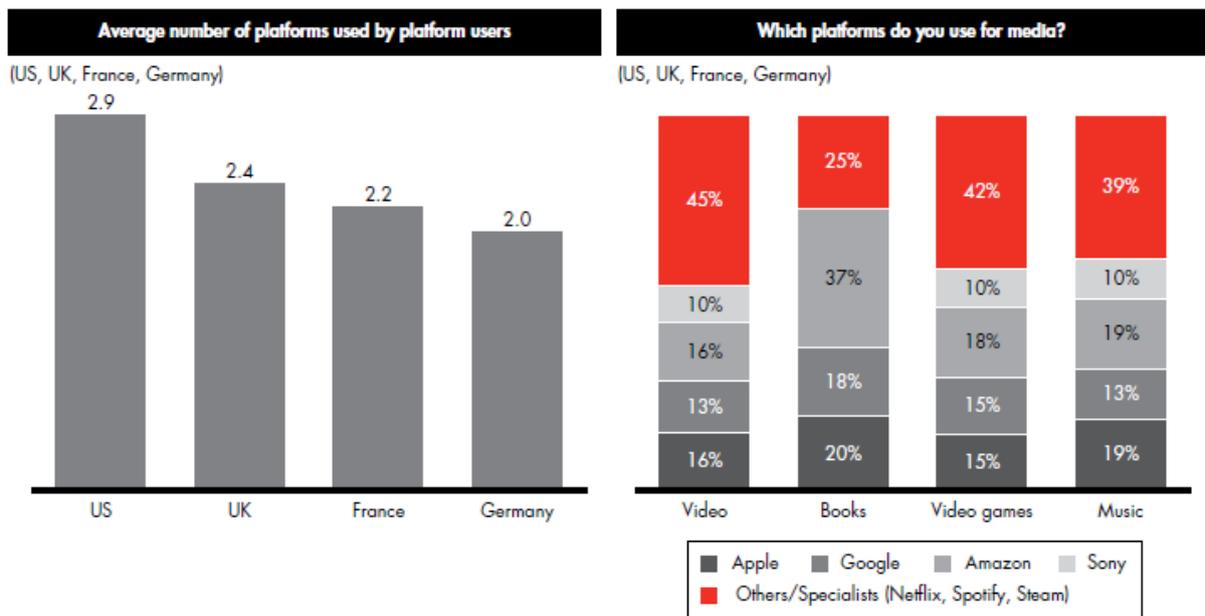
1. Pricing (or targeted free-of-charge access) geared to recruit the same number of users on both sides.

For example, job seekers on average use three platforms. This means that neither one of those platforms can charge companies a lot for posting their vacancies. Multi-homing is the norm in many fields, and rife on B2C as well as B2B markets.

In France, for instance, 76% of Internet users have two e-mail accounts⁶. A recent survey of the markets for digital cultural goods found that multi-homing behavior is ubiquitous among consumers of these goods.

2. Users are shifting towards multi-homing, i.e. using several platforms for the same service, to avoid falling captive to any one provider.

Fig. 4: Multi-homing in consumption of cultural goods



Source: Bain consumer survey (n=6,251)

On the B2B market, most companies are active on several marketplaces at the same time, and use several platforms to compare prices and deals. This is even more so as several French companies (Neteven, Lengow, iziFlux) now enable companies to establish their presence on various platforms concurrently and thereby reduce their multi-homing transaction costs.

Multi-homing can also stem from platform lock-in strategies (see following section), on both sides: content producers do not want to depend on a single platform, and neither do content consumers.

Accordingly, developers are diversifying their presence on mobile platforms by using multi-platform development tools. Many software applications enable them to post information on several social

⁶ Source: SNCD, e-mail attitude, 2014

platforms concurrently. So, paradoxically, locking in weakens a platform by eliciting multi-homing behavior⁷.

3. **Two-sided platforms need to enlist exclusive “marquee users”** because they are the ones who make agents on the other side more willing to pay. Rochet & Tirole (2003)⁸ show that American retailers agreed to pay American Express higher than average commissions for a long time because a majority of “high-income” customers had the card. But, once it became common for high-income customers to have several cards, American Express’ market power (i.e. its power to charge higher prices) plummeted.

3. Marquee users’ profiles intrinsically add value to the platform.

From a two-sided to a multi-sided approach

The notion of a two-sided market does not capture a platform’s full breadth. Platforms are keen on adding sides in order to grow their revenue. They are shifting from their initial two-sided rationale to a multi-sided approach.

Platforms such as iTunes are trying out multi-sided market approaches by diversifying the product ranges they offer.

That is how iTunes became such a prominent platform for digital culture and entertainment around the world. It was initially designed to distribute music in digital form and subsequently branched into films, TV series, books and then mobile apps. So the customers it had recruited on its original music platform could then purchase other goods from the entertainment industry (again, films, TV series, books and mobile applications). This is referred to as a multi-sided market.

Lock-in effects

Strictly speaking, lock-in effects are not network effects: they help to protect or strengthen network effects. In practice, lock-in effects mean that users and customers who want to switch will have to pay a steep price. Lock-in effects are not exclusive to the digital economy: they exist in many other markets as well (industrial goods and durable goods, where production technology substitutability can be scant⁹). Reliance on one seller of industrial supplies often resembles a lock-in effect as the buyer has no alternative source.

4. Lock-in effect (def.): when the cost of switching is so high that it holds consumers captive to a product or service.

A lock-in effect is at work in a situation where the costs of switching technology are so high that the customer chooses not to change products. The weight of these switching costs determines the extent to which a customer is “bound” by a given supplier.

⁷ J. Choi, (2010), “Tying in two-sided markets with multi-homing”, The Journal of Industrial Economics, Vol. 58, n° 3, pp. 607–626.

⁸ J.C. Rochet, J. Tirole, “Platform Competition in Two-Sided Markets”, Journal of the European Economic Association, June 2003.

⁹ This is the case with all “specific assets”, as defined by O. Williamson. An asset (material, human, etc.) is specific when the transaction requires a long-term investment and that investment cannot be redeployed to another transaction. In this case, the party that commits the asset to the transaction becomes reliant on the other party. See https://en.wikipedia.org/wiki/Asset_specificity.

The total cost of switching products is equal to the cost that the consumer bears and the cost that the new supplier bears to serve the new customer. Switching costs often result from using **complementary products, which is the case when there are indirect network effects at work**. In the case of a network product or software packages, **the training acquired by the user complements** the similar training acquired by all the other users.

Lock-in effects and the ensuing switching costs arise from:

- Complementarity between products/services, i.e. the weight of the indirect network effects;
- Contracts, which may span several years, include renewal clauses, provide termination penalties or set termination dates, etc.;
- The expense of looking for an alternative;
- Training to use the brand and its products/services, entailing substantial learning costs following a switch;
- The supplier's strategies to nurture loyalty.

That said, technologies are increasingly interoperable as due to factors such as XML formats or web services joining the mainstream, the development of infrastructure in Cloud mode, the development of Software as a Service (SaaS), and the virtualization of systems and applications. Switching costs are not entirely disappearing but migration costs have generally been trending downward over the past few years. This includes the Cloud where the process to transfer from one platform to another is being standardized, in particular thanks to the container technology¹⁰ developed by Docker, and the creation of an open-source technology consortium around that technology¹¹.

Interoperability is progressively undermining lock-in effects.

Intermediate conclusion:

Several complementary network effects structure digital platforms. This first angle on platforms helps to shed light on competitive dynamics in the digital economy and on user behavior on those platforms.

¹⁰ <http://www.journaldunet.com/solutions/cloud-computing/docker-definition-avantages-inconvenients.shtml>

¹¹ <http://www.journaldunet.com/solutions/cloud-computing/1158949-google-confie-son-infrastructure-de-container-a-un-consortium-open-source/>.

From ecosystems to platforms

Network effects are essential to characterize the notion of platforms, but do not define them by themselves. As a variety of different players and partners are interrelating, **the notion of business ecosystems clarifies the notion of platforms**. Other dimensions – mostly revolving around technology and viewing customers as platform resources – provide a more comprehensive and specific description of these new ways of organizing exchanges and production, which are specific to information technologies.

The “business ecosystem” is the second notion defining a digital platform.

A business ecosystem’s characteristics

The notion of business ecosystems is not, in itself, new. It was coined by James Moore in 1996¹². He took an interest in companies’ strategies in general and in “co-opetition” (competition and cooperation) strategies in particular, and defined an ecosystem as **“An economic community supported by a foundation of interacting organizations and individuals.”** An ecosystem produces goods and services of value to customers, who themselves are members of the ecosystem. The members also include suppliers, producers, competitors and other stakeholders.

The members of an ecosystem coevolve on the basis of their respective capabilities and roles, and tend to align themselves with the directions set by one or more central companies. This is especially clear in Apple’s mobile ecosystem, where hardware innovation hinges on its suppliers’ innovative capabilities (Sony supplies the cameras, LG the screens, Samsung the processors, Qualcomm the modems). The ecosystem leader’s role is to bring value into the community: it rallies its members around a vision, and they adjust their investments and find mutually supportive roles to play accordingly.

In a business ecosystem, many companies pivot around central ones, in co-opetition (concurrently competing and cooperating).

Every ecosystem is organized by one or more central companies. The automobile ecosystem is organized around the world’s leading vehicle manufacturers (GM, Honda, Volkswagen, Renault-Nissan, etc.). The mobile industry pivots around three or four companies (Apple, Google, Samsung, China Mobile).

The central company has a customer base, which it has built, and provides its partners in the ecosystem with a gateway to that customer base. It establishes the technical and financial terms governing the partnership, and organizes, leads and builds the ecosystem.

Rolling out these strategies involves enlisting a wide range of complementary resources that the central company lacks, i.e. recruiting partner companies. It deals with competition-related issues

¹² J. Moore, (1996), “The Death of Competition: Leadership and strategy in the age of business ecosystems”, New York, Harper Business.

and partnerships. Their interdependence is strong and complex (content/containers, technology, access to data). **We say that partners coevolve** when their joint efforts can lead to unexpected results that in turn entail redefining the terms governing the partnership. The interaction between Apple and Google on mobile map apps is one example.

As soon as Apple opens up its iOS mobile platform, Google makes its Maps app available on it. This service is very popular and used extensively. Apple therefore builds its own map app and tries to outsmart Google, but it does not provide the same wealth of features, points of interest, itineraries or directions. This app is key for both companies to generate other services and add value to their terminals. Google cannot forgo hundreds of millions of iOS users and Apple cannot dislodge Google from its platform until its app rises to its rival's standards.

In the digital world, therefore, there are two competition dynamics at work:

– **Competition between ecosystems:**

- E.g. Apple vs. Google on mobiles, even though they partner up to acquire a few patent portfolios, or Samsung and Apple, which work together on mobile processors but compete on the smartphone market;

– **Competition within ecosystems:**

- Co-opetition: the underlying rationale is aimed at fostering partnerships but competition with the central company may occur:
 - E.g. Apple and mobile app publishers, Amazon and Marketplace retailers;
- Competition for access to the end customer:
 - Control over channels to reach the customer (Apple customers have single login IDs, Amazon Marketplace retailers cannot view buyers' e-mail addresses);
- Visibility on the platform:
 - E.g. control over the platform and search algorithms in mobile app stores afford partners more or less visibility. There are literally hundreds of thousands of apps and the number of times each one is downloaded hinges heavily on how visible it is, i.e. where it ranks in the various app categories. Apple's App Store also has a protocol to verify apps. Apple thus reserves the right to decline apps (for example it removed AppGratis from the App Store in April 2013).
- Sharing value-added (see following section).

In an ecosystem, therefore, the central company coevolves with its partners, cooperates with them, and at the same time competes with them. The value it creates, in other words, also depends on the value that other partners in the ecosystem create. That said, an ecosystem is not necessarily a platform.

From ecosystems to platforms

There are three differences between ecosystems and platforms:

- A platform **invariably leverages network effects** in general, and two of them – indirect and two-sided network effects – in particular. It does so following a deliberate strategy, which is not always the case in an ecosystem such as that in the automobile industry for instance.
- A platform has an **initial technological strategy** enabling it to build cooperation and add partners, in particular via an API or an SDK. The platform's **generativity** characterizes this technological strategy. The notion of **generativity**¹³ refers to a technical architecture's capacity to enable the platform's development, and thus to the platform's **reach**. Generativity hinges on various dimensions:
 - IT resource architecture (open, closed, semi-open);
 - Capacity to facilitate access to the architecture via one or more APIs;
 - Capacity to rally a community of developers;
 - Capability to involve the customer (open innovation).
- **The customer is a component in the value-creation process**¹⁴. A platform is principally geared to enlist the customer as a resource:
 - Through two-sided network effects (the platform 'sells' access to this resource);
 - Through the data that the customer generates during interactions with the platform (if the platform utilizes this data);
 - Through all other mechanisms to involve the customer in the value chain (open innovation, co-design, crowdsourcing, co-production, co-branding, viral marketing, customer communities).

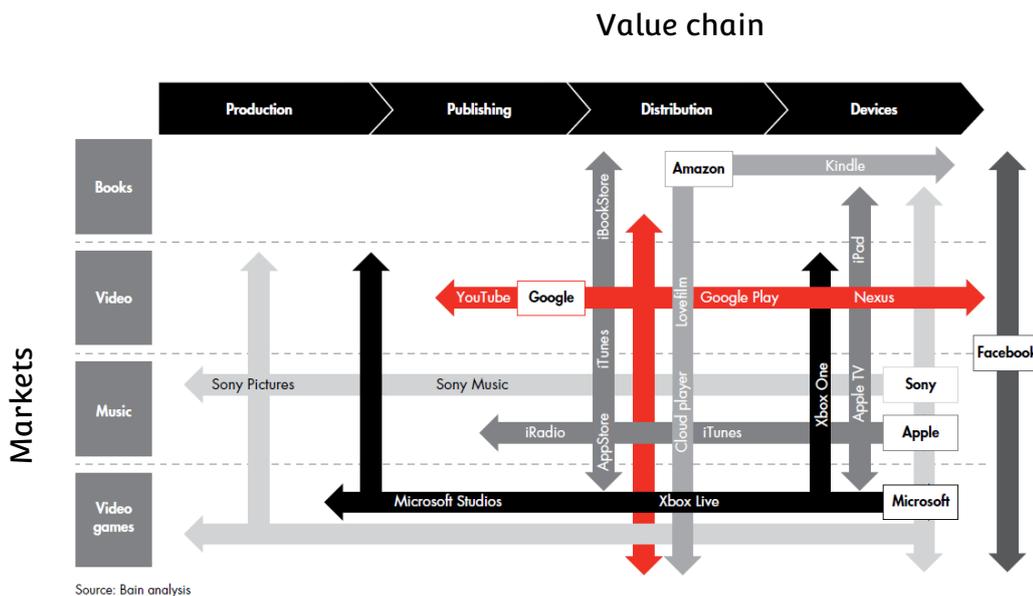
Lastly, if we want to characterize, compare and analyze platforms, it can be helpful to look at the way in which they roll out on markets (horizontal rollout) and on a value chain (vertical rollout).

The three factors that distinguish platforms from ecosystems are: network effects, the customer's role as a resource, and the platform's generativity, which may result from the technology it chooses.

¹³ See Y. Yoo, (2012), "The Tables Have Turned: How can the Information Systems field contribute to technology and innovation management research?", Working Paper Temple University.

¹⁴ See S. P. Chaudhary, "Platform Scale", on "interaction first business".

Fig. 5: The age of curation: from abundance to discovery¹⁵



A platform that covers an entire value chain, from beginning to end, is often referred to as a **full-stack¹⁶ platform**.

Platforms and value creation

To capture the full breadth of the notion of platforms, we need to understand that they alter the way in which value is created and distributed among the various players on it. If partners contribute substantively to producing value for the platform by supplying resources (content, services, assets, data, etc.), the platform also creates values for them in four ways.

Facilitating access to markets

Partaking in an ecosystem first of all provides **access to an existing customer base that the partner would have been unable to build alone**. Ecosystem partners therefore reach markets at a much lower cost than if they had done so by themselves. This is especially true for online booking platforms, such as Booking, which put accommodation providers in touch with an international customer base they would otherwise have struggled to attain. In 2014, when Priceline (Booking.com, Kayak, Priceline.com, CarRentals, Opentable, Agoda)

A platform creates value for an entire ecosystem.

Platforms are gateways to markets for many players. For example, e-commerce marketplaces are open to a large number of partners.

¹⁵ Adapted from: The Age of Curation: From Abundance to Discovery, a Bain & Company report on how people consume culture in the form of digital media for the Forum d'Avignon 2013.

¹⁶ <http://www.kpmg.com/fr/fr/issuesandinsights/decryptages/pages/full-stack-nouvel-etat-esprit.aspx>.

invested \$2.4 billion in Internet advertising¹⁷, its investment benefited all the platform's partners and generated more qualified contacts for hotels than their own investment in advertising would ever have been yielded.

The rationale is exactly the same in marketplaces, which funnel visitor traffic to retailers in volumes that those retailers could hardly have attracted single-handedly. Similarly, supermarket and hypermarket purchasing centrals provide many SMEs with gateways into substantial markets. Moreover, these marketplaces often provide small companies with a worthwhile alternative to costly mechanisms to acquire customers online (e-mail campaigns, affiliation, search engine marketing). This is why 8 of France's top 15 e-commerce sites are marketplaces open to a large number of partners. In an environment where the number of active retail websites continues to increase (14% in a year; 14,500 sites a decade ago, 164,200 today), this access reduces the cost of building traffic and can put the spotlight on brands that would struggle to stand out with their website alone.

Fig. 6: France's top 15 e-commerce sites¹⁸

Rank	Brand	Average unique visitors/month	Average reach (% of Internet users)	Unique visitors/day
1	Amazon	17,516,000	37.7	2,072,000
2	Cdiscount	10,732,000	23.0	886,000
3	Fnac	10,684,000	22.9	874,000
4	eBay	7,947,000	17.0	910,000
5	Carrefour	7,587,000	16.2	557,000
6	Price Minister	7,540,000	16.1	590,000
7	Voyages-SNCF.com	6,860,000	14.7	500,000
8	La Redoute	6,839,000	14.6	464,000
9	Vente-Privée.com	5,963,000	12.8	995,000
10	E.Leclerc	5,553,000	11.9	451,000
11	Darty	5,424,000	11.6	332,000
12	Leroy Merlin	5,005,000	10.7	346,000
13	Auchan	4,890,000	10.5	364,000
14	Rue du Commerce	4,665,000	10.0	296,000
15	Déathlon	4,361,000	9.3	242,000

The same rationale is at work in the e-book market, where authors whose books are declined by publishers can nevertheless reach an audience via online e-book platforms.

¹⁷ Source: 2014 Annual Report, Priceline.com, <http://tinyurl.com/p9v2rg3>

¹⁸ Quarterly survey, e-commerce audience in France, Fevad, Médiamétrie/Netratings, Nov-Oct 2014.

Access to international markets

Worldwide platforms provide their partners with **easier access to international markets**. This is the case for brands and distributors on marketplaces, and for developers on mobile app stores. Setting foot in a country invariably requires a sizeable investment to build a customer base. These costs – especially customer-acquisition costs – are much lower because the platform already has traffic in each of its country markets.

Platforms fast-track access to international markets.

Job creation

As they open up market opportunities, **digital platforms help their partners to build business**. This is particularly clear on mobile app platforms. A research note on the European App Economy estimates that the EU is home to 406,000 professional app developers, and that mobile platforms have helped to create 667,000 jobs directly and 1 million jobs indirectly¹⁹. The same applies to Chauffeur-Privé, LeCab, Uber or other car-and-driver services that provide job opportunities for many people. A report by French congressman Thomas Thévenoud estimates that this market could create 68,000 jobs if it developed as it has in New York or London²⁰.

The market opportunities that platforms generate also create jobs.

YoupiJob, a peer-to-peer service platform, observes that 20% of the 80,000 people offering services on it are otherwise unemployed²¹.

Revenue growth

Platforms rely on the partners in their ecosystem to derive revenues for themselves, but also generate revenues for those partners. If they did not, remaining in the ecosystem would make no sense and the partners would withdraw²². This aspect is fundamental for the partners, even in the collaborative economy.

In the field of mobile apps, Apple has paid app developers \$25 billion since 2008 (half of that in 2014 alone²³). In 2016, the worldwide market for mobile apps will amount to \$143 billion²⁴. In 2014, billings on Apple's platform, iOS, exceeded US box office revenues.

¹⁹ Report: "The European App Economy", Aug 2014 https://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/vision_mobile.pdf.

²⁰ <http://www.thomasthevenoud.fr/wp-content/uploads/2014/04/Rapport-Thomas-Thévenoud-24-04-20142.pdf>.

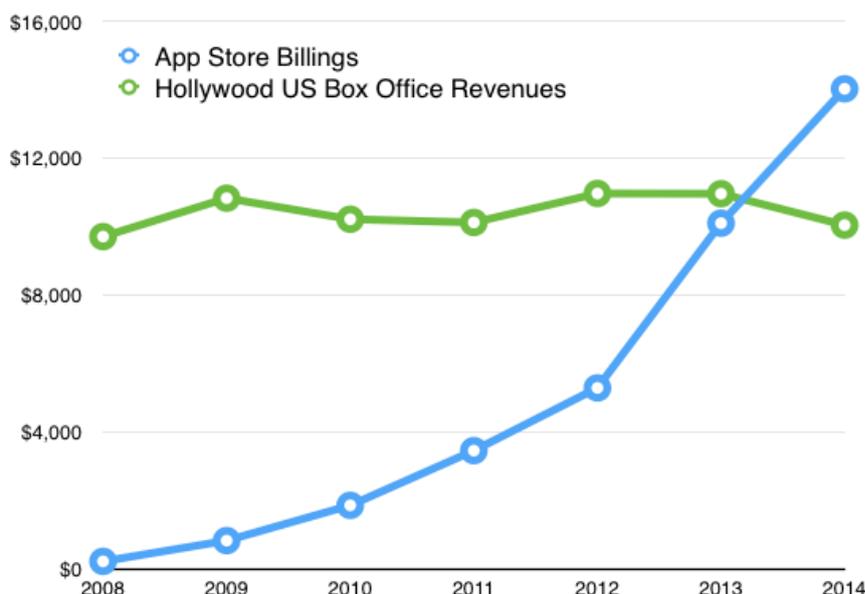
²¹ Source: "Les mille visages de l'économie du partage", article in Le Monde, 24/08/2015.

²² This is the case with certain artists (Jay Z, Taylor Swift for example); music platforms are sometimes unable to remunerate artists adequately due to contracts with record companies.

²³ Source: <http://theconversation.com/apples-record-earnings-show-app-economys-meteoric-growth-37014>.

²⁴ Report: "App Economy Forecasts 2013-2016", Developers Economy, <https://www.developereconomics.com/reports/app-economy-forecasts-2013-2016/>.

Fig. 7: App Store billings vs. US Box Office revenues²⁵



Moreover, the mobile app economy generated \$16.5 billion in Europe in 2014 up from \$13 billion in 2012²⁶.

In the case of collaborative platforms, a Crédoc survey²⁷ shows that, when purchasing power is dwindling, households use these platforms first and foremost to “save money and make money” (50% of respondents rank this reason in first place, 17% in second place).

This is also one of the essential drivers for a platform such as YoupiJob, which enables participants to supplement their incomes by providing a wide range of services for peers. Pipame (short for Pôle interministériel de prospective et d’anticipation des mutations économiques, a French inter-ministerial think-tank tasked with forecasting and anticipating economic shifts²⁸) estimates that income from the collaborative economy accounts for more than 50% of the income of 5.2% of France’s population. It also shows that 12% of 25- to 34-years olds derive more than 50% of their income from collaborative consumption²⁹.

If digital platforms create value for themselves, they contribute just as much to creating value for the partners that use the platform and its features.

New digital platforms, especially in the collaborative economy, are creating new opportunities to generate income.

²⁵ Source: <http://www.asymco.com/2015/01/22/bigger-than-hollywood/>.

²⁶ Report: “The European App Economy”, Aug 2014 https://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/vision_mobile.pdf.

²⁷ E. Daudey, S. Hoibian, (2014), “La société collaborative – mythe et réalité”, Cahier de recherche, Credoc, n°313, 65 p., Dec. <http://www.credoc.fr/pdf/Rech/C313.pdf>.

²⁸ DGE, (2015), Report: “Enjeux et perspectives de la consommation collaborative”, 336 p., Jul, <http://www.entreprises.gouv.fr/etudes-et-statistiques/enjeux-et-perspectives-la-consommation-collaborative>.

²⁹ Ibid, p.37.

Intermediate conclusion:

Ecosystem dynamics are a key component in the definition of platforms. Due to them, digital platforms generate an economy that benefits a multitude of partners and competitors, by providing new ways of reaching markets, and by creating jobs and new revenue streams.

Central companies play a pivotal role, building strong interrelations, which could also prove harmful if those companies abuse their dominant position. That is the issue that the last part of this paper discusses.

THE CONSEQUENCES OF NETWORKS EFFECTS IN MARKET ANALYSIS

The network effects at work and the rise in prominence of platforms have prompted a number of analysts to conclude that these markets result in monopolistic (winner-takes-all) configurations.

However, a closer look at the various markets suggests that the set-ups where network effects and platforms occur look more like **oligopolies with competitive fringes**, where a handful of players concentrate a vast portion of the market and many players compete for niches, or winners-take-the-most markets. Also, despite a widespread impression – the first-mover advantage – the companies that first venture into a market are rarely the ones that dominate it later on.

Platform markets are characterized by an oligopolistic structure where a handful of players concentrate a vast portion of the market.

Network effects and competition

It is important to point out that a company's ability to harness network effects hinges heavily on its ability to dissuade its customers from leaving its platform. It can do that by developing lock-in effects (see above), in particular through technical standards. Proprietary technical formats can be used to "internalize" network effects; open formats, conversely, help to disseminate network effects throughout the market.

It is therefore necessary to distinguish two situations when we analyze markets governed by network effects:

- Network effects spread across the market and fuel its overall momentum;

- One market player captures the network effects, to some extent, because it has made its product widely appealing and at the same time incompatible with its rival products' characteristics.

Two-sided network effects do not necessarily entail a monopoly. To the contrary, a monopoly is an exception, which occurs when:

- The cost (in monetary or psychological terms) of switching from one platform to another serves as a deterrent;
- Range segmentation by type of user, type of requirement or geography is unlikely to secure preference on the part of a portion of users. This is seldom the case. Broad-based platforms can of course use in-house segmentations and characterizations, and use search features, but some users will invariably prefer the affinity-based approach they find in specialist sites. This is fundamentally linked to the way an individual allocates preferences;
- The platform is not faced with competition from newcomers promising sufficiently superior value and/or technology to prompt users to migrate.

Three factors identify a platform that has established a monopoly: lock-in effects, range segmentation and the lack of competition.

Winner-takes-all or winners-take the most?

Various laws are presumed to prevail in markets where network effects or increasing adoption are at work. But the one that has made the deepest and longest mark is the winner-takes-all law, meaning a monopoly. According to this principle, network effect mechanisms play out in such a way that a single player takes over entirely or at best overwhelmingly (i.e. the winner takes most).

Theoretical models lead to this “aberration” because they are precisely that: theoretical. They consider network effects and exclude all other effects, be they different or contrary, and they factor no timeframes into the equation.

In the “real” world, where the ways in which digital technology is used are evolving very rapidly, and where Chinese players are slowly but surely rolling out strategies on the European market, network-effect markets only exceptionally arrange into a monopolies.

Most of the time, the configuration that prevails is an oligopoly with a competitive fringe (a handful of players concentrate a vast portion of the market and many players compete for niches). That is how competition works in many markets, in and beyond the digital realm.

In the French job-hunting market, the dominant platform, Pôle Emploi, reaches an audience that is six times larger than that of its first rival,

The monopoly law applied to the platform market overlooks realities and developments in the markets.

Indeed. In the real-estate ad market, Leboncoin and SeLoger combined attract a larger audience than all of their competitors together³⁰.

Fig. 8: Platforms and markets

Market	Core players	Competitive fringe
<u>Travel</u>	Voyages-sncf.com, Booking, Air France, Blablacar	Opodo, Kayak, Expedia, Voyage Privé, easyJet, AccorHotels, eDreams, LastMinute
<u>Dating</u>	Meetic, AdopteUnMec	Gleeden, Gauche-rencontre, Feujworld, Mektoube, Attractive World, Zoosk, Elite rencontre, eDarling, be2.fr, Casualdating, Tinder, easyflirt, Forcégay, Rencontre obèse, Marmite love, Celibest, theotokos
<u>Jobs</u>	Pole Emploi, Indeed, LeBoncoin, Apec, Cadremploi, Meteojob, Monster, Regionjobs, Keljob	Cadresonline, yupeek.com, geojobs, recrut.com, Jobweb, Jobaroundme.fr, jointree, lesjeudis.fr, careerbuilder, DogFinance, JobTransport, Metalemploi, jobenergies, clicandpower.fr, revue-banque.fr, emploi-assurance.com, leem.org, aeroemploifformation, akadeus.com
<u>Real Estate</u>	Leboncoin, Seloger	PAP, ParuVendu Immo, AVendreALouer, Explorimmo, Orpi, Century21, Vivastreet Immo, Meilleursagents, Foncia, Fnaim, entreparticuliers, Les Clés du Midi
<u>E-commerce</u>	Amazon, Cdiscount, Fnac, eBay, PriceMinister, La Redoute, vente-privée, E.Lecleerc, Darty, Leroy Merlin, Auchan, Rue du Commerce, Decathlon	138,000 online retailers 800 sites make 67% of the revenue 66.5% of e-commerce sites make under €30k in revenue 30% of e-commerce sites make €30k to €1m in revenue 3% of e-commerce sites make €1m to €10m in revenue 0.5% of e-commerce sites make over €10m in revenue (800 sites make 67% of revenue)
<u>Music</u>	iTunes, Spotify, Deezer (90%)	Google Play, Groove (formerly Xbox Music), YouTube, Amazon Music, Fnac Jukebox, Quobuz, Rdio, 7Digital, CD1D, Habbet, Jamendo, Starzik, Universalmusic, Zaoza, Adziik, Altermusique, Hitster, last.fm, etc.
<u>Photo</u>	Fotolia, Getty Images	Flickr, 500px (6M), EyeEm (10M), Instagram

³⁰ Source: A. Duthoit, Les effets de réseau exacerbent la concentration, <http://www.xerfi-precepta-strategiques-tv.com/>.

Five of the reasons that explain the situation in the previous table follow.

1. **Network effects are rarely the only effects shaping competition:** network effects are weak when the product or service in question encompasses a plethora of dimensions that users respond to. Conversely, network effects are powerful when they prevail over all the other factors weighing in on competition. In social media, for instance, network effects are “powerful” because the number of people we can potentially contact is the main criterion that determines choice, and it easily outweighs all the others (interface user-friendliness, services, data privacy). On the other hand, indirect network effects play a more ancillary role in the smartphone market: the fact that iPhone users have a wider choice of apps is one among other factors that determine their choices, including more compelling ones such as price, battery life and even looks;
2. **However powerful, network effects dissipate beyond a critical number of users** and become secondary to other variables influencing choices. A winner-takes-all configuration in a market governed by network effects implicitly assumes that every additional user is a plus, regardless of that user’s identity or his or her position in the queue. According to this line of thought, a dating site’s 100,000th member is supposed to add value to the network in the eyes of all its other members and potential members. It is more reasonable, generally speaking, to suppose that network effects dissolve beyond a given critical mass, and to postulate that several services harnessing network effects can therefore coexist provided they achieve critical mass;
3. **In the “real” world, the information asymmetry between consumers and producers of goods or services means that a less efficient platform may not be seen as such by users.** A job seeker has no way of knowing, beforehand, which site will have the widest choice of new vacancies matching his profile. He can find out how many vacancies are currently available on each portal but knows that these figures warrant caution. An average job seeker will therefore use several platforms concurrently, even though it would be more profitable to use only one. From the recruiter’s standpoint, as several job sites attract sizeable audiences, the only way to reasonably ensure vacancies reach a large enough candidate pool is to use several channels. This multi-homing on both sides explains why several fairly large sites – such as Cadremploi, Apec and Monster in the case of online job-hunting – tend to coexist;
4. **In many markets, it is more common to see several players who have achieved critical mass coexist in a form of permanent equilibrium than to see monopolies.** Unless they make a serious mistake, they

Five factors challenge the economic theories on network effects and explain why oligopolies outnumber monopolies.

all have a very good chance of holding their own on the market. Their overriding concern is that their user numbers should not dwindle because, if they do, the drain to another platform could gather momentum and wipe them out. If we use an open-ended timeframe, as theorists do, the only way equilibrium will materialize is with a monopoly (at least at the core), because it is not a question of *whether* that minor disruption, that barely perceptible glitch, will confine one of the forces at play to oblivion: the question is *when* it will. In the real world, where companies rarely plan more than 5 years ahead, the chances of this occurring are scant. A company that wants to take over the core of the market and stand alone in it would certainly gain more from gradually buying up its rivals – as far as competition authorities permit – than by waiting until network effects polarize and eject their rivals;

5. **All the oligopolies we can see in the market core³¹ have a competitive fringe populated by numerous small players catering to niches.** It makes sense to debunk the illusion that broad-based sites will one day perfect search functions and browsing experiences to a point where they can quash niche players (which is what the winner-takes-all wording suggests). Broad-based sites naturally try to draw in niches but have trouble prevailing in them for the following reasons:
 - A considerable portion of users prefer specialist sites because they address their requirements more knowledgeably (or at least appear to do so);
 - Broad-based sites may sell highly specialized products and services but have trouble telling customers they do or retrieving them in search results. The more breadth and depth of choice a website offers, the more complex and tedious the website is to browse, and complexity and tedium put off users;
 - Niche players are typically keener to conquer and prouder to uphold their wares than broad-based players, because the latter only generate a fraction of their business in those markets. It is a question of resource allocation: resources may seem disproportionate at first, but it is a fact that specialists ultimately invest more financial, technical and human resources than broad-based specialists.

³¹ The “core”, here, refers to the market segment that accounts for the largest portion of revenue or audience.

Is competition impossible on network-effect markets?

Powerful network effects are a fearsome weapon in a competitive situation. Confronting Facebook, Google, Booking, Kayak, Meetic, Cadremploi, Leboncoin or Seloger is not easy.

That said, the dominant players in a network-effect market are not unassailable. A newcomer bringing the promise of attractive and original value can destabilize the market. It will indeed take time and heavy investment but observation in a number of markets shows that it occurs. In France, for example, eBay lost ground to Leboncoin, a local site for peer-to-peer sales. The number of Google searches between 2004 and 2015 shows this.

Fig. 9: Google searches for “eBay” and “Leboncoin”

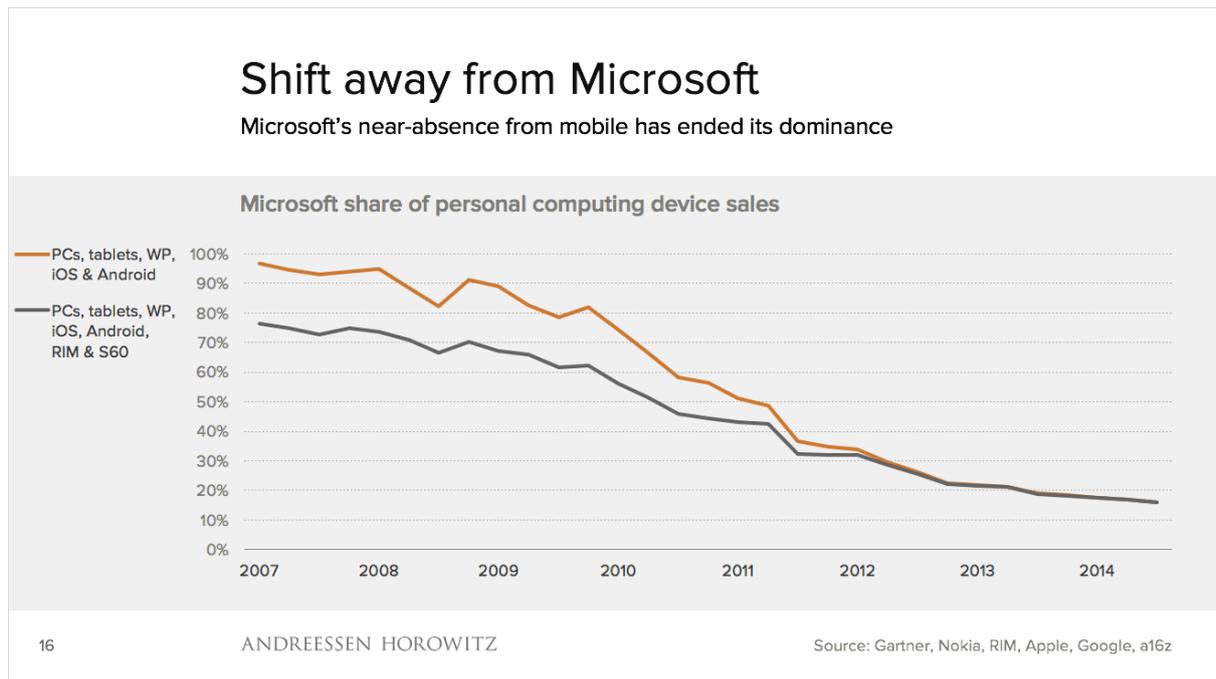


*Terme de recherche:
Search keyword
Évolution de
l'intérêt pour cette
recherche: Interest
in this search
Novembre 2004:
November 2004
Moyennes:
Averages*

The ultra-dominant position that Microsoft and Intel (“Wintel”) had built on the PC and IT market was undercut by Apple and Google, and by ARM-based chips in mobiles and tablets. It was not European antitrust proceedings that ended Microsoft’s reign over the world of Internet browsers, but the shift to mobile and the relative shift away from PCs, which Microsoft did not properly grasp.

*Network effects
step up
competition
between players
and make the
emergence of
dominant players
in future markets
unpredictable.*

Fig. 10: PC, tablet and mobile sales, Microsoft



A company such as Nokia, which ruled unchallenged over the worldwide mobile telephony market in pre-Internet days (its share in the worldwide market exceeded 40%), was swept aside by Apple and Samsung in only a few years. In 2007, Nokia had a 50% share in the smartphone market³². In 2012, it had less than 10%. Studies show that the fact that its executives clung unbendingly to their technology and strategy precipitated the Nokia/Symbian ecosystem's nosedive in the mobile telephony market. Stephen Elop, its new CEO, discussed this point in depth in a memo he wrote in 2011³³.

Observation in many other markets over long periods of time shows that **no company lastingly dominates its market.**

Competition ensures that there is place on the market for innovative technology or uses. The threats for dominant players on markets governed by network effects most often materialize in the sidelines, where innovative startups transform and shift uses, companies embrace innovative business models and, often, the dominant companies take no notice.

³² IDC, Nokia, Gartner

³³ See "We too are standing on a burning platform", <http://www.engadget.com/2011/02/08/nokia-ceo-stephen-elop-rallies-troops-in-brutally-honest-burnin/> See also V. Fautro, G. Gueguen: "Quand la domination du leader contribue au déclin. Analyse de l'écosystème d'affaires Symbian et rôle de Nokia", *Revue Française de Gestion*, Vol. 32, n°222, pp. 107-121.

Does the first mover stay in the lead?

Literature about network effects has spread the idea that only the pioneer (or a handful of pioneers) can trigger and later benefit from network effects. The “first-mover advantage” is questionable because the trailblazer can also run into several disadvantages:

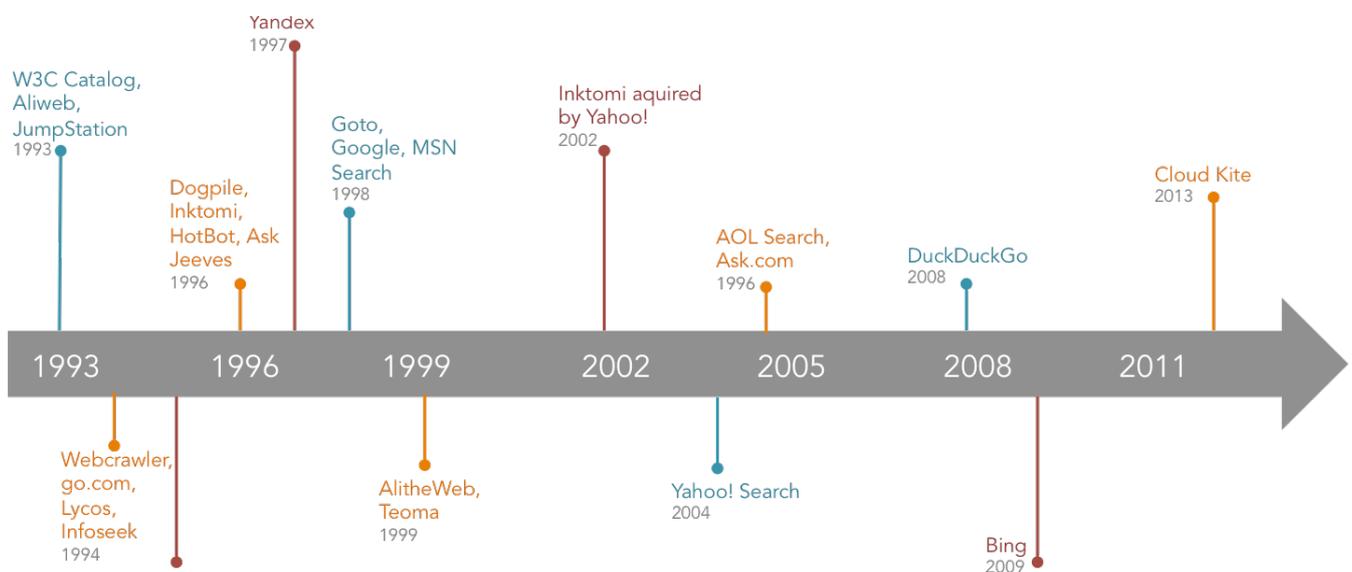
- It has to invest heavily in evangelizing the market, and the companies following in its steps reap the benefits;
- Imitating costs less than innovating;
- Latecomers learn from the pioneers’ trying and erring to fine-tune their products or services to market’s requirements. After an observation period, these latecomers may be in a position to tender a more appealing option, which may in due course move into the lead;
- A sharp disruption in the technological environment or in demand penalizes the players already in the market, especially if the costs they need to incur to adapt their products or services are high;
- Dominant players are often “trapped” in production routines, know-how routines and preconceptions about market expectations, which render them less flexible and less responsive to change. The fear of cannibalizing an existing product also hampers innovation.

Several digital markets show that first movers have no real advantages:

- The search-engine market: Google, the player that currently dominates the market (at least in the West) was not the first one to venture into it, as the timeline below shows.

The search-engine and social-media markets show that the first-mover-advantage theory is flawed.

Fig. 11: Search-engine timeline



- The social-media market also illustrates this phenomenon: the earliest social networks only very rarely stood the test of time. Networks such as Friendster, Myspace and Skyblog are closer to becoming web memorabilia than active players on today's market, owing to the change in uses that each new platform entering the market introduced.

Fig. 12: Social-media market timeline



Strategically speaking, pioneering entails no benefits by itself: companies need to be in a position to leverage their advantage by triggering network effects early on, and steer clear of any mistakes that would give followers a chance to outwit them. Also, claims that the positions that platforms have built are impregnable are untrue.

Intermediate conclusion:

Network effects and the development of platforms into ecosystems suggested – in theory – that the market was heading towards a monopolistic configuration. But the reality on the market, and the history of the Internet and of its platforms, show that market structures are closer to oligopolies with competitive fringes.

CONCLUSIONS

Markets governed by network effects necessarily concentrate revenue. This does not mean, in any way whatsoever, that the competitive landscape is gravitating towards a monopoly: most of the time, competition on network-effect markets takes the form of an oligopoly with a competitive fringe. This market configuration is prevalent in a variety of markets ranging from food distribution to book publishing.

Analyzing competition necessarily involves measuring the “intensity” of network effects, meaning their bearing on the competitive landscape. Network effects are “powerful” or “structuring” when they prevail over all the other factors that regulate competition. The more value-creating dimensions a product or service has, the weaker its network effects and the less structurally meaningful they are.

A player that has taken the lead in a network-effect market has a very good chance of increasing its lead because what it sells starts becoming increasingly desirable with every new user it enlists. However, solid though its position may become, it has no long-term guarantees: a mistake can cause its network effects to crumble and its audience to shrivel.

The costs of migrating to an alternative are generally trending downward as a result of recent developments in technology, which are gravitating towards interoperability. The main threat for players dominating network-effect markets comes from emerging innovators that disrupt and update uses.

In digital endeavors, network effects are often merely one factor contributing to the accrued momentum, and intertwine with other effects such as:

- Economies of scale;
- Reputation effects: the larger a site’s audience, the more it attracts free-of-charge exposure in the media;
- Experience and a lead on the learning curve, resulting in savvier business management;
- Learning effects relating to uses.

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About Renaissance Numérique

Renaissance Numérique was born from a strong conviction shared by its founders, that there is a need to anticipate the digital transformation of society to ensure that it does not induce new fractures. Ten years later, the think tank continues its mission of supporting the digital transition of public action and its goal of an inclusive, fair and growth-oriented digital society. It currently has about fifty members (entrepreneurs, major Internet companies, researchers and academics, representatives of civil society).

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