

Platforms: Bigger, Faster, Stronger

Summary and conclusions

- Platforms have rapidly become an important part of the global economy. Currently, five of the world's 10 largest listed companies by market cap are platform companies. In the period 2014 to 2016, the revenue of the five largest platform companies in the US grew more than three times faster than US GDP. Several elements help explain their rise: positive network effects, digital technology, high levels of customer engagement and the development of complementarity of goods and services.
- Platforms' ability to curate relevant information from data and to stimulate users to generate new content and data is key to understanding why they succeed in personalising and enriching services. Platforms turn consumers into producers and turn both into value-creating partners. Platforms scale quickly and, as a result of all of that, provide lower cost structures for suppliers' offerings.
- These benefits in terms of value created and advantageous price setting suggest that the "platformisation" of the economy will continue. At the same time, we also think that the traditional pipeline business model will continue to exist. Pipeline companies are less complex and provide owners with more control, and several parts of the economy are not ripe for platformisation. Moreover, pipeline and platform business models can co-exist within companies.
- Still, the "underlying economics" favour further "platformisation". We expect to see more and more pipeline companies adopt a platform strategy. This is likely in the parts of their businesses where value creation can better be achieved by leveraging data and interactions with and between customers, rather than by optimisation of the traditional value chain. We would expect more platform giants to emerge, notably in the area of the Internet of Things.
- Some sectors may only be partly suited to platformisation. Parts of the financial services sector, such as lending and retail payments, are suitable for platformisation, even though specific factors such as strong regulation complicate this.
- Blockchain raises questions for pipeline companies as well as platforms, and for non-financial as well as financial companies. Blockchain technology can potentially be a sound basis for future platforms, through removing complicated intermediary steps.

Lei Pan

Senior Economist
Amsterdam +31 (0) 620967147
lei.pan2@ing.nl

Stefan van Woelderren

Principal Economist
Amsterdam +31 (0) 630182119
stefan.van.woelderren@ing.com

Introduction

The growth of tech giants such as Google and Amazon has been impressive. Companies such as Uber and Airbnb grew from zero to dominance in only a few years. They all have characteristics in common that make them so called “platform ecosystems” or “platforms” with the core function of facilitating interactions between suppliers and consumers.

What explains the rapid rise of some of these platforms? Will the business and consumer worlds be dominated by just a few platform giants and will all non-platform businesses be squeezed out eventually?

In this report, we will first introduce key terminologies related to platforms. We will then provide evidence on the growth of platforms and explain the driving factors. This will be followed by a discussion of the factors that lead platforms to dominance. In the last parts of the report, we will discuss the future of platforms, in particular, whether the traditional pipeline business model will be squeezed out.

What is a platform?

Platforms have been around for millennia. They are essentially businesses that bring supply and demand sides together. For example, a local market, where buyers meet suppliers and come to interactions that add value to both, is a platform¹.

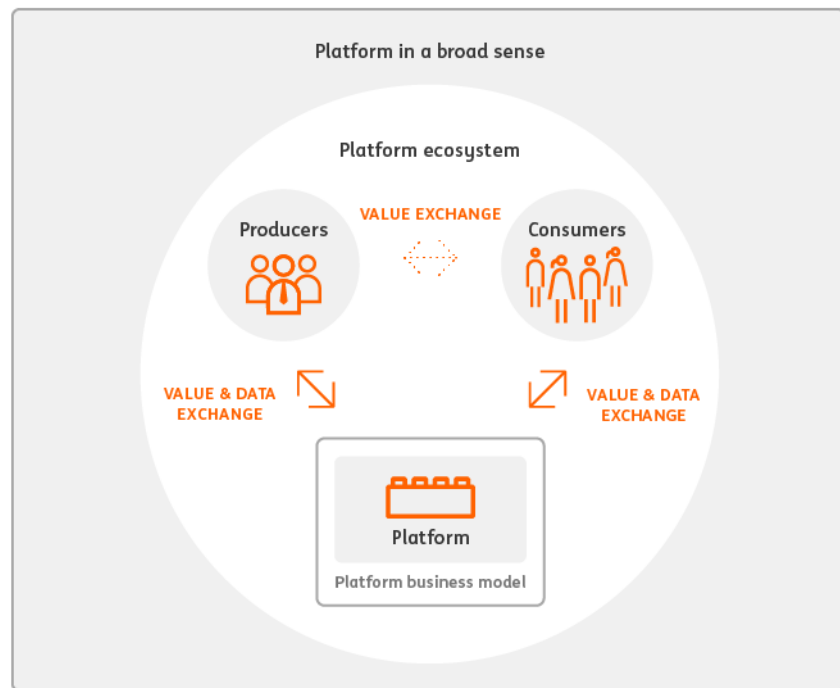
The addition of a data layer to platforms has been a game changer and helps to explain the current dominance of platforms

What has been a game changer in the recent decade is that technology has turned non-digital platforms into digital ones. More importantly, a data layer has been added to platforms and is crucial for value creation and for scaling up platforms. It is one of the essential reasons why platforms have become a dominant force in the economy. The algorithms used can help remove frictions and enable the digital platforms to create value for all parties involved. Data can, for example, be used to match different participants from various sides of the platform. For example, Facebook feeds users with content based on users’ “Likes”.

The word “platform” in the strict sense refers to the underlying technical infrastructure. However, in practice “platform” often refers to the combination of technical infrastructure, the platform company itself, the business models and ecosystem. In this report **we refer to this broader sense when using the word “platform”**.

¹ Nevertheless, the distinct economics/economic mechanisms behind them have only gradually been better understood since the year 2000.

Fig 1 A platform and its ecosystem



Source: The figure was inspired by Van Alstyne, Parker and Choudary (2016).²

A platform is a set of technology building blocks that serve as the foundation for building complementary products and services and for facilitating the interactions between two or more groups (producers and consumers).³

A platform business model is one that connects two or more user groups and facilitates efficient creation and exchange of value between these groups, mediated by software at scale.⁴

A platform ecosystem is the totality of networks of individuals, businesses, institutions, and other complementary factors that affect the value, positively or negatively, that a platform can generate for the participants of the platform.⁵

Platform in the broader sense often refers to not only the technical infrastructure, but also to the platform company itself and business models around the infrastructure, as well as the networks and ecosystem connected by business models. The use of the word “platform” like this is in line with common practice.

Network effects that are generated through interactions between different sides of a platform are a defining characteristic of a platform

Platforms and their ecosystems have a few characteristics:

- Platforms revolve around interactions between participants in order to generate network effects (see box) through the ecosystem. As a result, successful platforms may come to dominate the markets that they operate in. Recognising the importance of achieving scale, investors have often been prepared to tolerate losses

² Van Alstyne M.W., G. G. Parker, and S. P. Choudary. 2016. “Pipelines, Platforms, and the New Rules of Strategy.” *Harvard Business Review*, April 2016 issue. Available at <https://hbr.org/2016/04/pipelines-platforms-and-the-new-rules-of-strategy>.

³ The definition is adopted from Muegge. S. 2013. “Platforms, communities, and business ecosystems: Lessons learned about technology entrepreneurship in an interconnected world.” *Technology Innovation Management Review*, 3(2): 5-15. <http://timreview.ca/article/655>

⁴ The definition is adopted from Parker, Geoffrey G., Marshall W. Van Alstyne, and Sangeet Paul Choudary. 2016. *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. W. W. Norton & Company.

⁵ The definition is adopted from Evans, D. S. and R. Schmalensee. 2016. *Matchmakers: The new economics of multisided platforms*. Harvard Business School Publishing.

in the early stages of growth. In contrast, a **pipeline company** follows a traditional type of value chain from production and distribution to the consumer. A pipeline company may also have two or more user groups, but there are limited interactions among these groups. Therefore, the scope of network effects is limited.

Network effects refer to the impact that the number of users of a platform has on the value created for each user. Successful platforms can grow virally and achieve positive network effects if additional users add further value for other users.⁶ See the “Enablers are network effects, technology levers, high levels of engagement and complementarity” section later in this report.

- Platforms are multi-sided, with two or more kinds of participants for the platform. Uber connects drivers to riders. YouTube is a three-sided platform with uploaders as well as viewers of videos, and advertisers. Unlike traditional pipeline businesses, the multiple sides of platforms are interdependent. Platforms may subsidise one side of users with free products and services in the interests of attracting other paying groups of users to other sides of the platform.
- Curation is an essential element for platforms to maintain quality and avoid negative network effects. Rules and governance are crucial for the health of platform ecosystems.
- Most platforms allow reconfiguration and innovation by, for example, leaving room for suppliers to innovate their offerings.

Platforms' growth to dominance

In 2007, the largest firms in the world by market capitalisation were energy companies and banks. It took these companies decades to grow big. Back then, Microsoft was the only platform company in the top 10. By 2017, platform companies Apple, Alphabet (Google), Amazon and Facebook had completely changed the landscape (Figure 2). We also found that of companies in the S&P 500 – a leading index of US equities – about 5% are platform companies as of 2017, up from 3% in 2013 and 1% in 2001⁷.

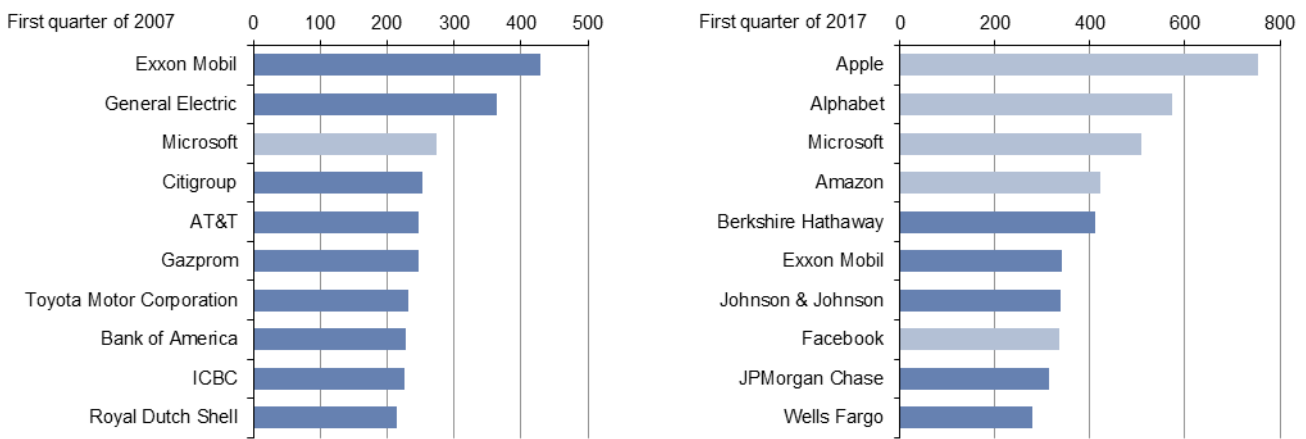
Platforms may take many years to reach profitability, partly because they typically invest a sizeable share of their revenues in their further expansion – probably more than pipeline companies do. Later in this report the importance of investing in network effects in a platform's strategy will be described.

Platforms are growing fast and changing the global business landscape...

⁶ See footnote 4.

⁷ Source: <http://www.alleywatch.com/2015/07/5-reasons-entrepreneurs-should-take-advantage-of-the-platform-business-model/>

Fig 2 World's largest listed companies by market capitalisation in 2007 and 2017, in US\$bn

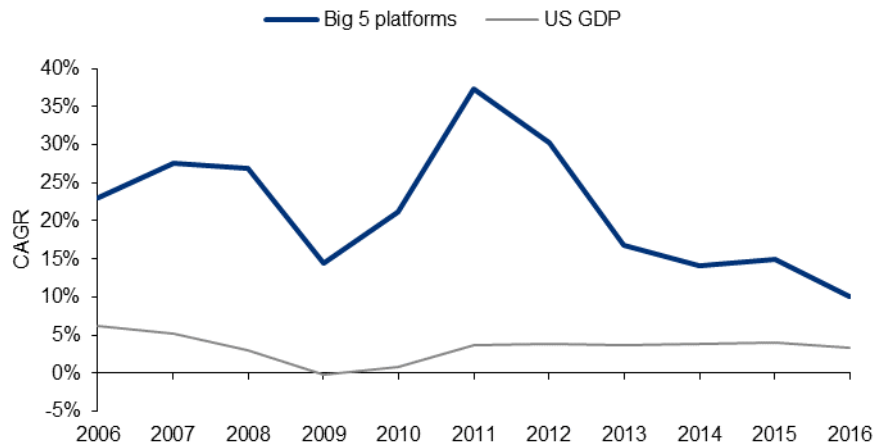


Source: FT Global 500.⁸ This figure was inspired by <http://www.economist.com/news/special-report/21707048-small-group-giant-companiessome-old-some-neware-once-again-dominating-global>.

...This is reflected by platforms' high growth rate in market cap and revenue,...

Zooming in on the biggest five platforms in the world (Apple, Google, Amazon, Microsoft and Facebook), their annualised revenue growth was 37% in the period from 2009 to 2011. In the same period, US nominal GDP only grew at 4% annually. From 2014 to 2016, these numbers were 10% and 3%. In 2005, the combined share of Apple, Alphabet (Google), Microsoft, and Amazon in total US market capitalisation was only 3%. In 2016, these four plus Facebook made up close to 9% of the US total market cap of USD 27.3 trillion⁹.

Fig 3 CAGR of the revenue of big five platform companies and CAGR of US' nominal GDP



Source: Bloomberg, the Bureau of Economic Analysis of the US and ING calculation. CAGR uses a **three-year period**, i.e., CAGR for 2016 is the annual growth rate from 2014 to 2016. Big 5 platform companies include Microsoft, Apple, Alphabet, Amazon and Facebook. Facebook data are only available from 2010 to 2016.

...and also by the growth of consumer uptake

The growth to dominance of these tech giants in terms of users has been rapid. YouTube (owned by Google) had 1.3 billion unique users in early 2017¹⁰, which resulted from an average compound annual growth rate (CAGR) of 34% over the 11 year period since Google's acquisition of YouTube in 2006¹¹. Very high levels of user growth were also

⁸ Data for 2017 are available at https://markets.ft.com/data/dataarchive/ajax/fetchreport?reportCode=GMKT&documentKey=688_GMKT_170401 with Alphabet and Berkshire Hathaway's numbers updated with YCharts data, and data for 2007 are available at <http://im.ft-static.com/content/images/4608ca30-e788-11db-8098-000b5df10621.pdf>.

⁹ Company market cap data are from Bloomberg and the US total market cap data are from the World Bank <http://data.worldbank.org/indicator/CM.MKT.LCAP.CD>

¹⁰ <https://fortunelords.com/youtube-statistics/>

¹¹ The 2006 figure is from <http://www.nytimes.com/2006/10/09/business/09cnd-deal.html>

The growth of platforms is particularly high in the US and China

recorded by Android (owned by Google) and iOS (Apple). In 2016, 1.27 billion smartphones which had an Android operating system were sold worldwide, as well as 0.22 billion which had iOS. The corresponding numbers in 2009 were only 6.8 million for Android and 24.9 million for iOS¹². This means they have recorded average CAGRs of 111% and 37% over a period of 7 years.

There are also examples outside the US, particularly in China, of large platforms which have shown particularly high growth, some with local or regional reach only and some with potential to reach a global community. One of the most impressive examples is WeChat (owned by Tencent), the number of monthly active users of which increased from 50 million in the last quarter of 2011 to 889 million in the last quarter of 2016, at a CAGR of 77%.¹³ Another example is Chinese platform giant Alibaba. Their number of active customers had reached 454 million by March 2017, close to three and a half times as much as in 2012.¹⁴ However, Europe seem to be behind in the platform revolution, with a combined market cap size of platform firms being less than a quarter of the market cap of those in North America.¹⁵

Enablers are network effects, technology levers, high levels of engagement and complementarity

Network effects

High growth rates of platform companies are enabled by strong network effects, ...

The network effects from interactions within the platforms' ecosystems are key to their rapid growth. For a platform, a critical mass of producers and consumers needs to be reached for network effects to kick in and to create value for each side.

No one will come to YouTube if there is no video to watch and no one will upload their videos if there are no viewers. Once a critical mass of videos is uploaded, more viewers will come to the platform, and then more videos will be uploaded in order to reach viewers. That attracts more viewers (and advertisers), and YouTube enters a virtuous cycle of positive network effects. Besides attracting uploaders and advertisers ("cross-side network effects"), viewers can also attract other viewers ("same-side network effects"). These feedback cycles have enabled YouTube to scale up very quickly and to generate growth at minimal cost.

Curation that matches customers to the right suppliers and relevant and quality content is crucial in creating positive network effects. When viewers receive unpleasant advertisements on YouTube or when waiting time or driver downtime is too long on Uber, suppliers and/or consumers may leave the platform, generating negative network effects.

Technological developments enable better access to resources and low marginal costs

... no need for ownership or control of assets, low marginal costs in connectivity, search, production and distribution,...

The development of digital and mobile technology has enabled platforms to grow exponentially in the past two decades¹⁶. The essential driver behind fast growth is the

¹² <https://www.statista.com/statistics/263445/global-smartphone-sales-by-operating-system-since-2009/>

¹³ <https://www.statista.com/statistics/255778/number-of-active-wechat-messenger-accounts/>

¹⁴ <https://www.statista.com/statistics/226927/alibaba-cumulative-active-online-buyers-taobao-tmall/>

¹⁵ Evans, P. and A. Gawer, "The rise of the platform enterprise: A global survey." The Center for Global Enterprise. Available at http://www.thecge.net/wp-content/uploads/2016/01/PDF-WEB-Platform-Survey_01_12.pdf

¹⁶ This is what Evans and Schmalensee call "The Six Turbocharging Technologies": 1. More powerful computer chips (computer power), 2. The Internet (the infrastructure connecting devices), 3. The World Wide Web (enabling more content/data based services), 4. Broadband communications, 5. Programming Languages and Operating Systems, 6. The Cloud (servers that provide computational resources and data for people on their mobile and

fact that technology has made it possible for platforms to create value using resources they don't need to own or control. The nature of the supply and demand relationships changes in a platform. Uber does not own cars and Airbnb does not own rooms. A platform organises around a community of consumers, and can turn those into producers. This unlocks extra resources.

Additionally, digital technology facilitates (near) zero marginal cost in connectivity, search, production and distribution. The cost is close to zero for Airbnb to add an extra room to their list. No wonder one of Airbnb's co-founder Brian Chesky tweeted "Marriott wants to add 30,000 rooms this year. We will add that in the next 2 weeks".

Lower cost structures and consequently greater scope for the platform to invest in better and richer services favour the consumer. The "excess value" that is created is distributed between the platform, suppliers and consumers. And even if only part of that excess value were to be passed on to the consumer, the platform has a comparative advantage (for the consumer) over the pipeline company.

High levels of engagement

...high level of engagement of participants,...

Many of the big incumbent platform companies have proven that their users can be made value creating partners. Many users find it stimulating that their creativity is being tapped into through open application platform infrastructures or user generated content such as reviews. Many also find it useful to be able to offer the spare capacity that is hidden in their underutilised assets (e.g. homes).

One of the critically important elements for platforms to succeed, is to make sure that participants are and remain properly incentivised to use the platform to create and exchange resources, goods, services or "social currency" (and not to interact outside of the platform). In order to create such incentives, platforms use various strategies including subsidising one or more sets of users to attract other sets of users to the platform.

The interactions between participants are what network effects are all about; designing these interactions is key to a platform's potential future growth. More data (and the quality of the inferences from the data) is one way of increasing a platform's capability to create more value for customers. Customers also benefit from the networks around platforms. For example, on-line reviews help customers choose the right products. One can even take this a step further and say that (platform) companies should invest in the competences and capabilities of their customers¹⁷.

Complementarity

.. and complementarity of services and goods.

Moreover, the open model that platforms have – exemplified by the open application platform infrastructures of Google's Android and Apple's iOS – creates room to make use of complementarity of services and goods. Additional services (e.g. through apps) can increase the value of goods or services offered by a platform company (e.g. Apple's iPhone) and lead to a higher "consumer surplus"¹⁸.

fixed devices). See Evans, D.S. and R. Schmalensee. 2016. *Matchmakers: The new economics of multisided platforms*. Harvard Business School Publishing.

¹⁷ Schrage, Michael. 2012. Who do you want your customers to become? Harvard Business School Publishing, and Schrage, Michael. 2016. "Rethinking networks: Exploring strategies for making users more valuable." MIT Initiative on the Digital Economy Research Brief vol. 2016 (1).

¹⁸ See McAfee, Andrew and Erik Brynjolfsson. 2017 *Machine, platform, crowd: Harnessing our digital future*. W. W. Norton & Company.

Any room for competition?

Will the business and consumer worlds be dominated by just a few platform giants and will non-platform businesses all be squeezed out eventually? A few factors determine whether or not the outcome is a winner-take-all market¹⁹: strong network effects, high costs of switching or of using more than one platform (“multi-homing”), supply economies of scale, and strong ability to address niche specialisation.

A winner-take-all market is a market in which one or more specific factors encourage users to gravitate toward one platform and to abandon others.

Multi-homing means that users engage in similar types of interactions on more than one platform. **High multi-homing costs** indicate that users find it impractical or costly to switch to another platform.²⁰

To illustrate these points, Microsoft has had years of undisputed dominance on the operating system of personal computers, starting from the mid-1990s. The contributing factors have been:

- strong network effects: more users, more developers developing software for Windows, and consequently more users using Windows,
- high multi-homing or switching costs: switching to another operation system requires acquiring new software,
- supply economies of scale: serving one extra customer requires minimum effort from Microsoft, and
- lack of user taste for niche specialisation / ability to address niche specialisation: Microsoft has been able to address the competition that wanted to serve niches, for example, with Direct3D for three-dimensional graphics which was a niche at that time.

Several factors can lead to a winner-take-all market ...

... but there are also factors that lead to more competition in a world with more platforms

There are also factors that lead to more competition in a world with more platforms. First, the same enablers of rapid growth that were mentioned earlier - network effects, no need for ownership of assets, high customer engagement and complementarity - can also be used by the competitors of incumbent platforms for them to potentially grow very fast as well.

Second, the absence of some of the factors mentioned above, particularly low multi-homing costs, no or low supply economies of scale and the inability to address niche specialisation increase competition and therefore limit dominance.

An example of low multi-homing costs is that Uber faces competition from other platforms such as Lyft in the US and companies such as Didi Chuxing in China. Vacation rental is a competitive market too with names such as VacationRentals, FlipKey and Tujia in direct competition with Airbnb.

Third, network effects may change with technological developments. This means that technology may require adaptation from a platform, as a result of changing consumer needs and available offerings from competitors. Technology may affect the nature of network effects and the ways these can be monetised in an ever evolving ecosystem of relevant players, rules and other (economic) circumstances. Firms are required to adapt

¹⁹ Drawn from Parker, Geoffrey G., Marshall W. van Alstyne and Sangeet Paul Choudary. 2016. *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. W. W. Norton & Company.

²⁰ See footnote 4.

their strategies and tactics to generate network effects, reduce multi-homing, and to cope with niche specialisation.

Of course, apart from looking at competition within certain market segments and geographies, one has to take the entry of platforms into new ones into account. Building on their market power and benefiting from the complementarities as discussed earlier, many of the platform giants are constantly recalibrating the weights of their activities in the market segments and locations they operate in; and they also enter or define new ones.

A next wave of platform giants in the domain of the Internet of Things

What will be the next big thing in platforms? Enormous opportunities could well lie in the domain of **the Internet of Things (IoT)** with platforms connecting people as well as machines. Many companies including Amazon and Google have been moving into the production of smart home devices that aim to better connect people and machines, and improve the interactions between them.

Some of the pipeline companies that have traditionally been producers of machines, have adopted a platform strategy in the IoT area in recent years. For example, in 2015 the incumbent pipeline company GE launched its Predix platform for the Industrial Internet, with the ambition to build on machine-to-machine connections. **We would expect 2-3 new global platform giants emerging in the IoT in the next 5-10 years.**

We expect 2-3 platform giants emerging in the domain of IoT in the next 5-10 years.

Will we only have platform companies in the future?

Notwithstanding the ongoing platformisation of the economy, we do *not* think that the days of the typical pipeline business model are numbered. Several factors will help to preserve the continued existence of pipeline companies in many sectors of the economy: the control and simplicity advantages of pipeline companies, low acceptance of failure in certain sectors, supply economies of scale in existing pipeline value chains for certain physical business, and the possibilities for co-existence of pipeline and platform business models.

There will still be room for pipeline companies and for the pipeline business models. Several factors explain that: ...

... Designing and managing the processes can be quite complicated for a platform owner. Pipeline companies are in general easier to operate....

The first factors are complexity & control. Setting up or operating a platform business model usually requires many more considerations than a pipeline business model. For a platform an even more outward-looking perspective has to be adopted to design and orchestrate the desired network effects and to monetise those. Although pipeline companies lack the ability to capture the benefits of network effects in the way platforms can, they generally do have more control with fewer moving parts.

... Difficulty in digitisation and commoditisation ...

The second factor is the difficulty in digitisation and commoditisation. Some pipeline value chains are not always suitable for a platform business model. Asset-heavy or resource intensive businesses such as food processing or airplane production are difficult to digitalise. Therefore, network effects may be difficult to create or are not sizable in these businesses.

... And low acceptance of failure from unsuccessful interactions

The third factor is low acceptance by consumers or regulators of failure resulting from unsuccessful interactions. One example is that in parts of the healthcare sector consumers or regulators may for the foreseeable future favour one-on-one relationships outside of a platform between supplier (doctor) and consumer (patient). Another example is the financial sector. On the other hand, some banking services are well suited for platformisation. These include lending, where a banking platform could

We expect there will be a mix of platform and pipeline business models co-existing within what are currently pipeline companies

accommodate other (bank and non-bank) lenders. Retail payment services has been a platform market of sorts for years, and looks set to evolve further in the near future. On the one hand, there are specific characteristics such as the need to provide near 100% reliability and stability, and strong regulation, which complicate platformisation.

We expect that more and more pipeline companies will open up parts of their business that use data and information to create value to be platforms in order to benefit from the potential network effects that stimulate growth. The choice for a platform or a pipeline business model is not always straightforward. There is nothing that stops a company being both a pipeline and a platform at the same time. For example, Apple still has the design and assembly of the iPhone operating under a pipeline model, while having the iOS platform that links app users to developers.

Blockchain, a distributed ledger technology, raises questions for pipeline companies as well as platforms, and non-financial as well as financial companies. Platforms nowadays are driven by IT structures, and here a lot is happening. Blockchain technology may provide a sound basis for platforms in the future. Its decentralised nature means that platforms could sustain themselves without an administrator. Smart contracts based on the blockchain could remove the need for intermediated steps in complex transactions, thus reducing their time and cost. What technological possibilities for disintermediation will mean for platformisation in financial and non-financial sectors is still too early to predict.

Conclusion

With their rapid growth, platforms are profoundly changing the global business landscape. We expect “platformisation” to continue given platforms’ strong benefit in value creation for suppliers and consumers. We also expect to see more and more pipeline companies adopt a platform strategy, and pipeline and platform business models to co-exist in many companies.

Suggested readings

Parts of this report are drawn from the following references and we recommend readers who are interested in this topic to consult these sources:

Evans, David S., and Richard Schmalensee. 2016. *Matchmakers: The new economics of multisided platforms*. Harvard Business School Publishing.

McAfee, Andrew, Erik Brynjolfsson. 2017 *Machine, platform, crowd: Harnessing our digital future*. W. W. Norton & Company.

Parker, Geoffrey G., Marshall W. van Alstyne, and Sangeet Paul Choudary. 2016. *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. W. W. Norton & Company.

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