

The Role of Platforms for the Digitalisation of European Industry

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Executive Summary

The European Commission will establish “Leadership in Digital Platforms for Industry” as an important pillar of its forthcoming digitalisation strategy for Europe. With this paper, we would like to present our views and recommendations for three types of platforms: “Commercial digital platforms” (1), “non-commercial digital platforms” (2), and “stakeholder platforms” (3).

(1) “**Commercial digital platforms**” generate income by allowing different stakeholder groups to interact via the internet and exchange or trade ideas, data, or services (e.g. Facebook, Amazon). They are the backbone of digital business-to-consumer (B2C) markets, and are starting to emerge in business-to-business (B2B) markets as well. So far, Europe has largely failed to create successful B2C platforms. However, European companies are still well positioned to drive the creation of B2B platforms in those domains where they can leverage their market and domain know-how, e.g. manufacturing, automotive.

Platforms benefit from the network effect, and tend to lead to oligopolistic or monopolistic market structures. For B2C platforms there is a case for regulating platforms in order to protect individual consumers’ rights (e.g. data privacy) from abuse by powerful platform operators. For B2B platforms, the need for regulations is much less urgent, because platform users will have more market power relative to platform operators (unless faced with a true monopoly), and will be more conscious of the value of their data.

For European policy makers concerned about the digitalization of the European economy, fostering the creation and growth of commercial digital platforms in Europe should have high priority. Policy makers can help by creating adequate conditions, mainly through:

- Finalizing the Digital Single Market with harmonized rules for the digital economy in order to allow digital platforms to scale to European dimensions

- Refraining from ex ante regulating commercial platforms with new regulation where existing regulation is sufficient.
- Refraining from directly intervening and sponsoring the creation of specific commercial digital platforms
- Ensuring further investments in a high-performance IT infrastructure in 5G focused on vertical industries (bandwidth, latencies, and semantics).
- Fostering a more active European venture capital industry and improving framework conditions (taxation and regulation) in order to support the foundation of platform-based start-up companies

(2) Compared to commercial platforms, “**Non-commercial digital platforms**” have the same objectives, but operate on a not-for-profit basis, e.g. Wikipedia or Linux. Successful non-commercial platforms usually result from grassroots movements and were created without significant government support.

It is tempting for policy makers to focus their support on non-commercial platforms on the assumption that non-commercial platforms offer all the economic benefits of digital platforms without the risk of abuse by oligo/monopolistic platform operators. However, policy makers would be ill advised to pursue this route, which neglects the power of a free market and is entirely untested. Non-commercial B2B platforms are particularly hard to conceive. Governments should drive the creation of non-commercial platforms only if the following conditions are fulfilled:

- There are clear indications of a market failure, i.e. there is no credible perspective that the desired outcome can be achieved by companies competing in the market.
- The proposed platform does not compete against commercial platforms.
- There is broad consensus among a significant number of stakeholders concerning the business and societal value of the proposed platform.
- There is a clearly defined owner, who is able and committed to operating, maintaining and funding the operation of the platform once it is developed.

(3) “**Stakeholder platforms**” unite groups of stakeholders to collaborate in a pre-competitive context on different aspects of the digitisation of Europe (e.g. AIOTI or Industrie 4.0), including aspects such as standardisation or the alignment on an industry research roadmap. In the public debate, stakeholder platforms are often referred to as “digital platforms” because of the nature of the topics discussed within the platform. However, stakeholder platforms are clearly non-digital in their ways of working. They can be very beneficial, but if there are too many of them, they become a nuisance. The following guidance should be considered with respect to stakeholder platforms:

- Stakeholder platforms should limit their scope to the pre-competitive domain.
- Prior to initiating a new stakeholder platform, the option of extending, strengthening, and aligning existing platforms should be considered.
- European policy makers should carefully avoid the duplication of efforts made by national platforms such as Industrie 4.0. For aspects of digitalisation that require a European approach the collaboration of the different stakeholders should be facilitated
- European policy makers should refrain from founding new platforms for addressing European innovation policy issues, but instead strengthen established organisations such as the European Institute of Technology.
- Standardisation should be driven through established standardisation bodies.
- Stakeholder platforms should be governed by the participating stakeholders, with stable rules of engagement defined in consensus. Political interference should be avoided.

Introduction

In the forthcoming digitalisation strategy for Europe, the European Commission will establish “Leadership in Digital Platforms for Industry” as an important pillar of the overall strategy, with the objective “to ensure the availability of state-of-the-art open and interoperable platforms which any business can use to make its products, processes and services ready for the digital age” (Digitising European Industry, June 2015, p. 3)

This paper will follow the assumption that home-grown platforms are an important element of the digitization of the European economy. This assumption can and should be debated, if only to correctly trace the line between sensible economic policy and undue economic nationalism. However, such a debate is beyond the scope of this paper.

This position paper addresses mainly policy makers at both national and European level. It attempts to provide an industry perspective on the nature of digital platforms, as well as on steps that policy makers need to consider in order to foster the development of such platforms in Europe.

The topic of platforms will be addressed in two steps: Firstly, the concept of a “platform” will be examined in detail in order to clarify their role and their economic impact (Sect. 1, 2, 3). Secondly, the Siemens view and recommendations on three different types of platforms will be proposed, addressing different stakeholders in Europe (Sect. 4, 5, 6).

1. What is a “platform”?

The most general definition of a platform would be a place where different stakeholder groups meet under clearly defined rules of engagement, in order to exchange or trade ideas, goods, services, and whatever else can be exchanged between human beings or, for that matter, computers, machines or devices acting on behalf of human beings. Historically, cities or trade fairs provided a platform where merchants would meet and trade goods with other merchants or consumers. Likewise, a modern airport can be considered as a platform where airlines meet passengers.

Platforms usually benefit from the so-called network effect, i.e. the more stakeholders are attracted to the platform, the more valuable the platform becomes for individual stakeholders. Large airports offer many different flight connections, making them attractive for passengers. Vice versa, the presence of many passengers at a given airport is a strong incentive for airlines to offer flights to and from this airport.

The term “platform” is often also used to describe a product or system “core” from which multiple product variants are derived. For instance, automotive

OEMs often derive different car models from the same platform. This concept of a “platform” is not addressed in this paper.

2. Which types of platforms are addressed by this paper?

This paper focuses on three types of platforms that are most frequently referred to in public debates about the digitalisation of the European industry and society:

- “**Commercial digital platforms**” are established and executed in cyberspace for commercial purposes (see also the following section on digital platforms). They are offered with the clear motivation to attract a critical mass of stakeholders and use a suitable revenue model to generate income from this, e.g. an entrance fee or a fee on transactions executed on the platform. Due to the aforementioned network effect, the owner or operator of a successful platform has a strong opportunity to generate considerable income from the platform. The more stakeholders are attracted to the platform, the more attractive is the platform for these stakeholders, and the stronger is their willingness to pay for using the platform. More importantly, once a successful platform is established, it becomes very difficult for competing platforms to win market share from the incumbent. Platform businesses are “winner-takes-all” businesses, and often lead to oligopolistic or monopolistic market structures.
- “**Non-commercial digital platforms**” also exist in cyberspace, but for non-commercial reasons (not for the purpose of generating income). The driving force behind non-commercial platforms is usually a grassroots movement which gains sufficient momentum to create platforms such as Wikipedia. Governments may also sponsor a non-commercial platform in order to overcome a market failure and provide a platform as a public service; however, there are few really successful examples for this.
- Non-digital platforms are often set up to rally different stakeholders behind a defined policy goal. These platforms are usually neither digital (i.e. stakeholders meet face-to-face) nor commercial. However, the policy goal is often the promotion of digitalisation in general (e.g. AIOTI) or for specific industries (e.g. Industrie 4.0), including aspects such as standardisation or even the initiation of non-commercial digital platforms. For this reason, such platforms are often wrongly referred to as “digital platforms”. In this paper, we designate such platforms as “**stakeholder platforms**”.

The following illustration summarizes these types of platforms, and provides a few examples.

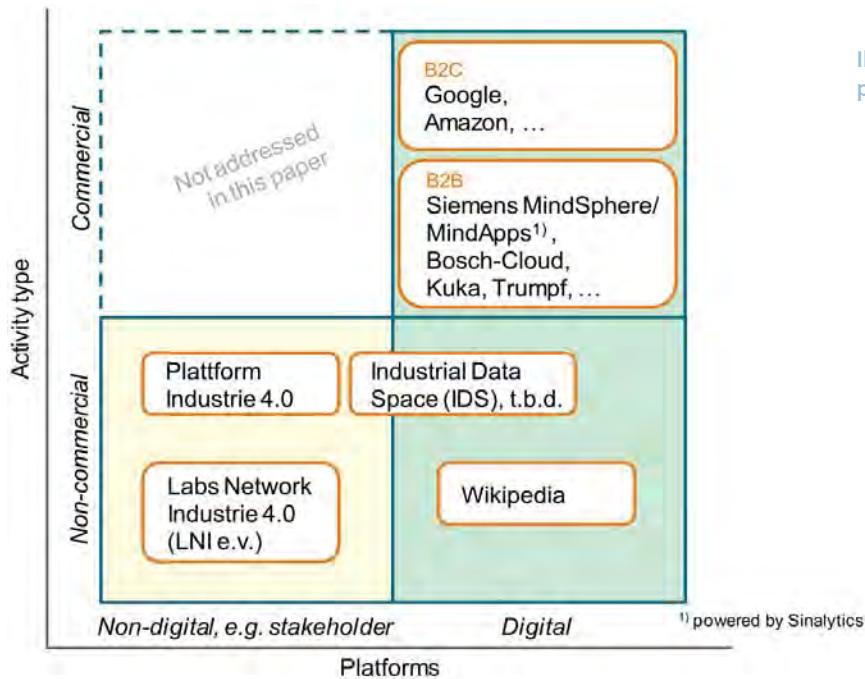


Illustration 1: Different types of platforms

3. What is a “digital platform”?

Historically, platforms required stakeholders to meet in person to participate in the platform (and for most stakeholder platforms this is true even today). Digital platforms follow the same principles as non-digital platforms, but the actual exchange between stakeholders happens in cyber space. Famous examples include Amazon (where shoppers interact with retailers), PayPal (where payers interact with payees), Google (where internet users seeking information interact with advertisers), or Wikipedia (where writers interact with readers).

Digital platforms have several advantages compared to non-digital platforms:

- Since platform stakeholders are not required to meet in person, the cost and effort to participate in a platform is vastly reduced.
- Whereas non-digital platforms usually target geographically constrained stakeholder groups, digital platforms have the potential to scale up on a global scale, and may reach out to everybody with internet access.
- The scalability of non-digital platforms is usually limited; for instance, an airport cannot grow out of proportion. Digital platforms do not know such constraints.

- Digital platforms provide transparency of prices, services and customer satisfaction at an unprecedented level and thereby significantly increase competition between providers.
- The improved comparability of offerings on digital platforms and new services based on the use of previously underutilized assets (such as cars or apartments through Uber or AirBnB) provide better convenience and give consumers and customers more choice.

For these reasons, digital platforms are even more than non-digital platforms subject to a network-effect and a “winner-takes-all” principle, which applies to many digital platforms at a global level. European platforms (such as StudiVZ, a Germany-based social network platform) have competed and lost against their US counterpart (such as Facebook).

Digital platforms do not necessarily appear as a central web page such as Amazon or Google. Android is an example of a platform deployed on billions of smart phones. It nevertheless owes its success to a network effect where app providers sell apps to app users.

Digital platforms can be designed in many different ways, but two design choices are worth mentioning:

- Interoperability is the technical ability of the platform to interface with external products or systems, so as to facilitate the transfer of data to and from the platform. Interoperability is a desirable feature of almost any digital platform, be it commercial or non-commercial, and thus strongly in focus of platform designers.
- Furthermore, platforms can be “open” or “closed”. An open platform offers application programming interfaces that are fully published and documented. They allow third parties to add functionality to the original platform without accessing the platform’s original SW code. The Linux operating system is a fully open platform, whereas Apple’s iOS uses proprietary interfaces and thus limits what third parties can do.

The question “open vs. closed” is not a case of black vs. white. The designer of a digital platform will usually open parts of the platform and keep other parts closed, thus defining what third parties can or cannot do on the platform. An open platform allows other parties to provide additional functionalities to the platform, and to share in the success of the platform. This typically increases the overall attractiveness of the platform for all stakeholders. On the other hand, platform designers may want to keep core elements of the platform closed in order to preserve a unique competitive advantage, or to offer a core user experience that is the same for every platform participant.

“Open platforms” is often cited as an explicit goal of policy makers. This may be justified for government-funded, non-commercial platforms. However, for commercial platforms, the platform designer should be free to strike the balance between “open” and “closed”. Customers should then be the final judge of the provider’s offering, and reward those platforms giving them the best deal.

A platform-based business model is increasingly important to enhance the value of a (connected) product. Apple's smartphones, still the company's most significant source of income, is strongly enhanced by the rich offering in the iTunes app store.

By its very nature, a smart phone is a connected device. However, in the age of the internet of things, almost all products – from cars to production machines – will eventually be connected to the internet. Amongst others, such products will generate useful data, and all allow for remote addition of functionalities. The crucial question is if and how to complement an established product business with a platform-based business model, so as to enhance the customer's experience with these products, is thus becoming a matter of interest for many companies in different industries. BMW's ConnectedDrive offering is a well-known example.

This challenge is not limited to the B2C (business-to-consumer) domain, it is equally important in the business-to-business (B2B) arena. Many B2B platforms relate to company processes, such as e-commerce platforms for procurement or salesforce.com for customer relationship management. However, more and more platforms are emerging that enhance the value of industrial equipment. For instance, the Siemens Cloud for Industry (MindSphere, introduced to the general public at the Hannover Trade Fair 2016 as part of Siemens' Sinalytics digital offering) will add value to production equipment by offering a platform for providing services such as asset management, energy management or remote maintenance to multiple stakeholders. The platform will connect customers, Siemens, and third party app providers. Factory owners might select data from their machines to be uploaded to MindSphere and to be analysed by applications offering their service on the platform, and they might then choose the application of another provider on the platform to calculate optimized operation schedules for their machine based on this analysis. The data processing can also take place on-site if the factory owner wishes so, but in any case he or she keeps full authority of the data generated by their machines.

The key characteristics of digital platforms, as outlined above, apply to consumer-oriented platforms (B2C) as well as to business-oriented platforms (B2B). However, from a regulatory perspective there are important differences between B2C platforms and B2B platforms to be considered. By definition, B2C platforms have individual consumers as an important stakeholder group. The underlying business relationship is characterized by a strong imbalance of market power: the individual consumer deals with a large and possibly even monopolistic company, and has usually no choice but to accept the terms and conditions proposed by the company. At stake may be nothing less than the consumer's fundamental rights, especially regarding data privacy. B2C platforms are therefore rightly in the focus of regulators.

For B2B platforms, the matter is less clear. The risk of oligopolistic or monopolistic market structures should be mitigated by business customers' buying behaviour, which usually favours multiple sources not only for products, but also for platform-based services. Furthermore, as long as there is not a truly monopolistic supplier market for platform-based services, large business

customers can be expected to have a market power comparable to the platform providers, thus limiting the risk of abusive behaviour of their service providers. And finally, business customers are usually much more conscious of the value of their data. They will carefully analyse the benefits of uploading company data to a platform, and retain a certain degree of control over the usage of these data. Users of Siemens MindSphere, for example, can decide at all times which data they provide to the platform and when this data is deleted again.

In view of these differences between B2C and B2B platforms, and given the early development stage of most B2B platforms, there is currently no clear case for a strong regulatory focus on B2B platforms.

4. Siemens view and recommendations on “commercial digital platforms”

Commercial digital platform are the backbone of the often envied US IT-Industry. The most valuable companies in the world, Google and Apple, owe their success to the successful design and implementation of a digital platform, first in their US home market and then globally. For the digitalization of the European economy, the creation of boundary conditions favouring the growth of platform-based businesses is an obvious (if not trivial) policy goal.

At least in the Western hemisphere almost all major digital platforms in consumer space have their origin in the US. This applies even to platforms such as Amazon (online retailing), where geographical constraints still play a role. The underlying reasons for this include the following:

- US-based platforms enjoy the advantage of a large home market. This allows them to scale up to a considerable size, and gain the experience and financial strength to expand abroad. In contrast, European platforms have to cope with rather small home markets, and with a still very fragmented European market space.
- Many platform-based businesses are the result of a successful start-up company. Amazon, Google, Facebook and the like have all been founded quite recently. Thanks to the much more vibrant and dynamic start-up environment in the US, by far the most attempts to create “the next big platform” are made in the US. More seeds that are planted into the ground increase the likelihood of obtaining large trees.
- Technology leadership plays a role as well. Platforms such as Google and Amazon owe their leading position to world class competences in data analytics and logistics, respectively. It is estimated that a significant share of the world’s leading data scientists work for Google, even including the academic domain.

- At least some successful platforms act in a legal grey area. For instance, it may be questioned whether the user data stored by Google, even with the explicit consent of the users, are in line with European data privacy regulations. Another example is Uber and more specifically the question whether the relationship between Uber and the car drivers constitutes an employment. The US seem to be somewhat more ready than Europe to trade the enforcement of regulations against innovation and economic success.

In the B2B space, there are fewer examples of successful platform-based businesses. However, this is only a matter of time. So far, digital technologies have transformed markets where non-tangible goods are traded (finance, media, music, communication, etc.), and this is where many of the successful platform-based businesses have emerged. Digital technologies are starting to merge with the real world. We therefore expect to see more and more platform-based business models focusing on enhancing real-world products and systems.

Europe has largely missed the first wave of digital platforms in the B2C world. On the other hand, Europe has many strengths in real-world industries such as machinery or automotive. European companies are well positioned to leverage their domain know-how in these industries to build platform-based business models on top of their current portfolios, in order not to miss the second wave as well. Companies need to be in the driver seat for this, but policy makers can help by creating adequate market conditions. In particular, policy makers should focus on the following:

- Make the creation of market conditions favouring the foundation and growth of platform-based businesses a primary policy goal.
- Refrain from *ex ante* regulating commercial platforms with new regulation where existing regulation is sufficient.
- Consider offering limited government funding or other forms of government support also for the development of commercial platforms.
- Create a truly single digital market in Europe with harmonized rules, so as to allow platforms to reach out to the entire European market of 500 million citizens and compete at eyes' level with their US-based competitors.
- Ensure that rules for taxation of profits generated by B2B digital platforms are clear and well aligned across Europe.
- Further invest in a high-performance IT infrastructure, and consider requirements of vertical industries in the further development of such infrastructure.
- Close or at least narrow the competence gap between European and US universities with respect to digital technologies.
- Take decisive actions to ease and promote the founding of start-up companies, with particular focus on start-ups focusing on novel technologies or platform-based business models.

- Foster a more active and risk taking European Venture Capital Industry to give European start-up's better access to seed and (more importantly) growth capital.

Policy makers should refrain from attempting to directly intervene in the market and sponsor the creation of commercial digital platforms, following the example of Airbus. A state-sponsored foundation of companies is justified only in cases where market forces are insufficient, as was the case in the capital-intensive aviation industry where no single company had the financial means and the endurance to break Boeing's monopoly. In the case of digital platforms, there are no discernible reasons why market forces should fail, not least since both US and European platform providers have succeeded without any government support. The very dynamic nature of the digital economy requires agile development of online platforms which can be achieved by individual companies rather than by government-sponsored initiatives.

Policy makers should also not over-regulate commercial platforms. As mentioned, digital platforms tend to lead to monopolistic or oligopolistic market structures, but the current legal framework should be sufficient to safeguard against a potential abuse. Attempts to avoid such market structures are bound to fail, and Europe will be better off if at least some of the next generation platform players grow within Europe. Also, B2B platforms should be much less prone to monopolies than B2C platforms because B2B platform customers will attempt to avoid a vendor lock-in, and have the market power to do so.

Finally, policy makers should avoid using public funds in order to sponsor non-commercial platforms that are in competition to commercially driven ventures (see following section).

5. Siemens view and recommendations on “non-commercial digital platforms”

It is tempting to assume that non-commercial platforms are a politically more acceptable track to innovation, and have a higher societal value than commercially driven platforms. However, there is so far no evidence to support this assumption. Many commercial platform players are generating not only value for their shareholders, but also to society as a whole. The creation of digital platforms should mostly be left to markets, and governments should intervene only in cases of market failure.

There may be cases where a government sponsored and funded approach to develop a non-commercial digital platform is the preferred way forward. However, the following conditions should be fulfilled:

- There are clear indications of a market failure, i.e. there is no credible perspective that the desired outcome can be achieved by companies competing in the market.
- There is broad consensus among relevant stakeholders that the proposed platform can be expected to have a tangible economic and societal benefit.
- The proposed platform does not compete against commercial platforms.
- A powerful coalition is in place in order to drive the platform development; if the platform is for non-academic use, this coalition should include relevant European companies.
- Platform development is handled by development partners with a proven track record in building industry-grade systems.
- A clearly identified future owner is committed and able to ensure the operation, maintenance and further development of the platform.
- A clearly defined governance and funding model is in place for the entire lifecycle of the platform

It is worth noting that many non-commercial platforms, such as Wikipedia or Linux, have their origin in grass-roots movements and succeeded with little or no government support. By their very nature, such platforms are B2C platforms. On the other hand, there are few (if any) successful examples of government-sponsored non-commercial platforms.

6. Siemens view and recommendations on “non-commercial stakeholder platforms”

Non-commercial stakeholder platforms include the German platforms Industrie 4.0 and Nationale Plattform Elektromobilität, the French Industrie du Futur, the AIOTI platform, and many other platforms uniting different stakeholders to promote a defined objective of national or European innovation policy (leaving aside many other platforms pursuing other policy goals). In the public debate, this concept of a platform is often confused with the digital platforms discussed earlier, even though they are clearly quite a different matter.

While stakeholder platforms clearly have a societal value by allowing different stakeholders to align on key questions in a pre-competitive setting, there is a growing anxiety among companies and other stakeholders that there are too many of them, both at national and European level. The following guidance should therefore be considered prior to initiating any new stakeholder platform:

- Firstly, and most importantly, stakeholder platforms should limit their scope to the pre-competitive domain. This excludes, for instance, the development of SW for commercial use.
- Stakeholder platforms should pursue defined and measurable goals, and terminate upon completion of these goals.
- Prior to initiating a new stakeholder platform, the option of extending and/or strengthening existing platforms should be considered. Ideally, the initiation of a new stakeholder platform is always decided in the context of already existing platforms, and aligned with all relevant government departments.
- Stakeholder platforms launched to facilitate the introduction of new standards should focus on defining the cornerstones of these standards, and use existing standardisation bodies for the actual definition of the standards.
- Stakeholder platforms should avoid a competitive mindset with respect to their counterparts in other countries, and rather reach out to them so as to support a global alignment e.g. on reference architecture models and derived standardisation activities.
- Stakeholder platforms should be governed by the participating stakeholders; political interference should be avoided. They should operate under stable rules of engagement defined in consensus
- European platforms should limit their scope to policy issues that need to be addressed at European level. They should not duplicate efforts by national platforms. Broadly speaking:
 - the design of European research programs such as Horizon 2020 and the improvement of European-level innovation policies and regulations should be addressed by European stakeholder platforms;
 - the design of technology and innovation strategies in various domains such as manufacturing, energy, healthcare, etc. (e.g. to agree on national research priorities or identify necessary changes in regulation) should be handled by stakeholder platforms at national level, because member states usually have very different starting points.
- By mutual consent, European policy makers may complement national stakeholder platforms with a forum to allow for best-practice exchange between member states.

Furthermore, institutions such as the European Institute of Technology should be strengthened and empowered to drive stakeholder alignment on European innovation policy. Standardisation should be driven through established standardisation bodies (CEN, CENELEC, ETSI).