



SOLVING THE ONLINE PLATFORM PUZZLE

How can policymakers make sense of the impact of online platforms?

CHRISTIAN HILDEBRANDT and **RENÉ ARNOLD** put forward a model that covers the complex dimensions

The internet can reduce information and transaction costs to almost zero – so it lends itself well to creating platform business models that act as intermediaries to match two or more users or groups quickly and independently of their location. It is not surprising that two of the earliest actors in the commercialisation phase of the internet were Amazon and eBay – and both companies are still thriving today.

With consumers spending more time online, advertising expenditure was bound to quickly follow eyeballs. Google, Facebook and others build on the insights they are able to gather about consumers, but also about advertising effectiveness, to create highly profitable platforms for advertisers. Recently, new competitors such as Snapchat and WeChat, which better understand how to capture the attention of consumers on mobile devices, are catching up.

As the latest communication from the European Commission on online platforms reflects,¹ policymakers have grown more convinced of the positive socioeconomic impact of online platforms. However, they still appear to have some difficulty grasping all the building blocks of online platforms at once, identifying patterns and making

comparisons across business models, or quickly assessing the potential impacts of new entrants.

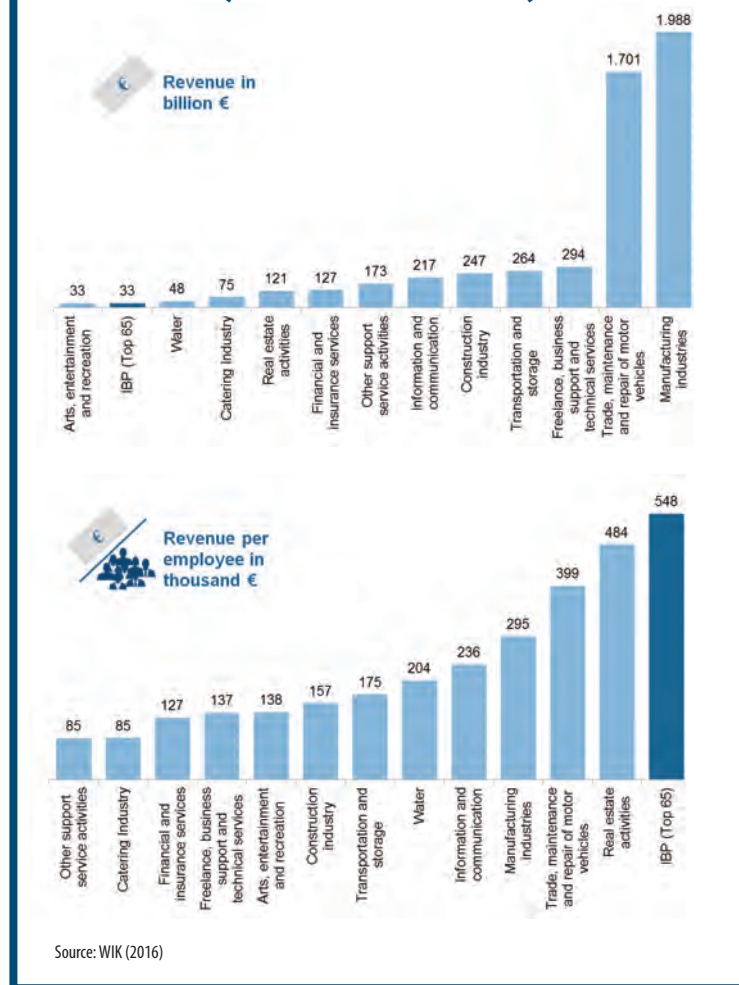
We have taken up the call for a new conceptual framework to consistently identify and analyse online platforms. First, we present our findings on the impact of online platforms, underscoring their importance from both economic and societal perspectives. Second, we present our new conceptual framework. It draws on business model research and provides an intuitive approach to understanding platforms' major building blocks, enabling a quick assessment of existing and new actors, including their potential competitive effect.

THE IMPACT OF PLATFORMS

The recent initial public offering (IPO) by Snap (Snapchat's parent) has proven once more that traders are fond of online platforms. In fact, many large platforms achieve impressive market capitalisation despite their comparatively small turnover and sometimes non-existent profits.

To explore the socioeconomic impact of platforms and explain their success, we collected data on the companies behind the 65 most important online platforms in Germany. Our study focused on five types of online platform: ➔

FIGURES 1 & 2
REVENUE OF ONLINE PLATFORMS
(GERMANY - 2015)



zero. This explains part of the high market capitalisation and underscores the importance of the underlying choice of business model.

HOW TO ANALYSE PLATFORMS

Understanding these choices is crucial for policymakers, regulators and business actors. We suggest the 'data revenue attention model' (DRAM) (see figure 3) as a novel conceptual framework to identify and analyse online platforms. Just like the 'business model canvas',² DRAM offers an intuitive taxonomy of an online platform's essential building blocks and their interactions.

As the name suggests, the model seeks to capture the three main flows (data, revenue and attention) that are typically exchanged among platform users and, with some degree of mediation, with the online platform itself. In our model, users can enter a theoretically unlimited number of user roles on the platform. Each user role is defined by the platform, as is the barrier to enter a user role. This is where most of a platform's creative leeway resides.

First and foremost, each user role is designed with the purpose of value creation in mind. For example, a search engine provider benefits from search query listings and users benefit from finding relevant websites (information, media content, etc.) via search engines. Thus, there is value creation for both sides of the platform. The barrier to entry can range from typing a query, e.g. as a search engine user, to qualifying for a specific role on a platform by providing relevant certificates such as a driver's licence. The barrier to entry to a specific user role can be determined in part by national legal and regulatory frameworks, as with a driver's licence.

Online platforms create value by mediating the flows of data, revenue and attention among the different user roles. For a business model view, it is critical to understand how a specific online platform taps each of the flows defined in the DRAM. While designing this part of the business model can be

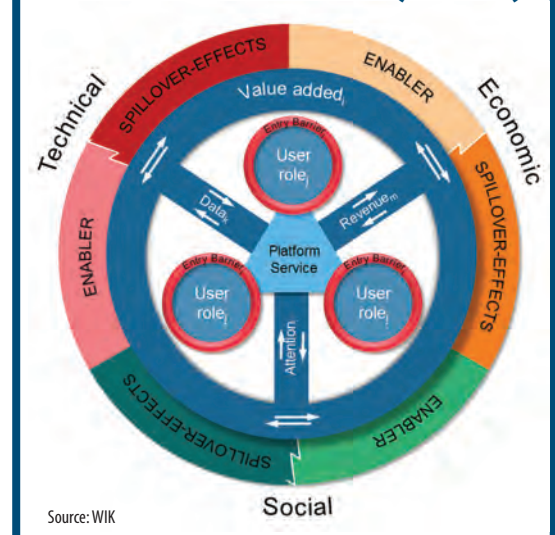
- Search engines
- Comparison tools
- Media and content providers
- Social networks
- Collaborative economy services.

We find that collectively the 65 companies, some of which operate more than one type of online platform, made €33 billion revenue in Germany in 2015. This is roughly a tenth of their global revenues, which we estimate at €320 billion in 2015. They employ approximately 61,000 and 589,000 people in Germany and worldwide respectively. Given that there are new entrants and many smaller actors which we did not capture in our estimates, these figures are conservative.

If one thinks of online platforms as a sector just like financial services or construction, their total revenues are comparatively small. However, the revenue per employee (about €548,000) that they are able to attract is very high compared with other sectors in Germany (see figures 1 & 2).

Besides revenues, the cost structure of online platforms differs fundamentally from other sectors. While there can be significant costs to set up and scale a business, the marginal cost is practically

FIGURE 3
THE DATA REVENUE ATTENTION MODEL (DRAM)



fairly simple, such as with a fee that is collected for each purchase made on the platform, mediating the interaction between the various user roles can be a major challenge. The quality and quantity of users in each user role has to be precisely tuned.

Finally, the DRAM conceptualises the enabler and spillover effects of online platforms. This exogenous perspective appears to be of particular relevance for policymakers as they seek to understand how they can create a positive environment for online platforms and their socioeconomic impact. Both enabler and spillover effects can be characterised as economic, technological or societal. In our study, we registered economic spillover effects for all five types of online platforms:

- Search engines – Average saving of €119,000 per capita annually for the average German firm³
- Online marketplaces – Trigger continuous growth for courier services (+4.5% annually)⁴
- Media and content platforms – The top 13 YouTubers grossed \$54.4 million in 2015⁵
- Social networks – Facebook’s economic impact in Germany is €2.63 billion⁶
- Sharing economy – Airbnb contributes €100 million to Berlin’s economy.⁷

In sum, the DRAM provides an integrative taxonomy to capture and analyse the significance that business model choices have for both the potential success of online platforms as well as their socioeconomic impact. Thus, it also offers a novel perspective on regulatory and antitrust analysis that is dominated by the concept of market definition.

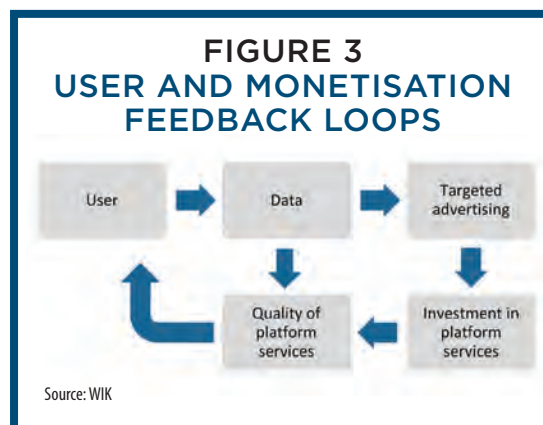
Market definition is a traditional concept that has difficulty coping with the complexity and peculiarities of online platforms such as network effects, data-specific economies of scale and scope, and feedback effects. In addition, there are network complementarities and complex interdependencies pointing to an important role of network evolution.⁸ Finally, services are often offered at zero monetary cost, which renders key tools of market analysis such as the small but significant non-transitory increase in price (SSNIP) test impractical.⁹

The exchange of data, revenue and attention determines a platform-specific mix between quantity and quality when matching different user roles by differentiating service quality and prices.¹⁰ Thus, these three main building blocks merit in-depth analysis. The following discusses data, revenue and attention flows in online platforms, and regulatory implications.

DATA COMPLEXITY

Since online platforms are data-driven business models, the role of big data raises the attention of antitrust and regulatory authorities.^{11,12} The real-time flow of immense volumes of structured and unstructured data combined with technologies such as data fusion, machine learning and predictive analytics, form a complex business environment that is becoming more difficult to assess.

The data flow in the DRAM can be broken down into two powerful economic forces in platform business models: user and monetisation feedback loops, as illustrated in figure 3.



According to the user feedback loop, a platform provider with a large user base is able to gather more and more data to improve its algorithms, which increases the quality of the platform service and therefore attracts new platform users (data flow). The monetisation feedback loop enables platform providers to analyse their data and to get the most out of them in terms of targeted advertising and content distribution (revenue flow). This generates further means for investment in the quality of the platform services, attracting even more data-generating platform users. Thus, both effects enable fast scaling and consequently gaining strong positions by platform providers. They are the mechanisms constituting the basis for potentially gaining market power in digital markets.¹³ Indeed, an online platform can achieve a competitive advantage by offering superior quality. This may lead to monopoly-like situations.



A strong market position is more contestable than in other settings.



However, a dominant position of an online platform is not problematic per se given the strong competition apparent among actors. Generally, a strong market position is more vulnerable and contestable than in other settings.¹⁴ Notably, data shares some

characteristics that make contesting dominant positions even more feasible. In general, data is arbitrarily usable and can be utilised for different applications at various times. Thus, in many cases data is non-rivalrous in usage. But there are situations in which excludability of other actors from specific data happens. Nonetheless, there are data brokers acting as a corrective from which excluded players can buy relevant data to realise a position in which they can replicate necessary data.

In this context the heterogeneity of data is playing an important role. Data on income cannot be replaced by location data and extracted data from search queries are only partially replaceable from data on buying behaviour. Thus, the complementary character of different types of data becomes apparent. This is also a main reason for many data-based merger and acquisition activities of online platform providers.



The ecosystem renders untenable any premature regulatory intervention.



and interdependencies that are different from telecoms, casting doubts on the traditional economic way of defining clear-cut markets.

Against this backdrop, we have suggested a new approach for consistently identifying and

analysing online platforms: the DRAM. It offers a complementary tool that provides a consistent taxonomy of online platform building blocks as well as their interactions. The model will be further developed into a comprehensive analysis toolkit.

In future work, it will be important to understand the interdependencies of online platforms. The DRAM can already account for these as one or more user roles can be fulfilled by another online platform. It is exactly this idea of an ecosystem that renders any premature regulatory intervention untenable. Indeed, our analysis underscores that simplistic black and white approaches hardly capture the subtleties of data, revenue and attention flows within online platforms.

Furthermore, the DRAM offers a holistic and functional perspective on the complexity of developing a successful online platform business model. Insights generated in this way can aid both policymakers and regulators, as well as industry. Its main advantage is that it can highlight the subtle specificities of individual online platform business models and so enables a detailed, but nonetheless intuitive, comparison of online platforms.

Finally, the model enables us to formulate relevant framework conditions for online platforms captured by technological, economic and social enablers. Policymakers and regulators should focus on setting sustainable technological standards for data security, data protection and consumer protection, and making sure there are open application programming interfaces (APIs) to ensure a competitive internet landscape.

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← FLOWS OF REVENUE

The organisation of revenue flows among user roles as well as between roles and the platform provider can have a significant impact on a platform's success. Our study identifies the following major types of organisation and corresponding impact.

Many platform businesses build at least partly on attracting eyeballs for advertising display. Since payment for online advertising is only triggered when a consumer clicks on the advertisement, platform owners need to consider how to ensure best possible targeting of their adverts. Notably, they can outsource this task to advertising networks.

Advertising also plays a role in 'freemium' models common among video and music streaming or VoIP services that offer a free version and their premium services only for a subscription fee. Other online platforms ask for subscription fees for one or more of their user roles right away.

Royalties or pay-per-use models are most common for supply-side user roles. This can be Uber trips, Amazon sellers or Airbnb hosts.

Most notably, in almost all online platforms that were analysed in our study, there is at least one other user role that does not pay a monetary price: users allegedly 'pay with their data'. While there is some truth in this assertion, the more common means of payment is attention or eyeballs.

PAYING ATTENTION

The relevance of attention in advertising funded online platforms is obvious. Arguably, a significant part of the success of collaborative platforms such as Airbnb and Uber is linked to their superiority in creating attention for apartments or rides offered. In the same vein, YouTube and others seek attention for their own or promoted content. The way that Facebook, LinkedIn and others create and shape attention from users for content created by others is critical for engagement and hence revenue.

In light of its relevance, it is surprising that the public debate and the economic literature on online platforms has largely neglected this attention flow. Based on our results, we would even argue that managing the flow of attention among user roles is indeed the most critical strategic asset for (many) online platforms. The significance of this aspect is further underpinned by the fact that attention is the true bottleneck all players are competing for. By definition, one cannot spend more than 24 hours a day on any online platform.

CONCLUSION

In sum, online platforms play an increasingly important role in our daily lives from finding and enjoying content on the internet, to enabling transparency of insurance offers, to engaging in social interactions. Their businesses are often complex and quickly attune to the high competitive pressure as well as sometimes rapid changes in consumer behaviour. Our analysis shows that traditional regulatory, legislative and antitrust approaches have some difficulty keeping up with these complexities. Specifically, the internet landscape is characterised by complementarities