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‘Everything the Data Touches Is Our Kingdom’: Market Power of ‘Data Ecosystems’

Peter J. VAN DE WAERDT, LL.M.*

Companies such as Google and Facebook are not merely conglomerates of Internet-based services which just so happen to process personal data. They should instead be conceptualized as ‘data ecosystems’ and treated as such. Data ecosystems are companies which collect and monetize personal data through a network of widely diverging internet-based services, for the overarching purpose of targeted advertising. Contrasted with traditional conglomerates, a data ecosystem is unique since all of its different branches are interconnected through a single shared resource: personal data. Consequently, this ecosystem structure grants strong sources of market power. Network effects of personal data, throughout the entire ecosystem, lead to services being constantly updated and personalized with increasing accuracy, while simultaneously enhancing the monetization strategy of targeted advertising. Meanwhile, data ecosystems’ reach across the Internet means that consumers cannot realistically choose not to participate, nor find suitable competitors for each service. Finally, data ecosystems have strong incentives to expand into additional markets: conglomerate mergers are an essential strategy to reinforce their sources of market power. Data ecosystems enjoy a unique form of market power which has been seriously underestimated in the past. A new approach that fully appreciates their unique structure and market power is therefore required.

Keywords: Data ecosystems, digital conglomerates, market power, personal data, targeted advertising, data monetization, network effects, mergers, competition law, digital economy

1 INTRODUCTION

Alongside the expanding functionality and everyday use of the World Wide Web, prominent online companies such as Google, Facebook, Microsoft, Apple, Amazon, and others have also expanded their influence on our increasingly online society. In doing so, they have come to present considerable challenges for both personal data protection law and competition law. There is still much work to be done on integrating these two fields of law into a coherent whole. Namely, data protection law and competition law are still presented as two separate areas which only incidentally overlap, even with regards to data-driven companies. Scholars refer to ‘digital markets’, ‘big data in competition law’, ‘competition law as applied

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to the digital economy’, or ‘digital conglomerates’.¹ Such language demonstrates that online competition and data protection are still not truly being examined in an integrated manner, but rather as slight adjustments to traditional models.

This article therefore aims to be a step in a new direction, namely by emphasizing the complete and fundamental integration of personal data in the business model of data-driven companies. As this article will show, companies such as Google and Facebook are not merely conglomerates of internet-based services which ‘just so happen’ to process personal data. They should instead be conceptualized as ‘data ecosystems’ and treated as such.

In particular, this article will re-evaluate the concept of market power in light of data ecosystems. It will be argued that it is exactly the central role of personal data within these ecosystems as a whole that allows them to become powerful actors across many different markets. Even though many of these companies operate on vastly different markets from another, it is worth noting how they employ similar structures of data collection, analysis and monetization as a means of amassing market power.

In order to effectively regulate data ecosystems, European Union (EU) competition law must develop a new understanding of market power with regards to such companies: one which wholly incorporates their data-driven nature, and one which looks beyond any single well-defined market to appreciate the market power of an ecosystem as a whole. Such a perspective would have significant implications both in light of merger oversight and enforcement of Article 102 of the Treaty on the Functioning of the European Union (TFEU). After all, both are vital components of the regulation of data ecosystems *ex ante* and *ex post*. The present article will focus on merger oversight, as this has a direct connection to the creation, maintenance, and expansion of data ecosystem market power.

The structure of the article is as follows:

In section 2 the phenomenon of data ecosystems will be explained in greater detail. Of special significance are the distinctive features of data ecosystems as opposed to more typical conglomerates; particularly their ‘hub and spokes’ structure and the extensive network effects of personal data.

¹ For example: Marc Bourreau & Alexandre de Streel, *Digital Conglomerates and EU Competition Policy*, SSRN Electronic Journal (2019), <https://www.ssrn.com/abstract=3350512> (accessed 26 Jun. 2019); Nicholas Economides & Ioannis Lianos, *Restrictions on Privacy and Exploitation in the Digital Economy: A Competition Law Perspective*, SSRN Scholarly Paper ID 3474099 (Social Science Research Network 2019), <https://papers.ssrn.com/abstract=3474099> (accessed 26 Mar. 2021); Miriam C Buiten, *Regulating Data Giants: Between Competition Law and Data Protection Law*, in *New Developments in Competition Law and Economics* (Klaus Mathis & Avishalom Tor eds, Springer International Publishing 2019); Marco Botta & Klaus Wiedemann, *EU Competition Law Enforcement Vis-à-Vis Exploitative Conducts in the Data Economy Exploring the Terra Incognita*, (2018) Max Planck Institute for Innovation & Competition Research Paper No. 18-8; They were dubbed ‘Information Empires’ by Tim Wu: Tim Wu, *The Master Switch: The Rise and Fall of Information Empires* (1st Vintage Books ed., Vintage Books 2011).

Section 3 will follow up by discussing how the fundamental integration of personal data in data ecosystems leads to a unique form of market power. Namely, market power which is not drawn from a singular market, but from the broad data collection across many markets. In addition, this section will take this logic one step further still; it will be discussed how expansion of the data ecosystem through mergers is itself a driver for increasing market power.

Section 4 will focus on the response of EU competition law to this phenomenon of data ecosystems. It will present a normative discussion on how the failure to account for data ecosystems' market power has negatively affected Commission Decisions in the past. The European Commission has significantly undervalued the market power of undertakings on the digital market on a number of occasions, as the data ecosystem perspective will make clear.

Ultimately, this article aims to show that it is not sufficient to merely acknowledge that personal data is an important resource for many undertakings. Instead, the broad market power which data ecosystems derive from that resource should be considered in full. In many ways, large online undertakings form their own 'kingdoms' of connected users and services, from which consumers cannot easily detach themselves. It would go beyond the scope of this article to draft the most appropriate legal response in detail; this is still subject to further research. Nevertheless, it is vital that the dynamics of online market power are fully understood. This article is intended to be a step in that direction.

2 'DATA ECOSYSTEMS': A NEW PHENOMENON

At first glance it may seem appropriate to view companies such as Google and Facebook simply as digital conglomerates.² A conglomerate is an undertaking that comprises multiple branches which operate on different, though often neighbouring, markets from one another.³ A *digital* conglomerate is then simply an undertaking which offers many different Internet-based services on several markets. Google, or rather Alphabet, would certainly seem to fit that mold. Taking this view, it is not immediately obvious that digital conglomerates differ significantly from conglomerates operating on the more 'traditional' markets of goods or services.

However, such a view would also discount some of the most fundamental characteristics of online undertakings. In particular, it fails to account for the central role of personal data collection, as well as the myriad interconnected data flows, which effectively shapes the undertaking as a whole. As a result, significant elements that contribute strongly to their market power risk being ignored. On these issues, the new conceptualization of online undertakings as 'data ecosystems' has added value.

² Bourreau & de Stree, *supra* n. 1, at 4–5.

³ 'Conglomerate | Business' (*Encyclopedia Britannica*), <https://www.britannica.com/topic/conglomerate-business> (accessed 27 Aug. 2020).

For the purposes of this article, the term ‘data ecosystem’ is defined as: **‘A business structure which is characterized by the collection, aggregation, analysis and monetization of personal data; achieved through offering many different (online) products on various markets, which interact with each other through shared data’.**

This definition and terminology was chosen to emphasize how these companies have moved beyond traditional networked or conglomerate structures.⁴ To most people, the word ‘ecosystem’ immediately calls to mind a concept of biology and ecology. It refers to a system in which many different actors (plants and animals) and environmental factors (habitat, climate) form an interconnected whole.⁵ As will be explained in more detail below, data ecosystems are also characterized by many different actors interacting with each other to form an interconnected whole. Service providers, consumers, advertisers, third-party websites and apps, and many other actors all interact with each other in various ways through the same company. These interactions, indeed these interconnections, between actors are therefore also central to the concept of ‘data ecosystems’ explored in this article. In effect, a data ecosystem is not a two-sided market, but a *many*-sided or multi-sided market.⁶ The definition further emphasizes the main (re)source on which this interconnection depends: personal data.

2.1 THE HUB AND SPOKES; INTERCONNECTED BRANCHES WITH A CENTRALIZED PURPOSE

As stated, the most significant feature of data ecosystems is the strong interconnectedness between all of the different branches; all of the different markets on which an online company operates. For traditional conglomerates, all of the branches are effectively separate. Taking the Phillips conglomerate as an example: the production and sale of electric toothbrushes does not significantly affect the production and sale of radios, beyond potential cross-subsidizing.⁷ If radios are doing poorly this product market could be cross-subsidized by the market for toothbrushes, but there is no direct integration of these two markets on a general

⁴ As noted above, many works refer to these companies as ‘digital conglomerates’, although use of the term ‘ecosystem’ is becoming more common. Notably, this is also the case in the 2019 ‘Competition Policy for the Digital Era’ report of the European Commission. Jacques Crémer et al., *Competition Policy for the Digital Era* 12–13 (2019), http://publications.europa.eu/publication/manifestation_identification/PUB_KD0419345ENN (accessed 11 Jun. 2020); Ioannis Lianos, *Competition Law for the Digital Era: A Complex Systems’ Perspective*, 6/2019 CLES Research Paper Series, 103 (2019).

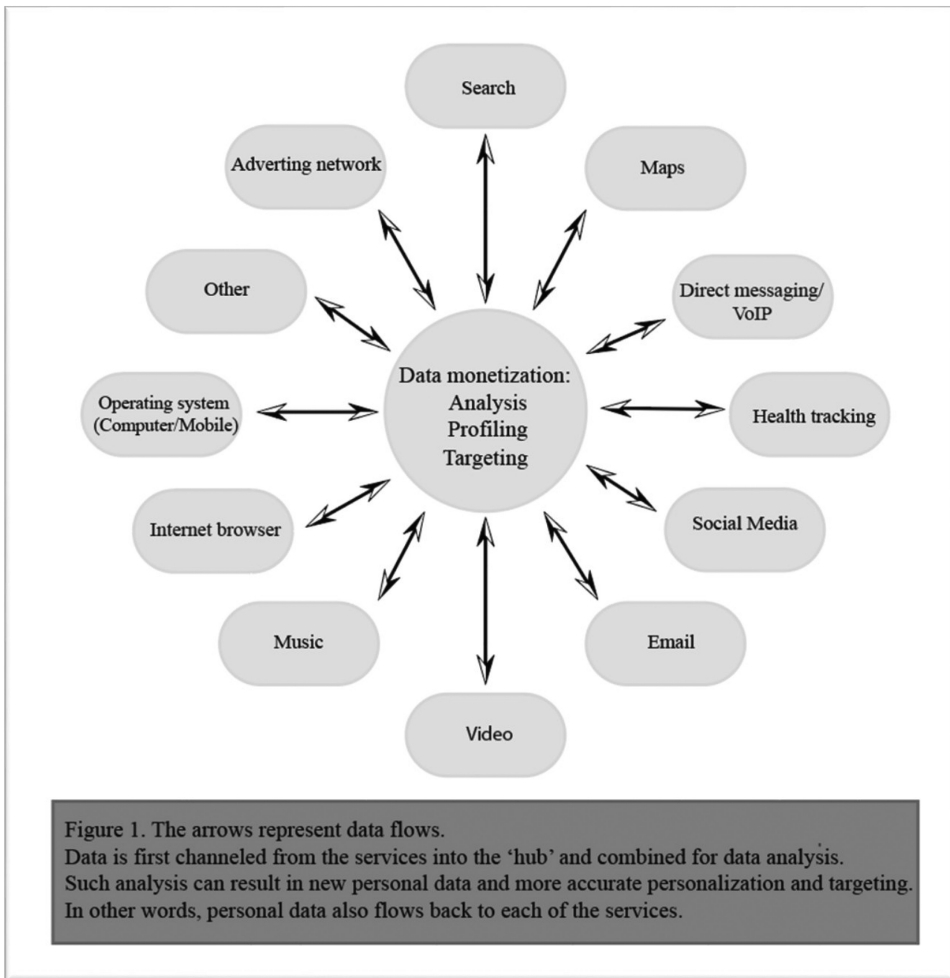
⁵ Lauren E Elrick, *The Ecosystem Concept: A Holistic Approach to Privacy Protection*, *International Review of Law, Computers & Technology* 1, 11–12 (2020), <https://www.tandfonline.com/doi/full/10.1080/13600869.2020.1784564> (accessed 9 Jul. 2020).

⁶ Crémer et al., *supra* n. 4, at 21; Bourreau & de Stree, *supra* n. 1, at 16; Compare, however: Lianos, *supra* n. 4, at 74.

⁷ Bourreau & de Stree, *supra* n. 1, at 7; see generally: Zhijun Chen & Patrick Rey, *Competitive Cross-Subsidization*, 50 *RAND J. Econ.* 645 (2019), <http://onlinelibrary.wiley.com/doi/abs/10.1111/1756-2171.12293> (accessed 26 Mar. 2021).

level. In contrast, the many branches of a data ecosystem *do* significantly affect each other. In fact, they not only reinforce one another, but also the core business of the ecosystem as a whole. As Crémer et al. observe, this complementary of conglomerate services within the data ecosystem is a particularly important element of competition that demands our attention.⁸

It is illustrative to think of these online undertakings in terms of a hub-and-spokes model, pictured in Figure 1.



⁸ Crémer et al., *supra* n. 4, at 34.

At the centre, the hub, one would find the primary source of income for data ecosystems. Namely, advertising. Specifically, the core business of data ecosystems is advertising targeted at individual users through personal data analysis. The spokes in this model represent the many online services provided by the ecosystem company. For Google, these spokes would include Google Search, YouTube, Google Maps, Gmail, Google Chrome, DoubleClick, and many more.⁹

Crucially, all of these spokes in this model lead to the hub. This represents the flows of personal data, collected by each of the different services, being channelled towards the targeted advertising scheme. This can be personal data in a broad sense, namely data points about many different users, or a deepening of personal data by collecting more data points about the same user. In either scenario, each of the spokes is in effect collecting and channelling the primary resource on which the core business of targeted advertising operates.

Not only do the spokes collect the primary resource, data ecosystems also generate extensive network effects through this structure. After all, they are engaged in targeted online advertising.¹⁰ In other words, they operate advertising space which becomes more valuable based on how many users it can reach, and based on the level of accuracy with which an individual user can be targeted.¹¹ Personal data analysis therefore adds value to the undertaking by boosting the generation of profits as data collection increases.

However, the data flows within this hub-and-spokes model go beyond that. What Figure 1 also shows is that data not only flows from the spokes into the hub, but data also flows back. In effect, each of the services are not only connected to the hub but also to each other. The data flows within the data ecosystems, represented in Figure 1, could more accurately be imagined as resembling a bicycle wheel. In a bicycle wheel, spokes do not run straight towards the hub at right angles. Instead, they are angled in such a way that they cross one another at several points. The hub-and-spoke structure should be considered in much the same way; as a model in which the spokes cross and intersect. What this means is that within the ecosystem, data collection by each service does not stand on its own. Instead,

⁹ See for a full overview: *Our Products – Google (2021)* https://about.google/intl/ALL_nl/products/ (accessed 26 Mar. 2021).

¹⁰ Joseph Turow, *The Daily You: How the New Advertising Industry Is Defining Your Identity and Your Worth* (Yale University Press 2011); Craig Dempster & John Lee, *The Rise of the Platform Marketer: Performance Marketing With Google, Facebook, and Twitter, Plus the Latest High-Growth Digital Advertising Platforms* (John Wiley & Sons 2015).

¹¹ As Lianos describes it, this is the sale of information. Not the raw personal information of the users, but the inferences that can be made from this data about such users: Lianos, *supra* n. 4, at 80; Ganesh Iyer, David Soberman & J Miguel Villas-Boas, *The Targeting of Advertising*, 24 Mktg. Sci. 461 (2005), <http://www.jstor.org/stable/40056974> (accessed 29 Jun. 2017); Lillian Wallace ed., *Hidden Hazards of Online Advertising: An Investigation of Consumer Security and Data Privacy Issues* (Nova Science Publishers, Inc 2014).

the data can be combined with data from any or all of the other branches. Even seemingly unrelated services are therefore still tightly connected; through personal data.¹²

This connected structure generates additional network effects on a branch-by-branch level. Specifically, such an exchange of data allows each of the services to improve their analysis. This will allow them to improve their service as a whole, most notably through better personalization for each individual user.¹³ For example, Google search queries can be used to recommend YouTube videos, or can be combined with Maps geolocation data to recommend relevant local businesses, which the Commission already noted in the *Google/DoubleClick* decision.¹⁴ Moreover, in the *Google/Fitbit* decision, the Commission expressed concern about the 'portfolio of data exploitable by Google' and how Fitbit's data would add to that, particularly for the advertising and digital healthcare branches of the ecosystem.¹⁵ As each ecosystem service covers different aspects of the end user's internet use, each will also have its own niche of personal data it collects. As a result, combining these datasets can reveal some valuable new insights which can be used to increase the value of each product. In effect, offering one service based on the collection of personal data also leads ecosystems to become more efficient at offering other services as well.¹⁶ In this way, the collected personal data is multifunctional.¹⁷

Ultimately, combining personal data in this manner improves the overall monetization strategy of the ecosystem in several ways. As more users are being brought into the ecosystem they can be incentivized to share personal data with one or multiple services. The profile that is built through such data collection and analysis generates network effects not only for each service, but also for the core targeted advertising. As such, the wealth of services which data ecosystems provide do not stand separate, as one might expect from a traditional conglomerate. Instead, they are the spokes of one centralized business strategy: the monetization of personal data. Just as a bicycle wheel maintains its strength through its many crisscrossing spokes, so too does the hub-and-spokes structure of data collection and combination ensure the strength of the data ecosystem. How this leads to high market power will be discussed further in section 3.

¹² Jörg Hoffmann & Germán Johannsen, *EU-Merger Control & Big Data on Data-Specific Theories of Harm and Remedies*, Max Planck Institute for Innovation & Competition Research Paper 74, 24 (2019).

¹³ *Competition Law and Data* 10–11, 33–34 (Joint Report Bundeskartellamt & Autorité de la Concurrence 10 May 2016), https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf;jsessionid=D0F39946F2A04E20AB75C13073A85CBD.1_cid390?__blob=publicationFile&v=2 (accessed 5 Apr. 2021).

¹⁴ *Case No Comp/M4731 – Google/DoubleClick* [2008], para. 360.

¹⁵ *Case M.9660 – Google/Fitbit* [2020], para. 400.

¹⁶ Crémer et al., *supra* n. 4, at 33.

¹⁷ Hoffmann & Johannsen, *supra* n. 12, at 16–17.

It is this structure, this fundamental integration of personal data across all of the services within the same online kingdom, that make data ecosystems a unique challenge for competition law. It is also what makes undertakings which at first glance may seem completely different, strikingly similar. While Google no longer operates social media, Facebook does not have a search engine, and Amazon's main service is an online shopping platform, they all operate a wide variety of secondary services which reinforce individual targeting through additional personal data.

2.2 THE ONLINE REACH OF THE ECOSYSTEM

The interconnected structure with shared data is not the only noteworthy characteristic of data ecosystems, however. An additional feature of incorporating a broad range of services within a single undertaking is an extensive reach across the Internet.¹⁸ Here too the interaction of services plays a significant role.

As digital undertakings continue to grow and continue to offer additional services, they have made it possible for users to conduct much of their daily online activity with the same company. A user can check their e-mail, operate their smartphone, search for the latest news, and watch their favourite videos without having to switch between different companies even once. Consequently, users are also given incentives to use multiple services under the branch of the same undertaking. A single account with a single password can be used across many different services.¹⁹ Moreover, these services will all perform slightly better should a consumer decide to use multiple of them, due to the network effects and improved analytics described above.

Additionally, several of these undertakings have also extended beyond the services offered as part of their ecosystem itself. They have done so by allowing third parties to integrate their services onto their websites. For example, many third-party services and websites offer a 'Log in with Google' option, which allows consumers to easily use their Google account even beyond Google's own services. As a result, having an account with Google also allows a user to be an active participant in many different online communities about any number of topics as a free benefit. Similarly, many websites integrate 'Share' widgets which instantly allow readers to share their favourite articles to their Facebook, LinkedIn, or Twitter feed, or to directly link them to their friends via WhatsApp.²⁰

¹⁸ Or more accurately: the World Wide Web. The present articles uses both terms interchangeably.

¹⁹ Crémer et al., *supra* n. 4, at 33.

²⁰ Erin M Sumner, Luisa Ruge-Jones & Davis Alcorn, *A Functional Approach to the Facebook Like Button: An Exploration of Meaning, Interpersonal Functionality, and Potential Alternative Response Buttons*, 20 *New Media & Soc'y* 1451, 1453–1454 (2018), <http://journals.sagepub.com/doi/10.1177/1461444817697917> (accessed 26 Mar. 2021); Arnold Roosendaal, *We Are All Connected to*

Most importantly, however, many third-party websites are also part of the advertising network of data ecosystems.²¹ This is especially important from the perspective of data collection. After all, as part of the advertising network, third parties also collect personal data on behalf of the data ecosystem. In particular, third parties can share webpage information as part of a real-time bidding system which determines which ads will be shown to a visitor. As this data is transferred to the data ecosystems, either directly or through its advertising branch, third party websites in effect become yet another spoke in the ecosystem structure. As a consequence, even those internet users who do not have an account with one of the major data ecosystems are still made subject to their business model of personal data monetization.

This wide reach of data ecosystems is especially significant, since it also means that such undertakings have a sizeable presence in consumers' daily online lives. The UK's telecommunications regulator Ofcom has called attention to this fact. It referred in its 2018 report to modern society as a society of 'digital dependence' and an 'always on' society,²² and emphasizes that a large part of modern life now takes place online, from the very moment we wake up to when we go back to sleep.²³ The undertakings which make up the largest portion of consumers' online activity are therefore in an enviable position, as they too could become ingrained in many consumers' daily lives. To a large extent, that has already happened. As Crémer expresses it: 'Google is the primary means by which people in the Western world find information and contents on the Internet'.²⁴ Indeed, the phrase 'Just Google it' will be instantly familiar to many people in the Western world, and some journalists have already vividly described how difficult it would be to maintain one's digital life without relying on any of the data ecosystems.²⁵ In effect, data ecosystems can become gatekeepers of the online world,²⁶ and as such it should come as no surprise that their services already account for a large portion

Facebook ... by Facebook!, in *European Data Protection: In Good Health?* (Serge Gutwirth et al. eds, Springer 2012); Arnold Roosendaal, *Facebook Tracks and Traces Everyone: Like This!*, SSRN Electronic Journal (2010), <http://www.ssrn.com/abstract=1717563> (accessed 26 Mar. 2021).

²¹ Economides & Lianos, *supra* n. 1, at 7–8, 24.

²² Ofcom, *Communications Market Report 4* (2 Aug. 2018), https://www.ofcom.org.uk/___data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf (accessed 3 Apr. 2021); via Lianos, *supra* n. 4, at 86.

²³ Lianos, *supra* n. 4.

²⁴ Crémer et al., *supra* n. 4, at 13.

²⁵ Kashmir Hill, *I Tried to Live Without the Tech Giants. It Was Impossible*, *The New York Times* (31 Jul. 2020), <https://www.nytimes.com/2020/07/31/technology/blocking-the-tech-giants.html> (accessed 26 Mar. 2021); Farhad Manjoo, *Tech's Frightful Five: They've Got Us*, *The New York Times* (10 May 2017), <https://www.nytimes.com/2017/05/10/technology/techs-frightful-five-theyve-got-us.html> (accessed 19 Feb. 2020); Kashmir Hill, *I Cut the 'Big Five' Tech Giants from My Life. It Was Hell*, (Gizmodo), <https://gizmodo.com/i-cut-the-big-five-tech-giants-from-my-life-it-was-hel-1831304194> (accessed 19 Feb. 2020).

²⁶ Bundesgerichtshof, Beschluss vom 23. Juni 2020 – KVR 69/19, ECLI:DE:BGH:2020:230620BKVR.69.19.0, paras 102–103; Bourreau & de Streel, *supra* n. 1, at 11; Crémer et al., *supra* n. 4, at 13.

of consumers' online activities.²⁷ As will be discussed in the following section, this can be a significant source of market power of its own.

Ultimately, it is these two factors, namely the hub-and-spokes structure and the reach across vital services and infrastructure, that differentiate data ecosystems from traditional undertakings and offline conglomerates. Not only does the hub-and-spokes structure facilitate a system in which the primary resource can be freely shared between different branches of the ecosystem. Ecosystems also reach virtually every Internet user in one way or another, and some ecosystem services have even become nearly synonymous with certain segments of the World Wide Web. Both of these factors are also major sources of potential market power and should be examined as such.

3 MARKET POWER OF DATA ECOSYSTEMS

The combination of the factors described above, namely the common resource shared between branches of the ecosystem, the network effects of personal data, and the reach of the ecosystem as a whole, lead to a number of competition concerns. In particular, these characteristics can be a strong source of market power. Traditionally, there are many accepted sources of market power. High barriers to entry, strong economies of scale, gatekeeper status, network effects, high switching costs, and information asymmetries can all lead a market to be dominated by one undertaking.²⁸ However, if we examine online companies such as Google or Facebook more closely, and we do so from the perspective of data ecosystems, it becomes clear that the unique characteristics of the data ecosystem also lead to a unique form of market power. This section will outline four critical factors which demonstrate how data ecosystems have achieved a form of market power which extends beyond the limits of any single definable market.

3.1 PERSONAL DATA AND 'NETWORK EFFECTS+'

First and foremost, personal data in particular is at the core of the market power of data ecosystems, just as it is at the core of their hub-and-spokes business structure. As was observed in section 2, data ecosystems are characterized by a wide range of services which nonetheless funnel the same primary resource, data, into a centralized pool. Thus, the undertaking combines many different data points about many

²⁷ Ofcom, *supra* n. 22, at 71; Lianos, *supra* n. 4, at 87–88.

²⁸ Beatrice Roxburgh, *Competition Law 2020 72–75* (College of Law Publishing 2020), <http://www.vlebooks.com/vleweb/product/openreader?id=none&isbn=9781913226466> (accessed 19 Oct. 2020). Alison Jones & B. E. Sufriin, *EU Competition Law: Text, Cases, and Materials* 324–349 (4th ed., Oxford University Press 2011).

individuals into broad and deep personal profiles. Doing so comes with benefits in the form of network effects, both on the level of individual consumers and on the level of the online market as a whole. In fact, these network effects even reinforce each other to a great extent.

On the individual level, the profiled consumer²⁹ will find the service increasingly catered to her personal preferences due to the analysis of her personal data.³⁰ As more data is collected through all of the ecosystem services she uses, the algorithm will become increasingly accurate in determining what is most relevant for her. Search results will become more relevant, she will receive recommendations for other videos or pages she might enjoy, and she may even find the advertising less intrusive if only products she is interested in are displayed. In effect, being personally profiled has provided her with a higher quality service. This will be especially evident if data points from many different services, each with their own distinct niche of data, are combined into a single profile. As a result, users are incentivized to stay with the same company for a longer period of time, and to use more than one of its products.

However, there is another side to this coin. Namely, as a user is analysed to provide them with a better and more personalized product, they are also analysed in order to increase profits. After all, the largest source of revenue for most online companies is targeted advertising, and advertising space can be sold for a higher price if ads can be more accurately targeted. Furthermore, new data points can be discovered through analysis, even without the user's direct involvement.³¹ In essence, the users' data itself becomes an increasingly valuable resource to the ecosystem, as the output of analysis itself becomes a new input.³² This forms an essential feedback loop which can be exceedingly difficult for competitors of the ecosystem to replicate or substitute.

Moreover, the network effects on the broader level of the online market also benefit from increased data collection.³³ In particular, accurate data analysis is only possible if there is sufficient (training) data from a sufficiently broad range of users to teach an algorithm properly. The algorithm can only learn which results are most relevant, both in general and to a specific individual, if it has past user input

²⁹ Or, in terms of data protection law, the data subject. 'Regulation (EU) 2016/679 of the European Parliament and of the Council on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data' (27 Apr. 2016), Art. 4(1).

³⁰ Lianos, *supra* n. 4, at 95–96.

³¹ Known as 'observed' or 'inferred' data: *Competition Law and Data*, *supra* n. 13, at 7; Peter J van de Waerdt, *Information Asymmetries: Recognizing the Limits of the GDPR on the Data-Driven Market*, 38 *Computer L. & Sec. Rev.* 105436, 3 (2020), <https://linkinghub.elsevier.com/retrieve/pii/S0267364920300418> (accessed 9 Jul. 2020); Crémer et al., *supra* n. 4, at 24–25.

³² Lianos, *supra* n. 4, at 84.

³³ Crémer et al., *supra* n. 4, at 31.

to draw from.³⁴ After all, data analysis in essence works by extrapolating aggregate past data to current individual interests.³⁵ A large varied userbase, maintained for a longer period of time, is therefore essential for operating a search engine which delivers the best possible results.³⁶ The same is true for other social media platforms, or indeed any service which boasts interest-based pages and communities. Moreover, a broader coverage of those users' interests improves those results even further. Such a broad coverage of data can easily be achieved within the ecosystem, such as through additional services' usage data, or alternative user inputs such as Youtube's search bar or Instagram's tags. All of this also serves to at least partially explain why online services are often offered for free: the easier it is for new consumers to step in, the easier it is to add new personal data to the dataset and increase the network effects of such data.³⁷

Additionally, analysing the personal data of the entire consumer base can lead to new insights into broad global trends. For example, in 2018 Apple acquired Shazam, a popular service which identifies music for the user.³⁸ As a result, Apple could track what music users most often request and thus eventually learn what music is popular.³⁹ By combining these results with its own personal data, such as the user details assigned to an account or smart device, Apple could specify further to potentially track trends among age groups or gender. This analysis in turn could be used to inform search results or advertising for services such as iTunes or Apple Music. Google and Facebook, meanwhile, operate much broader services, such as search and news sharing. As such, they could distil even more insights into trends across a wealth of different topics, up to and including political ones. By strategically employing the knowledge gained from data aggregation at such a scale, they could simply adapt their service to match, or focus on developing new technologies before competitors can successfully fill the gaps in the market.

³⁴ Claude Castelluccia, *Behavioural Tracking on the Internet: A Technical Perspective*, in *European Data Protection: In Good Health?* (Serge Gutwirth et al. eds, Springer 2012); Economides & Lianos, *supra* n. 1, at 24.

³⁵ Frederik Zuiderveen Borgesius, *Improving Privacy Protection in the Area of Behavioural Targeting* (UvA-DARE (Digital Academic Repository) 2014) 65–70.

³⁶ Crémer et al., *supra* n. 4, at 104; In fact, research suggests that the accuracy of search results continues to improve up until massive amounts of input data. Enric Junqué de Fortuny, David Martens & Foster Provost, *Predictive Modeling With Big Data: Is Bigger Really Better?*, 1 *Big Data* 215, 223–224 (2013), <https://www.liebertpub.com/doi/10.1089/big.2013.0037> (accessed 17 Oct. 2019).

³⁷ Crémer et al., *supra* n. 4, at 20; Economides & Lianos, *supra* n. 1, at 12–13.

³⁸ *Case M8788 – Apple/Shazam* [2018], European Commission C(2018) 5748 final.

³⁹ Subcommittee on Antitrust, Commercial and Administrative Law of the Committee on the Judiciary, *Investigation of Competition in Digital Markets* 43, 338, https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed 20 Oct. 2020).

In fact, the network effects of personal data which exist within a data ecosystem are to a great extent self-reinforcing and span multiple markets;⁴⁰ a kind of 'network effects+'. Crucially, it is not just a single product which can be improved by having more data available. All of the products within the ecosystem benefit from increased data collection by any of their sisters.⁴¹ Each of the products will be able to offer better personalization and more accurate results of whichever content it provides. As a result, each of them is also in a much stronger position to draw in new users, which is further reinforced by the 'zero price effect' of all these products being free to use.⁴² By bringing in new users, through any of the ecosystem's many points of entry, the ecosystem then further bolsters its total dataset. Accordingly, the benefits the undertaking enjoys from data analysis increase once again, and so too do the network effects increase further. In fact, research suggests that even if a company already possesses a massive amount of data for use in analysis, it can still improve its accuracy by acquiring even more.⁴³ There thus appear to be few, if any, upper limits to these network effects of personal data. Data ecosystems, with their hub-and-spoke structure of data monetization, exacerbate this issue since they benefit from the network effects of each branch side-by-side, as well as the overarching network effects of the whole ecosystem. In essence, network effects upon network effects.

Additionally, existing users can be further incentivized to spend more time on the platform by improving personalization. Through more accurate recommended content, users' attention can be held longer. This in turn leads users to share more usage data as well as increased ad impressions. Moreover, as more users are incentivized to spend more time with one or more of the data ecosystems' services, they themselves attract new users as well. By watching more videos, sharing their own content, forming communities and simply by interacting, the users themselves create additional network effects, which serve to further reinforce the network effects of personal data. The role of keeping users' attention on data-driven platforms was strongly acknowledged by the United Kingdom's Competition and Markets Authority in their review of the *Facebook/Giphy* merger.⁴⁴

Ultimately, data ecosystems therefore enjoy both direct and indirect network effects in many forms. Within the unique structure of data ecosystems, strong forces exist which are a source of network effects, or reinforce the ones which are

⁴⁰ Compare also the 'spiral effect' described in by Hoffmann & Johannsen: Hoffmann & Johannsen, *supra* n. 12, at 19.

⁴¹ Crémer et al., *supra* n. 4, at 49.

⁴² Economides & Lianos, *supra* n. 1, at 12–13.

⁴³ Junqué de Fortuny, Martens & Provost, *supra* n. 36, at 223–224.

⁴⁴ Competition and Markets Authority, Completed acquisition by Facebook, Inc (now Meta Platforms, Inc) of Giphy, Inc, Final report, 30 Nov. 2021, paras 8.131–8.138, <https://www.gov.uk/cma-cases/facebook-inc-giphy-inc-merger-inquiry#final-report> (accessed 22 May 2022).

already present. This is the direct result of the role of personal data as a shared resource through the ecosystem. Consequently, data ecosystems continuously strengthen their own position on the online markets, as well as their ability to monetize the personal data of their consumers. These network effects thus provide a clear advantage to the already established ecosystems over their smaller competitors. They have more past data to draw from, and are in the best possible position to collect even more going forward. Undertakings without such strong sources of personal data or the ability to cross-reference such data will find it difficult to compete with these market forces. In fact, they will find it increasingly difficult to compete as the self-reinforcing network effects grow ever stronger.

Considering the above, it should be noted that the market power derived from the network effects of personal data is not restricted to any single market.⁴⁵ While some markets may be a more lucrative source of personal data than others, it is ultimately the data ecosystem as a whole that enjoys such market power across its entire field of operation. Indeed, through a shared resource ‘everything the data touches’ contributes to the data ecosystem’s kingdom.

3.2 ECOSYSTEM REACH AND LOCK-IN

The network effects within the data ecosystem are not the only source of market power, however. The wide reach of the ecosystem can itself be a source of market power as well. The primary reason for this is that, due to the ecosystem model, consumers face high switching costs and may find themselves locked in.

3.2[a] *Lock-in*

In particular, data ecosystems are able to incentivize consumers to use more than one of their products, by giving their sister services preferential treatment over its competitors.⁴⁶ Even without preferential treatment, consumers are often able to log-in to different services using the same account credentials, or several services may already be integrated in some form.⁴⁷ In contrast, they would need to set up additional new accounts should they decide to switch to a competitor.

More importantly, switching away from one ecosystem service would also imply drawbacks for the utility of the other services.⁴⁸ Old services might not even

⁴⁵ Crémer et al., *supra* n. 4, at 46.

⁴⁶ See e.g., *CASE AT39740 Google Search (Shopping)* [2017], European Commission C(2017) 4444 final, paras 341–343; Crémer et al., *supra* n. 4, at 69.

⁴⁷ Crémer et al., *supra* n. 4, at 34, Bourreau & de Stree, *supra* n. 1, at 19.

⁴⁸ Subcommittee on Antitrust, Commercial and Administrative Law, *supra* n. 39, at 104.

continue work unless the consumer maintains the previous account.⁴⁹ This can lead to a case of path dependency, in which the consumer is encouraged to stay at the incumbent data ecosystem and not to stray towards any competing services.⁵⁰ In some cases it goes even further, as consumers are sometimes compelled to have an account with a data ecosystem before its sister products can be used. For example, new applications for Apple devices can only be downloaded through the App Store, which requires an Apple account. Facebook, meanwhile, for some time required a Facebook account in order to use its Oculus brand virtual reality headsets.⁵¹ Rather than merely giving itself preferential treatment over its competitors, data ecosystems employ this type of gatekeeping strategy to bar entry to a service unless the consumer passes through the appropriate gate first.⁵² In other words, consumers are required to share certain personal data as a prerequisite for using a service, even if that service itself is far removed from targeted advertising.

Consumers can also face additional 'costs' for switching due to the network effects present on these markets. While they could easily install a new app, doing so will only carry any actual meaning if they know they will find a network of their peers waiting for them there. If not, early switchers would have to convince other users to join them. Users who, in turn, must convince their own friends to follow suit; effectively leading to 'collective switching costs'.⁵³ Since it is highly unlikely that an entire network will switch from one service to the other, consumers often use multiple services in tandem: they multi-home. The extent to which multi-homing also qualifies as an effective competitive pressure, however, is highly questionable. Furthermore, it is often not possible to transpose the entire user experience a consumer has become accustomed to from one service to another. For example, his entire posting or chat history will likely be lost upon switching, or he might be forced to take considerable time re-uploading old videos. Rebuilding one's reputation or goodwill amongst friends, peers, or fans may also take considerable time.⁵⁴ Finally, personal interest profiles will also be lost after switching. As a result, the new service will not be personalized to the same extent

⁴⁹ Crémer et al., *supra* n. 4, at 34.

⁵⁰ Subcommittee on Antitrust, Commercial and Administrative Law, *supra* n. 39, at 104; Crémer et al., *supra* n. 4; Economides & Lianos, *supra* n. 1, at 27.

⁵¹ 'Oculus', (2020) <https://support.oculus.com/424208161507635/> (accessed 20 Oct. 2020); It was planned that not only newly sold devices would need a Facebook account, but older Oculus devices would as well for continued use. Sam Machkovech, *The Facebooking of Oculus VR Becomes More Pronounced Starting in October [Updated]*, (Ars Technica, 18 Aug. 2020), <https://arstechnica.com/gaming/2020/08/oculus-vr-accounts-will-soon-require-facebook-ties/> (accessed 20 Oct. 2020).

⁵² Bourreau & de Streel, *supra* n. 1, at 11.

⁵³ Michael J Shaw, Carl Shapiro & Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy*, 25 Acad. Mgmt. Rev. 441, at 184–185 (2000), <http://www.jstor.org/stable/259025?origin=crossref> (accessed 1 Apr. 2021); via Crémer et al., *supra* n. 4, at 23.

⁵⁴ Subcommittee on Antitrust, Commercial and Administrative Law, *supra* n. 39, at 144.

as the old one was. It could take considerable time for the new app to re-establish these interests and personalize itself to the desired level.

It should be noted that the above is, of course, all under the assumption that a user will want to have their data ported at all. However, this is far from guaranteed, given that many consumers will not be aware of their data portability rights,⁵⁵ will not have the technological know-how to conduct such a transition, or simply will not have the patience to do so. As a result, new market entrants would have to convince consumers not only to switch, but also to provide enough of their personal data for the algorithms to become efficient at personalization and monetization.⁵⁶

Additionally, in many cases the consumers' access to specific content or services is also restricted to an ecosystem.⁵⁷ In part this is also a result of the aforementioned network effects. As more people decide to use a specific service to upload their content, others who want to enjoy that content will only be able to do so through the ecosystem. Neither fans of Taylor Swift nor fans of AC/DC need look at Vimeo to find their favourite music; those artists are already on Youtube, along with millions of fellow fans to interact with.⁵⁸ Even those who are not searching for a specific content creator will be funnelled to these same services, because that is where they will find the content which matches their interests. The effects of profiling, targeting, and personalizing the services then further exacerbates this issue. Even should such consumers decide to buy a new device, it is highly likely that they will continue to come back to these same services, either because they are already installed by default,⁵⁹ or simply because consumers install it immediately to keep up with their established network. In essence, data ecosystems, and Google in particular, have thus attained a status of gatekeeper for vital online products and services as a whole. In some cases, this might even extend to vital forms of (mobile) Internet use in their entirety, such as search, video, networking, communication, and advertising.⁶⁰ Some online services have become

⁵⁵ Regulation (EU) 2016/679, *supra* n. 29, Art. 20. This right in itself is somewhat limited, *Guidelines on the Right to Data Portability* 8 (Art. 29 Working Party 13 Dec. 2016), http://ec.europa.eu/information_society/newsroom/image/document/2016-51/wp242_en_40852.pdf (accessed 17 Feb. 2017); Aysem Diker Vanberg & Mehmet Bilal Ünver, *The Right to Data Portability in the GDPR and EU Competition Law: Odd Couple or Dynamic Duo?*, 8 Eur. J.L. & Tech. 4 (2017).

⁵⁶ Crémer et al., *supra* n. 4, at 36.

⁵⁷ One could also look at this problem from the opposite angle. It is possible that data ecosystems could also become gatekeepers for advertisers or other third-party companies to access online consumers. Bourreau & de Stree, *supra* n. 1, at 19–20.

⁵⁸ Compare: <https://vimeo.com/search?q=taylor%20swift> and <https://vimeo.com/search?q=acdc> to <https://www.youtube.com/user/taylorswift> and <https://www.youtube.com/user/acdc/>.

⁵⁹ This was already a prominent concern in 2007, with the Microsoft case regarding Windows Media Player, and subsequent discussion surrounding Internet Explorer: *Microsoft Corp v. Commission of the European Communities*, The Court of First Instance of the European Communities Case T-201/04 (2007).

⁶⁰ Bourreau & de Stree, *supra* n. 1, at 20–21.

highly impractical, if not practically impossible, to enjoy without at least one major data ecosystem acting as an intermediary.⁶¹

3.2[b] *Information Asymmetry*

Finally, consumers may find it difficult to switch between online services due to far-reaching information asymmetries which are present on many digital markets.⁶² Consumers are often not aware of what personal data is being collected by which companies, where that data is being collected from, with whom it is being shared, and where the options to restrict such practices are to be found. In essence, the data ecosystem possesses much more personal data than the consumer is aware of, and they possess much more technical knowledge of how such data is processed and monetized.⁶³ This phenomenon further increases the market power enjoyed by the data ecosystem by reducing countervailing buyer power. Due to the information asymmetries consumers are unable to usefully compare different services to one another on the quality parameter 'privacy'. Botta and Wiedemann even characterize such lacking transparency as a market failure in itself.⁶⁴

Moreover, consumers are also unable to ensure that switching to a competitor for any one product will effectively detach their personal data from the data ecosystem. For example: a consumer could delete her Facebook and Instagram account due to privacy concerns.⁶⁵ However, Facebook has also aimed to acquire Giphy, a service for sharing short animated pictures (.gifs).⁶⁶ This consumer, even without a Facebook account, cannot know to what extent either sharing or receiving .gifs through Giphy still results in her personal data being shared with

⁶¹ For a personal account of this phenomenon, see Hill, *supra* n 25.

⁶² On how information asymmetries affect online markets and their regulation, see Van de Waerd, *supra* n. 31.

⁶³ Economides & Lianos, *supra* n. 1, at 28.

⁶⁴ Botta & Wiedemann, *supra* n. 1, at 28–29.

⁶⁵ This in itself is not always as easy as it sounds. David Z. Morris, *How to Delete Your Facebook Account – and Why That's So Hard to Do*, (Fortune), <https://fortune.com/2018/03/24/how-to-delete-your-facebook-account-and-why-its-so-hard-to-do/> (accessed 23 Oct. 2020); Andrew Griffin, *Delete Facebook campaign takes off – but actually removing your data might prove more difficult than it seems*, (The Independent 21 Mar. 2018), <https://www.independent.co.uk/life-style/gadgets-and-tech/news/delete-facebook-cambridge-analytica-campaign-deactivate-data-remove-hide-privacy-a8266671.html> (accessed 23 Oct. 2020).

⁶⁶ However, this merger was rejected by the CMA. See Competition and Markets Authority, *supra* n. 44. Enrique Dans, *Facebook Now Owns the Web's Biggest Supplier of GIFs: Is That a Problem?*, (Forbes) 5 Apr. 2021, <https://www.forbes.com/sites/enriquedans/2021/04/05/facebook-now-owns-the-webs-biggest-supplier-of-gifs-is-that-a-problem/> (accessed 5 Apr. 2021); This merger is currently under review by the United Kingdom's Competition and Market Authority, *Facebook, Inc/Giphy, Inc Merger Inquiry*, (GOV.UK), <https://www.gov.uk/cma-cases/facebook-inc-giphy-inc-merger-inquiry> (accessed 5 Apr. 2021).

or observed by Facebook. This situation would be even more pressing if she still used WhatsApp or visited third-party websites which integrate .gifs directly into their web pages.

These information asymmetries thus mean that consumers are not able to exert any notable competitive pressure on the dominant data ecosystems. Consequently, the ecosystem is able to reduce the quality of the service, especially by decreasing privacy protection, without repercussions.⁶⁷ Indeed, this has already happened on multiple occasions. For example, after acquiring DoubleClick, Google committed itself not to combine the personal data from Google Search with its newly acquired advertising network. Similarly, during the investigation of Facebook's merger with WhatsApp, Facebook assured the European Commission that the two datasets would not be combined.⁶⁸ Nevertheless, in 2016 Google did start combining DoubleClick data with users' search history, e-mail data, location data, and the rest of their personal profile.⁶⁹ Facebook, meanwhile, also started combining WhatsApp data with the data from its social media platform in 2016. Neither seem to have faced significant repercussions from their consumer base,⁷⁰ since both changes were only implemented a few years after the takeovers through an update of the privacy policies. Since few consumers read these privacy policy updates, and fewer still understand the implications of what has been changed, this is a prime example of information asymmetries working to restrain consumers' competitive pressure and to solidify the market power of the data ecosystem.

Ultimately, consumers thus face high switching cost in a variety of ways. As a result of this, consumers are locked in to a great degree and are unlikely to switch to competitors *en masse*. In particular, they may decide to keep access to an old account for multi-homing purposes, or they may decide to switch away from the ecosystem for one service while keeping the others. By the very nature of the data ecosystem, switching away from one service does not automatically mean switching away from the ecosystem in its entirety. In effect, consumers are thus deterred from stepping out. It should be strongly questioned whether this is truly an example of effective competition, especially when one considers competition to data ecosystems as a whole.

⁶⁷ Botta & Wiedemann, *supra* n. 1, at 43–44; Economides & Lianos, *supra* n. 1, at 37.

⁶⁸ In fact, Facebook argued that it would be impossible to do so in the first place.

⁶⁹ Subcommittee on Antitrust, Commercial and Administrative Law, *supra* n. 39, at 209–210.

⁷⁰ Although Facebook was fined EUR 110 million by the Commission for providing misleading information during the merger investigation. European Commission, *Mergers: Facebook Fined for Providing Misleading Information*, 18 May 2017, https://ec.europa.eu/commission/presscorner/detail/en/IP_17_1369 (accessed 23 Oct. 2020).

3.3 BARRIERS TO ENTRY

Apart from consumers being discouraged from stepping out of the ecosystem, they might also find it difficult to find suitable competitors at all, since the barriers to entry online can be exceedingly high.

The fact that these barriers to entry are so high might seem counterintuitive at first. After all, online services tend to start small; programming does not typically require a large amount of resources, and novel ideas can spike in popularity quickly. Google and Facebook themselves started as small-scale projects managed by only a handful of programmers. However, if one takes into account all of the market forces online, in practice the picture is vastly different.

This is most apparent on the market for online search. In order to operate a search engine, an undertaking must first index the parts of the Internet it wants to make searchable.⁷¹ However, Google and Bing are currently the only sources of a complete index of the World Wide Web.⁷² It would be beyond unfeasible for a new start-up to crawl and index the entire World Wide Web,⁷³ yet this is an operation which Google has already had years to achieve and perfect. Replicating such an index would require a massive amount of storage space and processing power, far beyond the typical innovative programmer working from her garage. As a result, any competing search engines must acquire access to the index from Google or Microsoft.⁷⁴

These principles hold true for other markets as well, especially if they require a critical mass of users or personal data in order for their service to be profitable. A social network will not be competitive with Facebook without the direct and indirect network effects Facebook already enjoys through its enormous consumer base and dataset. Acquiring a network of users that could compete with Facebook and its network effects would no doubt carry major advertising costs, if it is achievable at all. After all, even Google with its strongly established userbase was unable to penetrate Facebook's dominance with its Google+ service.⁷⁵

⁷¹ *How Google Search Works – Search Console Help*, (2020) <https://support.google.com/webmasters/answer/70897?hl=en> (accessed 20 Oct. 2020).

⁷² Subcommittee on Antitrust, Commercial and Administrative Law, *supra* n. 39, at 80.

⁷³ *Ibid.*, at 78–80.

⁷⁴ *Ibid.* Even Microsoft's Bing search engine has only been able to maintain its own index through a cooperation between Microsoft and Yahoo!.

⁷⁵ Alex Hern, *Closure of Google+: Everything You Need to Know*, *The Guardian* (1 Feb. 2019), <https://www.theguardian.com/technology/2019/feb/01/closure-google-plus-everything-you-need-to-know> (accessed 21 Oct. 2020); Douglas MacMillan & John D. McKinnon, *Google to Accelerate Closure of Google+ Social Network After Finding New Software Bug*, *Wall Street Journal* (10 Dec. 2018), <https://www.wsj.com/articles/google-to-accelerate-closure-of-google-social-network-1544465975> (accessed 21 Oct. 2020).

This is not to say that any competition with data ecosystem services is impossible. However, this competition is usually the result of a start-up finding a particular niche located at the margins of an incumbent ecosystem. For example, TikTok has been rising in popularity as a video-sharing service distinct from Youtube.⁷⁶ It has done so by focusing specifically on short low-production videos designed for easy sharing. It is worth noting, however, that as a consequence of its growing popularity, TikTok has also drawn the attention of ecosystem companies, including Microsoft, for an acquisition. As will be discussed in the following section, ecosystem expansion can itself be a major source of market power as well.

Actual and effective competition to the established ecosystems on a more direct level is thus highly unlikely given the current market forces which start-ups would have to overcome at significant cost.

3.4 ECOSYSTEM EXPANSION

As the above has shown, there are many sources of market power which can be explained by the data ecosystem structure of online undertakings. Yet deriving market power from personal data analysis and monetization also carries another crucial consequence. Namely: data ecosystems have an unique incentive for expansion which goes beyond simple economies of scale. Expanding the ecosystem, even into 'unrelated' markets, directly contributes to the market power of the ecosystems and all of its subsidiaries.

Of course, many successful undertakings seek to grow and to enter new markets. There are many reasons why they might do so, and indeed market power can be one of them.⁷⁷ Undertakings could aim to cross-subsidize their products; lowering prices on a strongly contested market while keeping revenue steady through their other products.⁷⁸ Alternatively, there may exist certain synergies between the different markets,⁷⁹ for example if these markets share the same inputs or resources. If the same chipset could be used for multiple electronic devices, there could be economies of scale involved in manufacturing these chipsets in larger quantities. Should these benefits outweigh the costs of purchasing and restructuring the merged entity, a conglomerate expansion would be rational.

⁷⁶ It is worth noting, however, that many upcoming digital services, including TikTok, started and gained traction in China. This may raise doubts as to the privacy and censorship policies of such undertakings, as well as the potential role played by the Chinese government. *TikTok, WeChat and the Growing Digital Divide Between the US and China*, (TechCrunch), <https://social.techcrunch.com/2020/09/22/tiktok-wechat-and-the-growing-digital-divide-between-the-u-s-and-china/> (accessed 21 Oct. 2020).

⁷⁷ Bourreau & de Streel, *supra* n. 1, at 7.

⁷⁸ *Ibid.*

⁷⁹ *Ibid.*, at 7.

For data ecosystems, some or all of these factors could apply. For example, online services show a lot of overlap and shareable resources on the levels of inputs, software, and hardware.⁸⁰ In fact, the degree to which sharing resources and pooling input is possible within a data ecosystem far surpasses anything one would expect to find in a conglomerate based on physical products. Such overlap could easily be made profitable, as it will also allow an expanding data ecosystems to exploit much stronger synergies between these markets than traditional conglomerates would ever be able to. For example, similar pieces of software could be used on vastly divergent markets, provided that their function is broadly the same. An algorithm which determines which search results to show a specific user could also be used to recommend interesting videos with only minor alterations.⁸¹ Such an exchange of software within the ecosystem, or an exchange of programming staff, could provide a major benefit to both the existing services and the merged entity. Nevertheless, these traditional theories for conglomerate expansion do not fully explain the data ecosystem building that occurs among prominent data-driven companies.

First and foremost, there are substantial network synergies involved with integrating a new dataset into the ecosystem. Mergers like these bring in additional new users, or they provide additional new data points about existing users.⁸² By incorporating the personal data of its newly acquired users, the ecosystem can further improve its targeting software and its algorithms. A larger dataset on a larger group of individual users also means a larger set of training data for profiling algorithms. Personal data therefore also functions as a shared resource throughout the data ecosystem.⁸³ By expanding into new online services, a data ecosystem can simultaneously employ existing resources for new purposes, obtain and pool of additional resources, and improve each service on a technical level. It can lead to new insights into which data points correlate, more detailed information about specific interests, better predictive modelling, and more accurate targeting.⁸⁴ Suppose a data ecosystem which specializes in search engine services decides to merge with a service for online maps. By merging with such a map service, data which was originally collected for the search engine can now also be used to create maps with personalized points of interest. Moreover, this exchange of personal data functions as a two-way street. The map service also channels its own collected geolocation data back into the ecosystem, where it will be combined with existing data from elsewhere throughout the system. Data is therefore sharable in many

⁸⁰ *Ibid.*, at 9–12.

⁸¹ *Ibid.*, at 10.

⁸² *Competition Law and Data*, *supra* n. 13, at 16.

⁸³ Bourreau & de Streel, *supra* n. 1, at 9.

⁸⁴ Junqué de Fortuny, Martens & Provost, *supra* n. 36, at 223–224.

ways, and the informational output of one branch can also be the input for another.⁸⁵ By incorporating the know-how from merged entities it could even mean new developments in the artificial intelligence software itself, which will in turn function as another shareable input for each conglomerate service.⁸⁶

Secondly, as more services are incorporated into the ecosystem, the reach of the ecosystem expands. As a result, a larger portion of the online market will be covered. More importantly, by incorporating more services, consumers are also incentivized to keep using the same ecosystem for each of these services. At the same time, they are also being deterred from switching away from the ecosystem services. Discontinuing their account now carries the consequence of losing functionality of even more other services, or possibly any access to them at all. Moreover, as the data ecosystem solidifies, consumers will have an increasingly difficult time avoiding every service associated with the ecosystem.

The above points should sound familiar. They are, after all, effectively the same market forces which result in the ecosystem's market power in the first place. This itself is a significant feature of the market power of data ecosystems. The 'network effects+', network effects across many markets in the ecosystem, increase with the amount of personal data that is available, and therefore also increase through conglomerate expansion. The lock-in consumers can experience because of the reach of the ecosystem and the information asymmetries they face only increases as conglomerate mergers expand their reach even further.

These intrinsic market power benefits data ecosystems derive from conglomerate expansion can be further increased by exploiting specific opportunities to increase market power deliberately. Ecosystem undertakings could decide to tie the newly acquired products to product markets on which they are already dominant.⁸⁷ They could use their gatekeeper status to promote the newly incorporated services at the expense of their competitors. While such practices can already be regulated on an *ex post* basis through enforcement of Article 102 TFEU, it is nonetheless worth noting that the risks of such practices arise through such data ecosystem expansion.

It should be also be noted that, while there have been many high-profile mergers involving online markets, such high-profile cases are not representative of most data ecosystem mergers. In fact, most such mergers involve much smaller companies.⁸⁸ For example, Google has acquired on average one new internet-based company per month over the period 2001–2018,⁸⁹ over 200 in total.⁹⁰ Most

⁸⁵ Bourreau & de Stree, *supra* n. 1.

⁸⁶ *Ibid.*, at 10.

⁸⁷ *Ibid.*, at 14; Hoffmann & Johannsen, *supra* n. 12, at 21–22.

⁸⁸ Crémer et al., *supra* n. 4, at 113–115.

⁸⁹ Bourreau & de Stree, *supra* n. 1, at 4.

⁹⁰ Lianos, *supra* n. 4, at 40.

of these never make it into the news, nor are they subject to Commission oversight.⁹¹ Nevertheless, together they could form important building blocks of the data ecosystem as a whole. They might even include promising undertakings which could have outgrown their niche and become full-fledged competitors, had they not already been incorporated into the ecosystem at an early stage.⁹²

Thus, data ecosystem building goes beyond the traditional strategies of expansion and conglomerate mergers. It is intended to establish new data flows directed to the core business of monetizing personal data. By expanding or merging across different markets, the data ecosystem's reach, network effects, centralized role in the user's daily online experience, lock-in of consumers, and information asymmetries all increase. As a result, the undertaking's ability to monetize data increases, as does its hold over consumers. It does so in a manner which will be difficult for competitors to replicate,⁹³ who do not have the benefit of such a strong interconnected ecosystems of products. Incorporating new services thus further strengthens the market conditions which led to the data ecosystem's market power in the first place.⁹⁴ Expansion of a data ecosystem effectively strengthens all of its most vital sources of market power, and continues to do so as the ecosystem expands even further. In many ways, expansion could therefore itself be considered one of the sources of market power. This serves to explain why so many mergers occur on the online market: expansion is a vital component of the ecosystems' enduring and increasing market power.

3.5 INTERIM CONCLUSION: A 'CROSS-MARKET' KINGDOM OF MARKET POWER

Taking all of the above as a whole, the conclusion must be that data ecosystems enjoy significant market power, as a result of several factors which cannot easily be replicated by smaller competitors. The 'network effects +' of personal data, the wide reach of the ecosystem across increasingly vital markets, as well as the lock-in and barriers to entry this business model creates, all play a role in keeping the incumbent undertakings on top. Ecosystem expansion through conglomerate mergers further exacerbate each of these issues.

⁹¹ However, recall that Facebook/Instagram, while prominent in the news, was not subject to Commission oversight either. Crémer et al., *supra* n. 4, at 115; Moreover, *Facebook/WhatsApp* only reached the European Commission through a referral by national competition authorities, as it did not meet the EU turnover threshold either.

⁹² One could argue that Facebook/Instagram is an example of this phenomenon. The US House of Representatives reports notes that Instagram was itself growing into a social media platform, yet it is already a part of the Facebook ecosystem. Subcommittee on Antitrust, Commercial and Administrative Law, *supra* n. 39, at 12–14; Bourreau & de Stree, *supra* n. 1, at 15, 21.

⁹³ Kevin Coates, *Competition Law and Regulation of Technology Markets* 395 (Oxford University Press 2011); *Competition Law and Data*, *supra* n. 13, at 11–12.

⁹⁴ Sometimes known as 'monopoly maintenance': Economides & Lianos, *supra* n. 1, at 57.

That all said, it would be overly limiting to consider the market power of data ecosystems only on a per-market basis.⁹⁵ While it is true that Google is dominant on the market for search engines,⁹⁶ the market power of the data ecosystem extends far beyond this single market. The data ecosystem ‘Google’ in practice encompasses a large portion of daily internet use. The Google search engine and Youtube are the two top-ranking websites in the world, with over 2,3 million other websites linking to them.⁹⁷ Combined, visitors spend on average half an hour per day on these two websites alone.⁹⁸

Ultimately, the market power of data ecosystems must be considered as a whole. After all, it is ultimately derived from the far-reaching hub-and-spokes structure in which products are interconnected through shared data. The network effects of personal data are at their most effective when data from different markets are combined. Consumers are only locked in because one company encompasses so much of their day-to-day Internet use that switching to a competitor would mandate a serious overhaul of their daily routine. Finally, conglomerate mergers are so numerous and so effective exactly because they add an extra layer to the market power of the whole.

In other words: ‘Everything the data touches is our kingdom’. It is the market power of this ‘kingdom’ which should be considered under competition law enforcement, beyond any potential market power of each individual piece. In effect, data ecosystems have a market power over ‘the market for Internet use’, ‘the market for personal data monetization’, or indeed ‘the market for attention’.⁹⁹ It is a unique form of market power, towering over any individual markets, that can hardly be compared to a traditional conglomerate.

4 THE DATA ECOSYSTEMS PERSPECTIVE IN EU COMPETITION LAW

The sections above have discussed the business structure of data ecosystems, and demonstrated how this structure leads to strong market power. This is notable particularly because this form of market power has often been overlooked by competition authorities in the past. The difficulties raised by data-driven markets are not wholly new, after all. However, the Commission’s reasoning in previous cases can be criticized for failing to appreciate the unique characteristics of the

⁹⁵ Hoffmann & Johannsen, *supra* n. 12, at 7, 24, 32.

⁹⁶ *CASE AT39740*, *supra* n. 46, paras 271–272.

⁹⁷ *Alexa – Top Sites*, (2020), <https://www.alexa.com/topsites> (accessed 28 Aug. 2020).

⁹⁸ *Ibid.* It is worth noting that these internet statistics themselves were obtained from alexa.com, itself owned by Amazon; another company included in the ‘Big Five’.

⁹⁹ Tim Wu, *The Attention Merchants: The Epic Scramble to Get Inside Our Heads* (First Vintage Books ed., Vintage Books, a division of Penguin Random House LLC 2017); Turow, *supra* n. 10.

data-driven market and its sources of market power.¹⁰⁰ As a result, the market power of ecosystem companies has been structurally underestimated. Indeed, some notable ecosystem mergers have not even been scrutinized under EU law at all, as a result of not meeting the minimum turnover threshold.¹⁰¹ While it is easy to criticize anything with the benefit of hindsight, it is worth looking back and analysing past mistakes lest we continue to make them. This section will show in brief how the data ecosystems perspective has added value in competition law analysis, and conversely how the lack of this perspective has led to undervaluing digital undertakings and mergers.

4.1 'NON-HORIZONTAL MERGERS'

Most importantly, it is worth examining how the Commission deals with mergers which involve data ecosystems. After all, expansion of the ecosystem strengthens the sources of market power they enjoy, and could even be considered a source of market power in itself. As such, merger oversight is a prime candidate for the European Commission to step in.

However, the Commission has often taken a narrow view on ecosystem expansion, and this is still the prevailing view. The Commission's permissive stance on ecosystem mergers can partially be explained by the Non-Horizontal Merger Guidelines.¹⁰² So-called 'conglomerate mergers' are included in these guidelines. Non-horizontal mergers, including conglomerate mergers, are considered 'generally less likely to significantly impede effective competition than horizontal mergers'.¹⁰³ This is because they do not directly lead to the loss of a competitor, and may even result in new efficiencies.¹⁰⁴

What this standard has meant for data ecosystem merger oversight was demonstrated most clearly in several Merger Decisions, particularly *Microsoft/LinkedIn*, *Facebook/WhatsApp*, and *Apple/Shazam*.¹⁰⁵ In *Microsoft/LinkedIn*, for example, the Commission started by looking at the markets on which Microsoft and LinkedIn were active, but found little overlap. The Commission correctly

¹⁰⁰ It is worth noting that the European Commission has traditionally shied away from implementing privacy concerns in its Competition law oversight, notably in *Facebook/WhatsApp*. This view has been rightfully criticized: *Competition Law and Data*, *supra* n. 13, at 23–24; via Botta & Wiedemann, *supra* n. 1, at 41.

¹⁰¹ Crémer et al., *supra* n. 4, at 115.

¹⁰² European Commission, *Guidelines on the Assessment of Non-horizontal Mergers Under the Council Regulation on the Control of Concentrations Between Undertakings*, C 265/6 (18 Oct. 2008).

¹⁰³ *Ibid.*, para. 11.

¹⁰⁴ *Ibid.*, paras 12–13; Crémer et al., *supra* n. 4, at 116.

¹⁰⁵ *Case M8124 – Microsoft/LinkedIn* [2016], European Commission C(2016)8404 final; *Case M7217 – Facebook/WhatsApp* [2014], European Commission C(2014) 7239 final; *Case M.8788*, *supra* n. 38.

found that there was no direct competition between the two undertakings, as Microsoft was not active on the market for professional social networks.¹⁰⁶ LinkedIn also did not compete with Microsoft on many fronts, and even on the market for online advertising the Commission distinguished between search and non-search advertising; LinkedIn only being active on the latter.¹⁰⁷ As such, the Commission examined the merger under the Non-Horizontal Guidelines,¹⁰⁸ and noted that generally such a merger would be unlikely to have anticompetitive effects.¹⁰⁹ Similar conclusions were reached in the *Facebook/WhatsApp* Decision, where the Commission noted that Facebook Messenger and WhatsApp are not close competitors,¹¹⁰ and neither are WhatsApp and the Facebook social media platform.¹¹¹ This view remained prevalent as of *Apple/Shazam*, which also focused on the non-horizontal relations as a starting point.¹¹² It was not until *Google/Fitbit* that the Commission started performing a more critical analysis of the conglomerate effects of ecosystem mergers, and even there the role of personal data was considered separately from the conglomerate effects of the merger.¹¹³

However, in light of data ecosystem building, whether or not merging undertakings compete in a horizontal relation only tells an insignificant part of the story. If one were to look at the same problem from the perspective of data ecosystems, they would see different competition problems. In particular, it should be recognized that for data ecosystem expansion it hardly matters if there is any overlap between their primary market and the market which they are buying into. The reason for such mergers, after all, is not to recruit direct competitors, but rather to expand overarching market power through the scope of the ecosystem and the network effects of personal data. Therefore, what matters is primarily whether or not the personal datasets in possession of each merging party are complementary. Such complementarity could occur either because the ecosystem acquires data on new users, or new data on existing users. If either is the case, then the merger could reinforce the network effects of personal data and strengthen the lock-in faced by consumers. These factors would increase the market power of the ecosystem as a whole, even if no competitors on any single market are eliminated through the merger.¹¹⁴

¹⁰⁶ *Case M.8124*, *supra* n. 105, paras 168–174.

¹⁰⁷ *Ibid.*, para. 173.

¹⁰⁸ *Ibid.*, para. 182.

¹⁰⁹ *Ibid.*, para. 185.

¹¹⁰ *Case M7217*, *supra* n. 105, paras 101–107.

¹¹¹ *Ibid.*, paras 153–158.

¹¹² *Case M.8788*, *supra* n. 38, paras 144, 186–190.

¹¹³ *Case M.9660*, *supra* n. 15, ss 9.3 and 9.5.

¹¹⁴ Hoffmann & Johannsen, *supra* n. 12, at 32; *Competition Law and Data*, *supra* n. 13, at 24.

These same factors can also clearly be observed in *Microsoft/LinkedIn*, *Facebook/WhatsApp*, and *Google/Fitbit*. Microsoft did not previously maintain a (professional) social media platform, but did collect data through their Windows operating system, Office line of software, Skype VoIP service, Outlook e-mail client, and more. Acquiring LinkedIn added data points, such as place of employment and professional interests, to this dataset. Moreover, it also extends Microsoft's reach as the go-to ecosystem for business professionals, as opposed to an ecosystem primarily aimed at entertainment such as Facebook, or a generalized data ecosystem such as Google. The incentive for Microsoft was not to remove a competitor through this merger. Rather, Microsoft has an incentive to expand its own service portfolio by integrating a strongly established firm on an additional new market, thereby also adding a new point of entry for personal data. *Google/Fitbit* had the potential to add health and fitness data to Google's already broad dataset, and expanded Google's reach to exercising space. Finally, with the acquisition of WhatsApp by Facebook, the Facebook ecosystem went from being the primary social media hub to the primary social media hub *and* one of the largest providers of online communications.¹¹⁵ In *Facebook/WhatsApp* the Commission notes that every facet of Facebook and WhatsApp is contested by a competitor.¹¹⁶ However, it is worth noting that Facebook, now with the inclusion of WhatsApp, faces no notable competition to the ecosystem as a whole. The kingdom grows.

4.2 FORECLOSURE

Although ecosystem expansion has often been viewed through the lens of conglomerate, non-horizontal, mergers, the Commission's analysis of such cases certainly does not end there. After all, even the Non-Horizontal Merger Guidelines point to circumstances in which conglomerate mergers may still significantly impede effective competition. Most notably, they may lead to foreclosure.

The Commission has examined foreclosure in a number of ways, in a number of ecosystem Merger Decisions. For instance, in *Microsoft/LinkedIn* the Commission considers the possibility of Microsoft pre-installing LinkedIn on Windows personal computers or integrating it into Windows Office. The Commission notes a risk that the market for professional social networks could

¹¹⁵ *Two Billion Users – Connecting the World Privately*, (WhatsApp.com), 12 Feb. 2020, <https://blog.whatsapp.com/two-billion-users-connecting-the-world-privately/?lang=en> (accessed 24 Mar. 2021). *WhatsApp Status Daily Active Users 2019*, (Statista), 2019 <https://www.statista.com/statistics/730306/whatsapp-status-dau/> (accessed 24 Mar. 2021). Note that this analysis is not including Instagram, which has a sizable userbase on its own.

¹¹⁶ *Case M.7217*, *supra* n. 105, para. 104.

‘tip’ in LinkedIn’s favour, which would render it dominant on this market.¹¹⁷ Integrating LinkedIn in Windows could significantly increase its userbase by making LinkedIn’s service the default for every future Windows user. Due to the foreseen network effects, the growing network of LinkedIn could attract new customers in turn, looking to connect with such an extensive userbase.¹¹⁸ Since professional profiles require a certain amount of upkeep, it was also found unlikely that consumers could easily switch to a competitor.¹¹⁹ Should the market tip, it would thus be difficult for competitors to be successful on the market or to dethrone LinkedIn from its position. Despite these concerns, however, the Commission accepted Microsoft’s commitments not to pre-install LinkedIn and agreed that this would be sufficient to prevent the professional social network market from being tipped as a result of the merger.

Another way in which non-horizontal mergers could lead to foreclosure is if the merger would result in a decrease of the availability of personal data on the market. On a few occasions, the Commission has seen cause to examine whether personal data could be withheld from competitors to raise barriers to entry or cause foreclosure effects due to a lack of necessary resources.¹²⁰ However, as the Commission pointed out in *Microsoft/LinkedIn* and *Facebook/WhatsApp*, personal data on the internet is not a scarce input by any means.¹²¹ In effect, it considers personal data a virtually infinite resource, since each undertaking could request the same personal data from the same users.¹²² Nothing bars these users from providing their data to many different companies.

More interestingly, in *Apple/Shazam* and especially *Google/Fitbit* the Commission went into more detail regarding the availability of personal data and its effect on competition. For example, it considered the relevance and value of Fitbit data for the market of online advertising.¹²³ In doing so, it paid particular heed to the added value of Fitbit’s user data to the dataset already held by Google.¹²⁴ Meanwhile in *Apple/Shazam*, the Commission focused on the quality of the data. For example: how quickly does Shazam generate new data, how much data does it have on how many users, how much variety is in its dataset, and how valuable is it.¹²⁵ In both cases, the Commission considered how ‘unique’ the

¹¹⁷ *Case M.8124, supra* n. 105, para. 343.

¹¹⁸ *Ibid.*, paras 340–350.

¹¹⁹ *Ibid.*, para. 345.

¹²⁰ *Case M.8788, supra* n. 38. *Case M.8788, supra* n. 38, paras 273, 327–329; *Case M.7217, supra* n. 105, paras 180, 184–190.

¹²¹ *Case M.8124, supra* n. 105, paras 376–379; *Case M.7217, supra* n. 105, paras 188–189.

¹²² Hoffmann & Johannsen, *supra* n. 12, at 12; *Case M.8124, supra* n. 105, paras 256–264.

¹²³ *Case M.9660, supra* n. 15, s. 9.3.3.2.1.

¹²⁴ *Ibid.*, paras 431–432.

¹²⁵ Known as the ‘Four “Vs” of data’: velocity, volume, variety, and value. *Case M.8788, supra* n. 38, para. 317.

dataset might be, and to what extent complementary markets could benefit from access to it.¹²⁶ The Commission ultimately found that Shazam's dataset was fairly lacklustre in this respect. Data from music streaming services such as Spotify would be much more interesting for most undertakings,¹²⁷ and most of Shazam's user data would be easy to replicate through other means.¹²⁸ In contrast, Fitbit's data was considered significant, in that it would allow for better ad targeting particular for sports-related products.¹²⁹

However, while it is true that personal data is an important resource for many companies, this view fails to appreciate where the value of personal data is to be found within the whole data ecosystem. It is not the quality or the uniqueness of any single dataset on any single market which accounts for its value, but rather its complementarity to all the other sources of personal data to which the ecosystem has access.¹³⁰ The question therefore is not how valuable Shazam's dataset is on its own; the question is how valuable Shazam's dataset *will be* when combined with the other data within the Apple ecosystem.¹³¹ On its own, Shazam's user data might not be unique, but it might still lead to unique new data points for the merging undertaking.¹³² The same goes for Fitbit: it is not only the value of Fitbit's data on the advertising market which is relevant, it is the value on all of the markets where the Google ecosystem is present. This is a crucial distinction which the European Commission has not made in even its most recent Merger Decisions.

Moreover, the fact that competitors could potentially collect the same data through other means also does not account for the value of such data within an established ecosystem. While data might be 'infinite', the same data is not equally valuable to every competitor. After all, it is the analysis data ecosystems can perform on such data that activate the network effects and make personal data especially profitable for them.¹³³ For example, even if smaller companies were to have access to search query data that rivals Google's, they would not be able to monetize it to the same extent. For one, they lack the years' worth of historical training data that Google's algorithms have been able to use. As a result, their analysis will not be as accurate and their options for monetization will be comparatively limited. More crucially, while other undertakings may be able to collect similar search query data, they will not have access to supplementary data obtained through other services. They will not have access to e-mail keyword scanning,

¹²⁶ *Ibid.*, paras 175, 317.

¹²⁷ *Ibid.*, paras 269, 320.

¹²⁸ *Ibid.*, para. 319.

¹²⁹ *Case M.9660*, *supra* n. 15, s. 9.3.3.2.1, paras 431–434.

¹³⁰ Crémer et al., *supra* n. 4, at 104; Economides & Lianos, *supra* n. 1, at 24.

¹³¹ Crémer et al., *supra* n. 4, at 28.

¹³² *Ibid.*

¹³³ Hoffmann & Johannsen, *supra* n. 12, at 17.

geolocation data, contact lists, and so on, in the same way that a data ecosystem might.¹³⁴ The same data will therefore be less valuable to them than it would be to Google enjoying its reach and its network effects, meaning that their ability to monetize their service and grow into a serious competitor will also be limited.¹³⁵

In conclusion, while the Commission has started to look more closely at personal data as a potential factor of foreclosure, the data ecosystem perspective shows that this is still a quite limited view.

4.3 MULTI-HOMING

Finally, the Commission often emphasizes the possibility of multi-homing throughout its Merger Decisions involving online undertakings.¹³⁶ Especially in *Facebook/WhatsApp*, multi-homing received significant attention as a counterbalance to the market power of the merging undertakings. If it is possible for consumers to use multiple similar services at the same time, it becomes more likely for new competitors to become viable despite the network effects of established companies. The Commission assumes that start-up competitors will be able to attract enough consumers to run a viable business, because consumers can simply use their service in tandem to the ones they already have.¹³⁷

However, from the data ecosystem perspective, multi-homing in itself does not solve the problem of ecosystem market power. Specifically, while multi-homing may be a relevant consideration for examining market power on a single strictly defined market, it does not solve the problem of the overarching market power on a broader level.¹³⁸ On a market-by-market basis, individual branches of the hub-and-spoke ecosystem may not even be dominant themselves. Nevertheless, they may still contribute to the market power of the undertaking as a whole.

By multi-homing, consumers still remain within the spheres of the dominant ecosystem, which continues to collect, combine, analyse and monetize their personal data.¹³⁹ Although they may switch some of their attention away to competitors, it is unlikely that this will also result in a significant loss of personal data. As long as the consumer continues to use an ecosystems' service, significant portions of their data will remain an input which continues to generate network effects when combined with all other data points. Moreover, the monetization of

¹³⁴ *Competition Law and Data*, *supra* n. 13, at 38.

¹³⁵ Hoffmann & Johannsen, *supra* n. 12, at 18–19.

¹³⁶ *Case M.8124*, *supra* n. 105, para. 345. *Case M.7217*, *supra* n. 105, paras 87, 133, 151.

¹³⁷ *Case M.7217*, *supra* n. 105, para. 133.

¹³⁸ Compare Bourreau & de Streel, *supra* n. 1, at 17.

¹³⁹ *Competition Law and Data*, *supra* n. 13, at 29.

this data on the individual market as well as the ecosystem market still continues as well. In effect, the ecosystem loses little to no ground on the specific market, and crucially it loses no ground on the overarching data market. After all, it is likely that a consumer multi-homing on one market is also subject to the data ecosystem on any number of other markets.

It could even be argued that the very fact that consumers choose multi-homing instead of switching to a different undertaking is evidence of the dominance some data ecosystems exert over the market.¹⁴⁰ If the quality of the content offered by other services is higher and their price is lower,¹⁴¹ consumers would not need to multi-home; they would simply switch. As section 3 has shown, however, with data ecosystems there are many other forces that keep consumers locked-in to its many services. In particular the network effects of the userbase, the reach of the ecosystems, and switching costs are all factors to be considered.¹⁴² As these factors keep consumers tied to a service and tied to the ecosystem, the collection, combining, analysis, and monetization of their personal data continues unhindered. As such, even when confronted with competition on a specific market where multi-homing occurs, the data ecosystem does not necessarily lose out on its dominant position overall.

The attention which the Commission awards to the potential for multi-homing therefore further exemplifies a narrow view of online undertakings, based primarily on the effects of mergers on individual markets. As is submitted in this article, however, the effects of data ecosystems deserve far greater consideration.

5 CONCLUSION

It is clear that the modern markets for digital services are fraught with new challenges. Companies such as Alphabet, Meta, Microsoft, and others maintain a business model that was still impossible to even imagine twenty years ago. However, within that time they have grown to be some of the most powerful companies in the world. They enjoy strong market power on a variety of different

¹⁴⁰ For reference: the Commission notes in *Facebook/WhatsApp* that around 80% – 90% of consumers multi-home between communications apps. It does not cite specific figures in *Microsoft/LinkedIn*, but notes that multi-homing could decrease as LinkedIn's market power grows. The Commission also does not cite figures in *Apple/Shazam*, but notes that younger consumers and free users are more likely to multi-home. *Case M.7217*, *supra* n. 105, para. 110; *Case M.8124*, *supra* n. 105; *Case M.8788*, *supra* n. 38, para. 38.

¹⁴¹ 'Lower price' in this scenario should also be taken to mean a more protective privacy policy. See e.g., the comparison the Commission makes between LinkedIn and its competitor XING. *Case M.8124*, *supra* n. 105, para. 350.

¹⁴² Crémer et al., *supra* n. 4, at 58; *Competition Law and Data*, *supra* n. 13, at 28.

markets, and indeed enjoy market power across the entirety of the online market as a whole.

This article has outlined where these data-driven companies, these ‘data ecosystems’ draw their market power from. Primarily, it is the data itself which is the key to understanding how data ecosystems operate. Most importantly, the structure of data ecosystems in which personal data is collected, combined, analysed, and shared among its branches results in significant sources of market power. By combining a growing number of digital services under one umbrella, data ecosystems are able to draw their main resource, personal data, from increasingly many sources. This leads to strong network effects of data. Most notably: additional data allows for more accurate analysis on an individual level as well as on the level of global trends; it allows for personalization and careful targeting of advertising; it incentivizes consumers to use multiple services offered by the ecosystem; and it creates lock-in as consumers find it impossible to divest *all* of their data from the overarching undertaking.

These network effects are not only self-reinforcing, they also contribute to further monetization of the personal data involved. Combined with the extremely wide reach of data ecosystem, which can cover increasingly critical daily services, more consumers will find their way to the same ecosystem, yet few will find their way back out.

As the data ecosystems grow in influence on the online markets, they will find themselves in the position to acquire new start-up undertakings and incorporate them into the ecosystem. Doing so allows the ecosystem to further increase both its reach and the network effects of its data. Namely, mergers between data-driven services, even ones across wildly different markets, still provide the ecosystem with new data flows and new entry points for consumers. Any service which allows for new data collection opportunities can therefore be an asset to the ecosystem. In effect, expansion itself is a source of market power.

While it goes beyond the scope of this article to analyse each of the European Commission decisions in great detail, it is clear that merger oversight in the past has not always accounted for this new form of market power. As a result, merging undertakings have been undervalued, and the potential competitive effects of non-horizontal mergers has been underestimated. Analysing such cases from the data ecosystem perspective therefore has an added value in competition law analysis. This is especially true in merger oversight since preventing market power can be vital in regulating these markets. If data ecosystem expansion is allowed to progress without close scrutiny, the establishment of a few dominant ecosystems which control consumers’ online experience risks becoming a *fait accompli*. Data ecosystems can be complicated to break up after the fact, and datasets, once combined, can be nearly impossible to untangle. As such, the European Commission should

be wary of letting data ecosystem companies pass through significant mergers under the sail of the Non-horizontal Merger Guidelines. Otherwise, effective competition could still be impeded through the 'hidden' sources of market power described in this article, the full consequences of which may only become apparent when the ship of competition law oversight has long since sailed.

Ultimately, the market power of a potentially dominant data ecosystem is not defined strictly by single narrowly defined markets. It is their hub-and-spoke data monetization strategy, network effects, reach, and expansion across the entire digital marketplace which must be considered. Above all, this is what competition lawyers and regulators should study carefully.

There is still much research to be done on how data ecosystems should be regulated, and indeed a number of promising investigations have already been launched across the world. However, the starting point and guiding principle of any such regulation must be this: personal data protection and competition cannot be separated. It is the personal data collection itself which lends the incumbent data ecosystems their market power, across the World Wide Web as a whole. 'Everything the data touches' becomes a part of the data ecosystem's kingdom.

