

DOI 10.5817/MUJLT2025-1-1

NETWORK EFFECTS AND THE DYNAMICS OF DIGITAL MARKETS IN THE DATA ECONOMY

by

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With the advent of the digital age, data has become one of the most powerful tools shaping markets. The article examines how data is crucial for online platforms in gaining dominance, as well as several characteristics of online markets that play a role in competitiveness. Throughout the article, network effects, multi-sided markets, switching costs, and lock-in effects are discussed as examples of how these factors might affect innovation and restrict competition. The purpose of the article is to provide an overview of digital markets' challenges and highlights recent regulations intended to promote a competitive digital markets.

KEY WORDS

Data, Data Economy, Digital Markets, Network Effects, Competition Law

1. INTRODUCTION

Recent technological developments have revolutionised the markets and business models. Digital markets and platforms are of particular importance in this regard. As digital markets become more relevant and the economics behind them become more complex, competition law and authorities face new challenges. Network externalities might make markets highly concentrated. Therefore, such markets become less competitive if potential competitors face high barriers to entry due to structural disadvantages, compared to early market entrants. Several characteristics of online markets may allow for business practices that prevent fair competition.¹ The article aims to show the use of data in the digital age, along with the main

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¹ Brühl, V. (2023) Big Tech, the platform economy and the European digital markets. *Center for Financial Studies, CFS Working Paper Series*, 711, p. 3

characteristics of digital platforms and the problems they pose in the competitive environment. In this regard, Section 2 analyses the power of data after defining data and Big Data. Afterwards, Section 3 describes the main elements of online platforms and the problems associated with them, including multi-sidedness, network effects, economies of scale and scope, multi-homing, switching costs, and lock-in effects. Finally, Section 4 presents some current efforts to regulate digital markets and minimise online platform challenges as well as concerns regarding their success.

2. DEFINITION AND POWER OF DATA

Data has become more important than ever before, with the Economist referring to it as the new oil.²

The importance of data comes from the fact that it is not only collected and stored but also analysed and utilised. After companies discovered the value of data in the establishment of market power, they evolved their business models to emphasise the collection and use of data. Data refers to information that can be factual or digital in form and transmitted or processed, as well as information generated by a sensing device or organ that includes useful and redundant information and which must be processed to provide information that is meaningful. Data can be used to detect someone's behaviours, wishes, traits etc. This type of data is considered personal data, which is protected by data protection laws that set limits on the collection and usage of that data to ensure the privacy of consumers and users. Specifically, personal data is any information pertaining to a data subject. Examples of personal data include names and surnames, home addresses, e-mail addresses, an Internet Protocol (IP) address, and a cookie ID. However, it is not considered personal data if the data has been anonymised in such a way that it no longer identifies the individual.³

It is possible to categorise data as quantitative or qualitative, depending on the answer to the question, "how much/many" and "why". Quantitative data refers to statistical data that is expressed in numbers and values, and is therefore more easily processed and suitable for commercial use. However, qualitative data does not possess a statistical structure and is either unstructured or semi-structured in nature. Hence, it cannot be processed

² The Economist. (2017) *The world's most valuable resource is no longer oil, but data*. [online] London Available from: <https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data> [Accessed 12 March 2025]

³ European Commission. Data protection explained. Available from: https://commission.europa.eu/law/law-topic/data-protection/data-protection-explained_en [Accessed 12 March 2025]

directly or easily by machine language, which means it requires an algorithm to make it profitable.

A data subject may provide voluntarily or the platform may infer a data subject's data using artificial intelligence, thus, data can be volunteered, observed or inferred. Users may provide voluntarily data through platforms they use, such as setting up an account on a website or sharing their personal data with an online shopping site. Observed data may be collected as a result of individuals' activities, such as tracking web users' browsing history or location data provided by mobile devices. Analysing observed data yields inferred data.⁴

Data collected by a company itself from its own sources is referred to as "first-party data". The company collects this data through its websites, apps, social media accounts or surveys. For instance, when a company collects information about its customers' demographics, purchase history and time spent on its website, all of this information is considered first-party data. However, if a company purchases data collected by another entity, it is considered third-party information. Contrary to first-party data, third-party data is not free. As well as collecting first-party data, companies can also buy third-party data for better efficiency.⁵

Big Data differs from data in that it has 5 Vs, including volume, velocity, value, variety and veracity. When most people think of Big Data, they think of the "Volume", which represents the enormous amount of data. "Velocity" refers to the rate at which this data is collected, processed, stored and analysed. "Variety" relates to all types of data generated by humans or machines; structured, semi-structured and unstructured. "Veracity" of the source data is the result of the data accuracy of analysis. As a final and most important aspect of Big Data, "Value" is what companies strive to achieve and in which they gain the market power.⁶

Data has become increasingly vital in recent years and it is not a myth that it can be utilised to gain an economic advantage and enhance an undertaking's position in the market. Analysis of data can be used by companies to better target users that may create an advantageous feedback loop, a mutually beneficial system that will make it possible for the company to gain access to a greater amount of data. As users demand more, the

⁴ International Competition Network. (2024) Control of Data, Market Power, and Potential Competition in Merger Reviews. *Merger Working Group*, p. 17.

⁵ European Data Protection Board. (2024) *Opinion 28/2024 on certain data protection aspects related to the processing of personal data in the context of AI models*. p. 11.

⁶ Ishwarappa, K. and Anuradha, J. (2015) A Brief Introduction on Big Data 5Vs Characteristics and Hadoop Technology. *Procedia Computer Science*, 48, pp. 320-321.

company would be able to gather more data, improving user experiences and attracting more consumers.⁷

Refusal to access to data may be seen as anti-competitive if we consider data as an essential facility in terms of competition law. In addition to access to data, its accumulation can be a key indicator of a high entry barrier in a market, as well as the amount of data a company has that is likely to contribute to dominance. This is notably evident when a dominant company serves both as a marketplace and as a seller of its own products.⁸

A further anti-competitive scenario would be the use of algorithms to discriminate against prices. In many sectors, companies discriminate against customers and offer prices that reflect their willingness-to-pay for a specific product or service. As a result of data-based price discrimination, some consumers would pay higher prices, while others would pay lower prices. In light of this, it is difficult to assess the effects of price discrimination based on the facilitation of data.⁹

Through data, dominant firms can detect and acquire potential rivals early, before they become an actual threat. This strategy is often called “killer acquisitions”, in which established firms purchase emerging competitors to eliminate future competition, rather than improving innovation and efficiency. These acquisitions are typically outside of the notification thresholds set by traditional merger control regimes, particularly those that rely on turnover as a key criteria. The enforcement authorities may be unable to identify these acquisitions as anti-competitive since they could lack access to this information or fail to comprehend its significance.¹⁰ This creates an enforcement gap in the digital economy, as competitive threats are not always apparent in financial statements. Moreover, the merger of two companies that have already established strong positions in separate upstream and downstream markets may prevent new competitors from entering those markets.¹¹

⁷ U.S. Subcommittee on Antitrust Commercial and Administrative Law of the Committee on the Judiciary. (2020) Investigation of Competition in Digital Markets. *Majority Staff Report and Recommendations*, p. 42.

⁸ *Ibid.*

⁹ Autorité de la concurrence, Bundeskartellamt. (2016) *Joint Paper on Data and Its Implications for Competition Law*. [press release] 10 May. p. 21. Available from: https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2016/10_05_2016_Big%20Data%20Papier.html

¹⁰ U.S. Subcommittee on Antitrust Commercial and Administrative Law of the Committee on the Judiciary. (2020) Investigation of Competition in Digital Markets. *Majority Staff Report and Recommendations*, p. 44.

¹¹ Autorité de la concurrence, Bundeskartellamt. (2016) *Joint Paper on Data and Its Implications for Competition Law*. *Op. cit.* p. 17.

Lastly, massive collection of data can bring privacy and data protection concerns as firms can use market power to acquire more data from users to strengthen their position in the market.

3. CHARACTERISTICS OF DIGITAL PLATFORMS

Digital platforms are places where users are brought together for a particular purpose such as exchange of information, commercial transactions by a platform operator.¹²

Digital platforms can be described as digital services that facilitate communication between different but interdependent groups of users that can be firms or individuals via the Internet.¹³ As Geradin and Katsifis point out, digital markets share certain economic characteristics, such as extreme returns to scale, network externalities, the importance of data and ecosystems, by emphasising that these characteristics are not unique to online platforms, but they are exhibited in such a manner that has never been seen before.¹⁴ Even though these characteristics can be found in old industries, including electricity, gas and railway, new industries, including search engines, e-commerce platforms and social networks, are certainly likely to experience rapid change and disruptive innovation, resulting in the emergence of these features at an increasingly rapid rate.¹⁵

In this regard, this article examines the main characteristics of digital platforms, such as multi-sidedness, network effects, economies of scale and scope, single and multi-homing, switching costs, and lock-in effects.

3.1. MULTI-SIDED MARKETS AND AD-FUNDED BUSINESS MODEL

Multi-sided markets, or more specifically two-sided markets, are not new terms and can be seen even in newspapers where advertisers and readers interact.¹⁶ In a two-sided market, two sets of agents interact through an intermediary or platform and their decisions have an impact on the outcomes of the other set of agents, usually due to externalities.¹⁷

¹² European Commission (2016a). *Communication Online Platforms and the Digital Single Market Opportunities and Challenges for Europe*, 25 May 2016, COM(2016) 288 final.

¹³ OECD. (2019) *An Introduction to Online Platforms and Their Role in the Digital Transformation*. p. 21.

¹⁴ Geradin, D. and Katsifis, D. (2022) Strengthening effective antitrust enforcement in digital platform markets. *European Competition Journal*, 18 (2), p. 362.

¹⁵ Graef, I. (2016) EU competition law, data protection and online platforms: Data as essential facility. *International Competition Law Series, Kluwer Law International*, 68, p. 43.

¹⁶ Eriksson, C. I., Åkesson, M. and Lund, J. (2016) Designing Ubiquitous Media Services - Exploring the Two-Sided Market of Newspapers. *Journal of Theoretical and Applied Electronic Commerce Research*, 11 (3), pp. 1-19.

¹⁷ Rysman, M. (2009) The Economics of Two-Sided Markets. *Journal of Economic Perspectives*, 23 (3), p. 125.

Accordingly, platform effects describe the feedback loops created by a platform when users produce value for other users, which attracts more users, who in turn produce more value, which attracts yet more users.¹⁸ As there is no clear consensus on the definition of a two-sided market, and some definitions are rather broad, it may be difficult to show that a market is not two-sided. However, according to Rysman, markets with positive feedback loops would be two-sided under any definition.¹⁹

In the age of digitalisation, the nature of two-sided markets has not changed but evolved into digital platforms, such as Facebook. The German Competition Authority defined Facebook as a multi-sided market in its decision, expressing that “the service Facebook offers to its advertising customers becomes more attractive the more the quality and quantity of the data it provides to these customers increase.”²⁰

Despite Facebook being “free”, as it is financed by advertising, in this instance, the currency is data rather than money. This model can be seen by the fact that users will see advertisements related to certain products when they like them. As long as users are active on Facebook, the platform collects more data about them. Since Facebook’s strong user lock-in prevents users from easily multi-homing when family and friends use the platform as well, the platform creates a natural monopoly.

When data is being used as a currency, online platforms within an attention market can aim to capture as much attention as possible from users. In this manner, platforms can collect more personal data, enabling them to provide advertisers and users with more valuable services. However, platforms can also misuse personal data to gain more attention from individuals and to influence their thinking.²¹

On the basis of the above, even though some online platforms appear to be free, data is being exchanged for currency, and this can result in market disruptions.

¹⁸ Van Alstyne, M. (2019) The opportunity and challenge of platforms, Platforms and Ecosystems: Enabling the Digital Economy Briefing Paper. *World Economic Forum*, p. 8.

¹⁹ Rysman, M. (2007) The Empirics of Antitrust in Two-Sided Markets. *Competition Policy International Journal*, 3 (1), p. 198.

²⁰ Judgment of 23 June 2020, Facebook, KVR 69/19, ECLI:DE:BGH:2020:230620BKVR69.19.0, paragraph 43.

²¹ Tóth, A. (2023) Strengthening of EU Regulatory Intervention Against Data Exploitations By Online Platforms with a Zero-Price Business Model. *Masaryk University Journal of Law and Technology*, 17 (1), p. 115.

3.2.NETWORK EFFECTS

Interrelation between customer groups often affects the demand for many products, that gives rise to network effects, that is one of the characteristics of online platforms. Network externality or effect is defined by McKnight and Bailey as “the benefit gained by incumbent users of a group when an additional user joins the group. The group can be thought of as a ‘network’ of users, hence the term network externality.”²² According to Liebowitz and Margolis, the value that results from consumers’ increased use of the product or service can be divided into two categories: its intrinsic value when used alone (autarky value) and the added value from interacting with other users (synchronisation value), with the latter being key to network effects.²³

Network effects may appear advantageous to consumers since they increase the utility of their consumption through the synchronisation value, but they can also serve as a source of dominance for undertakings and a barrier to entry for new entrants.²⁴ This was also emphasised by the European Commission in *Whatsapp/Facebook* case as “The existence of network effects as such does not a priori indicate a competition problem in the market affected by a merger. Such effects may however raise competition concerns in particular if they allow the merged entity to foreclose competitors and make more difficult for competing providers to expand their customer base.”²⁵

Moreover, in 2021 Compendium of approaches to improving competition in digital markets it was stated that network effects may impact competition in several ways. Platform businesses may benefit from them and may invest and compete aggressively to acquire scale, or they may act as a deterrent to entry that insulates market power from competing firms.²⁶

Based on the above, it is possible that network effects can have both beneficial and detrimental effects on competition. On the one hand, network effects may be beneficial to emerging market participants. For instance, a new entrant with an innovative feature or unique value proposition can attract a significant user base. As a result, it will be able to gain more users due

²² McKnight, L. W. and Bailey, J. P. (eds.) (1997) *Internet Economics*. Cambridge: MIT Press, p. 6, note 3.

²³ Liebowitz, S. J. and Margolis, S. E. (2002) *Network Externalities (Effects)*. In: Newman, P. (ed.) *The New Palgrave Dictionary of Economics and the Law*. London: Palgrave Macmillan.

²⁴ Graef, I. (2016) EU competition law, data protection and online platforms: Data as essential facility. *International Competition Law Series, Kluwer Law International*, 68, p. 44.

²⁵ COMMISSION DECISION of 3 October 2014 declaring a concentration to be compatible with the common market, Facebook/WhatsApp, COMP/M.7217, paragraph 130

²⁶ G7 Competition Authorities (2021) *Compendium of approaches to improving competition in digital markets*. Available from: https://assets.publishing.service.gov.uk/media/61d6cef9d3bf7f054798bbe5/Compendium_of_approaches_to_improving_competition_in_digital_markets_publication.pdf [Accessed 12 March 2025].

to network effects. This can result in rapid growth of market share and enable challengers to disrupt established market players. Hence, network effects can facilitate competitive dynamics by helping new entrants to gain a competitive advantage quickly if they provide a unique advantage to the user. However, this dynamic can result in what is known as “tipping” which means the market shifts strongly in favor of one firm, possibly leading to long-term dominance.²⁷

On the other hand, network effects can act as a barrier to entry, limiting competition by reinforcing established firms’ dominance. As a company’s user base expands, it gains access to more user data, which can be leveraged to enhance product or service quality. Providing an improved product and service will further attract users, creating a feedback loop that will strengthen the incumbent’s position in the market. As a consequence, it would be difficult for new entrants to compete effectively.²⁸

Network effects can be a possible indicator of market power and act as significant barriers for new entrants. In these instances, network effects can raise switching costs, leading to consumer lock-in and limiting options for multi-homing strategies.²⁹ Although network effects may exist on one side of the market, they are not sufficient to demonstrate market power. Therefore, authorities should consider other factors that indicate market power in their market analysis.

3.2.1 Positive and Negative Network Effects

Network effects can be positive or negative depending on the circumstances. For instance, social media platforms can result in a positive network effect, as the value of a platform increases for each individual as more users join, since more people are available to connect with.

Belleflamme and Peitz illustrate negative network effects with the example of road congestion and traffic jams. In this case, as more drivers use a particular road at the same time, the traffic flow slows down, decreasing the overall benefit for each driver.³⁰ Similarly, advertisers can be subject to negative network effects on online platforms. Advertisers do not benefit from new advertisers. As additional advertisements are displayed, existing advertisers face greater competition for user attention, thereby reducing the

²⁷ Autorité de la concurrence, Bundeskartellamt. (2016) Joint Paper on Data and Its Implications for Competition Law. *Op. cit.* p. 28.

²⁸ Ibid.

²⁹ International Competition Network. (2024) Control of Data, Market Power, and Potential Competition in Merger Reviews. *Merger Working Group*, p. 47.

³⁰ Belleflamme, P. and Peitz, M. (2016) Platforms and Network Effects. *Working Paper Series*, 16-14, p. 2.

effectiveness of each advertisement. The platform may also raise prices as demand for ad space increases, which further increases costs for advertisers.³¹ However, network effects may not be symmetrical since advertisers may suffer from increased advertising on the platform, but they may also benefit from an increase in users.³²

3.2.2 Direct and Indirect Network Effects

In Katz and Shapiro's widely accepted definition of network effects, they state that: *"There are many products for which the utility that a user derives from consumption of the good increases with the number of other agents consuming the good."*³³ In the same paper, they also differentiate between direct and indirect network effects.

They explain that direct network effects occur when the quality of a product improves as more people purchase it, illustrating this with the example of a telephone, which becomes more valuable as more households and businesses join the telephone network. In our current age, direct network effects can be observed in social media platforms such as Facebook or Instagram, where as more users join these platforms, the value for each individual user increases as more people are available to interact with, follow and share content with.

This also creates a powerful growth cycle across digital platforms. In social media and messaging apps, the more people who join, the richer the experience becomes, as people are able to connect with a broader network of friends, colleagues or new contacts. Similarly, as search engines gain more users, their algorithms improve, producing better, more relevant results. Network effects can also enhance a platform's competitiveness, creating entry barriers for newcomers by increasing user loyalty and utility. However, these effects do not affect all platforms equally, for instance, dating apps can experience negative effects if growth becomes excessive and matching becomes less effective. As a result, positive direct network effects are critical for platforms aiming to scale quickly, since the continuous increase in users can lead to exponential growth and value.³⁴

³¹ Graef, I. (2016) EU competition law, data protection and online platforms: Data as essential facility. *International Competition Law Series, Kluwer Law International*, 68, p. 45.

³² OECD (2017) *Network Effects and Efficiencies in Multisided Markets*. Shelanski, H., Knox, S. and Dhillon, A. Paris: OECD, p. 3.

³³ Katz, M. L. and Shapiro, C. (1985) Network Externalities, Competition, and Compatibility. *The American Economic Review*, 75 (3), pp. 424-440.

³⁴ OECD (2019) *An Introduction to Online Platforms and Their Role in the Digital Transformation*. Paris: OECD, p. 22. Available from: <https://doi.org/10.1787/53e5f593-en> [Accessed 12 March 2025].

On the other hand, indirect network effects arise when the value a consumer gains from a product or service grows as more people use compatible or complementary products.

Positive indirect network effects can be achieved by platforms in two-sided markets. When a platform provides better service for one side, it attracts more users to that side, which in turn increases the platform's appeal to the other user groups, creating a mutually reinforcing cycle of growth. This dynamic facilitates interaction between different user groups which benefit from each other's presence on the platform, thus solving a coordination problem. A platform with positive indirect network effects may be able to profit from this coordination.³⁵

A computer operating system can be considered an example of indirect network effects since if only a few people use a given operating system, there would be a limited number of programs and applications developed for that operating system. However, as more users adopt the system, developers create more compatible software, which in turn attracts even more users. Also, in the case of marketplaces such as Amazon or eBay or app stores such as Google Play or AppStore, the number and identity of sellers and app developers affect the value of the platform.

In their paper, Evan and Schmalensee used YouTube as an example to show how indirect network effects can be effective for digital platforms since the platform did not succeed by being first to market. Instead, it navigated a challenging startup phase to identify effective strategies for encouraging users to upload and view videos, since users on the platform fulfill different roles, therefore, platforms can attract both types of users.³⁶

Direct and indirect network effects can coexist in certain cases. For example, the value of a social network for an individual user grows as more people are involved (direct network effects). At the same time, a larger user base also increases network value for advertisers (indirect network effects).³⁷

³⁵ OECD (2019) An Introduction to Online Platforms and Their Role in the Digital Transformation. *Op. cit.*

³⁶ Evans, D. and Schmalensee, R. (2017) Debunking the 'Network Effects' Bogeyman. *Regulation*, Winter 2017-2018, p. 38. Available from: https://object.cato.org/sites/cato.org/files/serials/files/regulation/2017/12/regulation-v40n4-1.pdf?utm_source=Cato+Institute+E-mails&utm_campaign=9f32909490-regulation-winter-20172018&utm_medium=email&utm_term=0_395878584c-9f32909490-141199901&mc_cid=9f3 [Accessed 12 March 2025].

³⁷ Autorité de la concurrence, Bundeskartellamt. (2016) Joint Paper on Data and Its Implications for Competition Law. *Op. cit.* p. 27.

3.2.3 Scale and Scope Induced Network Effects

It is also possible to distinguish network effects as scale and scope induced. Scale-induced network effects result from increasing the value of a product or service as its production volume or user base increases, often resulting in lower costs and better service. An example of scale-induced network effects would be a ride-sharing service such as Uber, whose drivers are able to experience a better experience as the number of riders grows. Because of an increased number of users, the service becomes more efficient and appealing to both drivers and passengers. Moreover, as more users perform searches, a search engine such as Google is able to display more accurate and relevant search results, which enables it to collect and analyse more data. Likewise, the larger user base enables Google to target its advertising more precisely, which increases the platform's value and attracts additional advertisers.

In 2010, Microsoft and Yahoo! decided to merge their search operations in order to better compete with Google by taking advantage of scale-induced network effects.³⁸ Microsoft argued that the main purpose of optimising algorithmic relevance is to increase user engagement, which is aligned with the company's incentives to maximise paid advertisement revenue.³⁹ As a result of combining resources, user bases and datasets, both companies sought to improve the accuracy and relevance of their search results, thereby increasing the value of their services. The Commission also noted that the merger would allow the merging parties to provide greater relevance through greater scale.⁴⁰

Scope-induced network effects occur when a business expands its range of offerings, products, or services, creating a broader ecosystem that adds value through diversity and complementarity. For instance, Google provides scope-induced network effects through its Google Search, Google Maps, Gmail and YouTube products. Users are attracted to each additional service, creating a network where the combined offerings are more valuable than individual services.

³⁸ COMMISSION DECISION of 18 February 2010, Microsoft/Yahoo! Search Business, COMP/M.5727

³⁹ Ibid. para. 211.

⁴⁰ Ibid. para. 225.

3.3.COSTS AND ECONOMIES OF SCALE AND SCOPE

Besides network effects, digital markets can be described as having high fixed costs, low marginal costs.

Companies entering such markets often face substantial fixed costs related to research and development and the establishment of a network infrastructure to deliver products and services.⁴¹ These upfront investments are essential for companies to establish themselves on the market, which requires advanced technological tools and reliable connectivity. However, once they are established, producing additional units or servicing more users has a relatively low incremental cost, often approaching zero.⁴²

Microsoft's software development process is an example of high fixed costs and low marginal costs. For Microsoft to develop products such as Microsoft Word or Microsoft Excel, substantial investment must be made in both human resources and development efforts. These are the high fixed costs associated with the development of the software. However, once the software is developed and the code is written, additional copies can be produced and distributed at a low cost.⁴³

Both economies of scale and economies of scope contribute to the competitive advantage of digital platforms. A company enjoys economies of scale in product production or distribution when its average costs fall as output increases.⁴⁴ On digital platforms, after the initial infrastructure is built, adding more units or serving additional users is relatively low-cost, allowing platforms to expand their user bases at a minimal cost. This scaling advantage, combined with network effects, enables platforms to grow rapidly. Platforms that offer multiple services or products are also subject to economies of scope. An economy of scope occurs when a firm produces two or more products that are cheaper to produce together than separately.⁴⁵ For instance, platforms such as Google and Amazon share data, infrastructure, and users across multiple services, making each additional service more cost-effective compared to providing each service on its own.

⁴¹ Van Uytsel, S. and Uemura, Y. (2017) Competition Law Interference Prior to the Formation of a Digital Market: The JFTC's Enforcement Action Against DeNA. SSRN. Available from: <http://dx.doi.org/10.2139/ssrn.3086449>

⁴² Ekingen, E. (2022) An Overview of the Concepts of 'Digital Economy' and 'Digital Markets' as Ongoing Trends in EU Competition Law. *Selçuk Üniversitesi Hukuk Fakültesi Dergisi*, 30 (4), p. 1947.

⁴³ Hovenkamp, H. (2017) Antitrust and Information Technologies. *Florida Law Review*, 68 (2), Article 9, p. 425.

⁴⁴ European Commission (n.d.) *Glossary of Terms Used in EU Competition Policy: Antitrust and Control of Concentrations*, p. 15.

⁴⁵ Ibid.

Combined with economies of scale, the low marginal cost advantage enables firms to scale efficiently, which is particularly advantageous in digital markets in which the costs of adding users or distributing additional units are minimal.⁴⁶

In digital markets, economies of scale can create high barriers to entry, making it difficult for new companies to compete. Markets with increasing returns to scale tend to favour large firms since the cost per unit decreases with increasing output, which allows existing firms to dominate the market. Especially in digital markets, where high upfront fixed costs are required for infrastructure, research and development, these costs can serve as a barrier to entry for potential competitors.⁴⁷ Furthermore, established firms can become more competitive by adding more users and producing more units at a minimal cost, which makes it harder for new entrants to compete. Consequently, competition in such markets shifts from competition in the market to competition for the market, resulting in highly concentrated industries dominated by a few or a single company.⁴⁸

3.4.SINGLE-HOMING AND MULTI-HOMING

Single-homing and multi-homing are two other characteristics of online platforms that are usually taken into account by competition authorities when describing market power.

The term “single-homing” refers to the use of only one single platform or network by users. Single-homing occurs when both users and providers of a platform market choose one platform exclusively.⁴⁹

Business that sells an item that is unique and fits best on its own dedicated platform such as handmade items and crafts on Etsy is more likely to single-homing. Also, the majority of app developers are prone to single-homing, due to the complexity of developing apps for different platforms.⁵⁰

On the other hand, “multi-homing” occurs when users use numerous platforms or networks on the market. Multi-homing on competing platforms is generally seen as a factor likely to reduce market power since it disrupts the self-reinforcing feedback loop effect by allowing users to use multiple

⁴⁶ Ekingen, E. (2022) An Overview of the Concepts of ‘Digital Economy’ and ‘Digital Markets’ as Ongoing Trends in EU Competition Law. *Selçuk Üniversitesi Hukuk Fakültesi Dergisi*, 30 (4), p. 1947.

⁴⁷ International Competition Network. (2024) Control of Data, Market Power, and Potential Competition in Merger Reviews. *Merger Working Group*, p. 53.

⁴⁸ Van Uytsel, S. and Uemura, Y. (2017) Competition Law Interference Prior to the Formation of a Digital Market: The JFTC’s Enforcement Action Against DeNA. *Op. cit.*

⁴⁹ Bundeskartellamt (2016) *The Market Power of Platforms and Networks: Executive Summary*, p. 14.

⁵⁰ Barcevičius, E., Caturianas, D., Leming, A. and Skardžiūtė, G. (2021) Multi-homing: Obstacles, Opportunities, Facilitating Factors. *European Commission Analytical Paper*, 7, p. 8.

different platforms. In this way, network effects are less likely to lock-in users.⁵¹

Payment cards can be considered as an example of multi-homing in non-digital markets, which occurs when users engage with multiple platforms or networks. Many merchants accept various credit and debit card brands like Visa, Mastercard and American Express. Additionally, consumers tend to carry several payment cards even when they favour one payment card the most.⁵²

According to Rysman, while some cardholders may concentrate their spending on a single card network, they maintain flexibility by holding cards from various networks. This allows consumers to easily switch between their preferred card networks if necessary.⁵³

Furthermore, multi-homing can be seen in the online platforms where business users use several platforms to interact with their customers in order to provide goods, services, apps. For example, online travel agencies are a market type that multi-homing can be observed from the perspective of renters as they usually consider several options prior to making a reservation. Additionally, hotels and property owners can list their properties on multiple platforms so that renters can browse and reserve accommodations.⁵⁴

Another most common example of multi-homing would be social media platforms. According to a report published in 2018 by the Pew Research Center, social media users are increasingly using multiple social media platforms. Based on the results of this survey, there is substantial overlap between social media users. For example, significant majority of users of social media platforms use both YouTube and Facebook, while about three-quarters of Twitter and Snapchat users indicate that they also use Instagram.⁵⁵

⁵¹ Bundeskartellamt (2016) *The Market Power of Platforms and Networks: Executive Summary*, p. 14.

⁵² Evans, D. S. and Schmalensee, R. (2007) The Industrial Organization of Markets with Two-Sided Platforms. *Competition Policy International*, 3 (1), p. 166.

⁵³ Rysman, M. (2006) An Empirical Analysis of Payment Card Usage. *Boston University - Department of Economics - Working Papers Series*, p. 14.

⁵⁴ Barcevičius, E., Caturianas, D., Leming, A. and Skardžiūtė, G. (2021) Multi-homing: Obstacles, Opportunities, Facilitating Factors. *European Commission Analytical Paper*, 7, p. 8.

⁵⁵ Smith, A. and Anderson, M. (2018) *Social Media Use in 2018*. Pew Research Centre, pp. 1-4. Available from: <https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/> [Accessed 12 March 2025]

3.5. SWITCHING COSTS AND LOCK-IN EFFECTS

Another characteristics of digital platforms that affect market power are switching costs and lock-in effects. Switching costs can be defined as the costs associated with changing from one supplier to another, which can be monetary as well as non-monetary.⁵⁶ Switching costs refer to the expenses users incur when switching suppliers, such as information, learning or transaction costs, often influenced by existing suppliers' technological or commercial strategies.⁵⁷

Although users wish to change products or services they use, switching costs will prevent them from making the switch. The more switching costs are incurred, the greater the degree of lock-in. Due to their ability to lock-in users, switching costs represent an effective barrier to entry for companies. Switching costs may eventually contribute to a more difficult entry into established markets, and result in reduced competition.⁵⁸

A lock-in strategy might negatively impact society by preventing the adoption of more advanced technologies, as illustrated by the continued use of the QWERTY keyboard. Although the QWERTY layout was originally designed in the 1870s in order to slow down typists and prevent mechanical jams, it has remained dominant even after the Dvorak layout was introduced in 1932. Although Dvorak allows faster typing, high switching costs and the challenges of coordination at large have kept QWERTY in use, even with computer keyboards.⁵⁹

A more recent example would be the switch between Apple and Google mobile device ecosystems, which could result in the loss of purchased apps and subscription-based services. Furthermore, switching may result in the loss of access to applications and hardware that are not interoperable, which will further reinforce a user's loyalty to a particular digital ecosystem.

As stated before, switching costs can also arise from the learning process. For instance, according to the survey conducted in 2022 by Competition Markets Authority ("CMA"), 31% of iOS Marginal Users and 21% of Android Marginal Users stated that they did not want to spend time learning how

⁵⁶ Hernandez Perez, A. and Gonzalez, A. (n.d.) Switching Costs. *Global Dictionary of Competition Law, Concurrences*, Art. N° 117837. Available from: <https://www.concurrences.com/en/dictionary/switching-costs> [Accessed 12 March 2025]

⁵⁷ Avgeropoulos, S. and Sammut-Bonnici, T. (2014) Switching Costs. In: *Wiley Encyclopedia of Management*. John Wiley & Sons. Available from: https://www.researchgate.net/publication/272353027_Switching_Costs [Accessed 12 March 2025]

⁵⁸ OECD (2022) *The Evolving Concept of Market Power in the Digital Economy – Background Note*, DAF/COMP(2022) 5 May, p. 16.

⁵⁹ Sammut-Bonnici, T. and McGee, J. (2002) Network Strategies for the New Economy. *European Business Journal*, pp. 183-184.

to use a new operating system as one of reasons why they did not switch device.⁶⁰

The same challenge can be faced if a property owner rents through AirBnB and decides to switch platforms, as AirBnB will increase its fees and if the owner has a well-established reputation with AirBnB, it will be necessary for him or her to begin building a reputation on a new platform from the beginning.⁶¹

Aside from technical difficulties, users can encounter lock-in effects as a result of social factors. Even though Facebook accounts can be deactivated, it would be difficult for someone whose entire family and friends are currently active on the platform. This will result in users feeling as though they are locked into the platform.⁶²

Similar social factors can be found in the situation where Whatsapp forced Turkish users to share their data with other Meta (formerly known as "Facebook") platforms, as in the famous *Bundeskartellamt v. Meta* case.⁶³ In January 2021, Whatsapp announced a change in its data privacy policy for end users in Turkey. When users opened the application, a pop-up message prompted them to approve this change by February 2021, in order to continue using the application. The new policy eliminated the option for users to choose not to share their Whatsapp account information with Meta, thus requiring the sharing of data. Following this move, there was a significant backlash, and users began considering alternative social communication apps like Signal, Telegram and BiP (Turkish alternative). However, lock-in effects hindered the switch. Due to Whatsapp's dominance and established network effects, switching to another platform was difficult.

Following the announcement of Whatsapp's new policy, the Turkish Competition Authority initiated an *ex officio* investigation into Meta and Whatsapp for the possible abuse of the dominant position. Whatsapp was also ordered to notify its Turkish users that its new policy would not be enforced as of February 2021, pending the outcome of the ongoing investigation at the Authority. As a result of Meta's substantial market share in consumer communications, social networking and online advertising

⁶⁰ CMA (n.d.) *Appendix D: Barriers to Switching Between Mobile Operating Systems*, p. 7. Available from: https://assets.publishing.service.gov.uk/media/62a22d5bd3bf7f036750b0d8/Appendix_D__002_.pdf [Accessed 12 March 2025]

⁶¹ Hernandez Perez, A. and Gonzalez, A. (n.d.) *Switching Costs*. *Global Dictionary of Competition Law, Concurrences*, Art. N° 117837. Available from: <https://www.concurrences.com/en/dictionary/switching-costs> [Accessed 12 March 2025]

⁶² Waller, S. W. (2012) *Antitrust and Social Networking*. *North Carolina Law Review*, 90 (5), p. 1789.

⁶³ Judgment of 4 July 2023, *Meta Platforms Inc and Others v Bundeskartellamt*, Case C-252/21, ECLI:EU:C:2023:537

sectors, the Authority has decided on 11 January 2021 that this may result in exploitative and exclusionary consequences, which could lead to irreparable harm to consumers. In May 2021, the Turkish Competition Authority announced that Whatsapp had informed them that the updated terms, under which user data could have been shared with other Meta companies, would not apply to Turkish users, even if they already agreed to them.⁶⁴

Both examples demonstrate that most users would not choose a social networking platform solely based on functionality or privacy enhancements, but rather based on their family and friends' involvement in the platform, which causes switching costs and lock-in effects.

4. THE EU'S EFFORTS TO REGULATE DIGITAL PLATFORMS

As discussed in the previous chapter, online platforms are likely to pose significant risks by distorting competition and stifling innovation as a result of their characteristics. Therefore, the EU's recent effort to address these concerns is the Digital Markets Act ("DMA"), which was entered into force in 2022 and became effective in May 2023, thus making it relatively new.⁶⁵

The main aims of the DMA are "contestability" and "fairness". In order to achieve these objectives, the DMA introduces a number of measures aimed at addressing the challenges posed by dominant online platforms who are deemed as "gatekeepers" in the DMA, especially those that leverage strong network effects and have entrenched market positions. For instance, the DMA has a measure relating to multi-homing that ensures that users and businesses can connect to multiple platforms at the same time, thereby minimising lock-in effects and increasing competition. Additionally, interoperability encourages large platforms to make their services compatible with competitors, fostering innovation and consumer choice. Through the DMA, measures are intended to mitigate digital platforms' anti-competitive characteristics and their exclusionary effects, in an effort to make digital markets more fair and contestable.

⁶⁴ Paksoy (2021) *Client Briefing*. Available from: <https://paksoy.av.tr/en/2021/06/whatsapp-notifies-turkish-competition-authority-that-new-conditions-on-user-data-sharing-will-not-apply-in-turkey/> [Accessed 12 March 2025]

⁶⁵ Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act).

Along with the DMA, the Digital Services Act (“DSA”) is a key element of the Digital Strategy and the Digital Decade policy programme 2030.⁶⁶ The DSA, which came into force in 2022 and became effective in 2024, sets out clear guidelines and obligations for online platforms in order to ensure a secure, credible and reliable environment for online services.⁶⁷

The DMA and DSA are landmark efforts taken by the EU to regulate digital markets and constrain gatekeeper power, but questions remain regarding whether they are sufficient to address network effects. Due to the DMA’s focus on specific anti-competitive acts based largely on prior competition law cases, such as self-preferencing, which was central to the EU’s enforcement actions against Google⁶⁸, it mostly offers behavioural remedies rather than structural ones.

Abuse of dominance remedies fall into two categories: behavioural and structural. Through behavioural remedies, dominant businesses are required to cease certain practices or take affirmative steps, such as combining data or enabling interoperability. On the other hand, structural remedies are forms of intervention that directly impact and alter market structures. As a result, they may intervene in the undertaking by requiring the divestiture of specific assets or business units.⁶⁹

Although the DMA focuses primarily on behavioural remedies, structural remedies are designated as a last resort under Article 18. Thus, the DMA may not be able to significantly disrupt self-reinforcing network effects and ecosystem lock-ins that entrench gatekeeper power.

Also, the European Commission’s decision to designate ByteDance, the operator of TikTok, as a gatekeeper under the DMA brought concerns regarding the coherence and proportionality of gatekeeper designations under the DMA. ByteDance challenged this designation before the General Court, seeking interim measures to suspend the obligations. According to ByteDance, TikTok lacks the entrenched network effects and ecosystem lock-in typically associated with gatekeeper status, and users engage in

⁶⁶ Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act)

⁶⁷ Brühl, V. (2023) Big Tech, the platform economy and the European digital markets. *Center for Financial Studies, CFS Working Paper Series*, 711, p. 4.

⁶⁸ COMMISSION DECISION of 27.6.2017 relating to proceedings under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the Agreement on the European Economic Area (AT.39740 - Google Search (Shopping)). *Official Journal of the European Union* (C(2017) 4444) 27 June. Available from: https://ec.europa.eu/competition/antitrust/cases/dec_docs/39740/39740_14996_3.pdf

⁶⁹ Mandrescu, D. (2024) Designing (restorative) remedies for abuses of dominance by online platforms. *Journal of Antitrust Enforcement*, p. 9.

multi-homing across platforms. It further emphasised the platform's limited role as a critical gateway for business users.⁷⁰

Nevertheless, the General Court upheld the Commission's designation, clarifying that in the absence of long-standing dominance, a platform may qualify as a gatekeeper under the DMA if it meets the quantitative thresholds and exhibits characteristics that justify qualitative assessment. As a result, the Court appeared to adopt a proactive approach, accepting that TikTok's fast growth and potential market influence were suitable grounds for regulatory analysis.⁷¹ Consequently, it appears to suggest a broad and flexible interpretation of the DMA's designation framework that may raise questions regarding the clarity of the gatekeeper concept.

As a result, the DMA and the DSA represent major developments in digital regulation, but their ultimate success in reducing network effects and enabling sustainable market competition may depend on greater legal clarity.

5. CONCLUSION

In the digital economy, data has become a crucial source of power which empowers those who control it. Because digital platforms possess unique characteristics, they often create complex market dynamics that reinforce dominance and limit competition. Network effects, which result in a platform becoming more valuable as more users join, give established players such as "GAMAM" (namely Google, Amazon, Meta, Apple and Microsoft) an advantage in attracting users, making it difficult for new competitors to compete. Additionally, users and businesses are discouraged from leaving dominant platforms due to high switching costs and lock-in effects. For example, App Store and Play Store impose restrictions that make it difficult for developers to distribute their apps outside of these ecosystems. The problem often results in fewer consumer choices, reduced innovation and an imbalance in the digital market as a result.

Because of the challenges presented by these platforms, more effective regulation has become necessary to ensure a more contestable and fair environment in the digital economy. The DMA and the DSA can be viewed as an effort to address these challenges and reduce their network effects.

Although the DMA and the DSA are a significant evolution in the EU's digital regulatory approach, they are complementary instruments rather than serving as the sole solution. Achieving success depends not only on

⁷⁰ Judgement of 17 July 2024, *ByteDance v Commission*, T-1077/23, ECLI:EU:T:2024:478

⁷¹ Court of Justice Of the European Union (2024). *Judgment of the General Court in Case T-1077/23 Bytedance v Commission*, 114/24, [Press Release] 17 July 2024. Available from: <https://curia.europa.eu/jcms/upload/docs/application/pdf/2024-07/cp240114en.pdf>

enforcement, but also on whether EU institutions and courts are prepared to engage in an ambitious agenda that directly addresses the economic infrastructures that enable dominance. Thus, these efforts should be read in conjunction with other tools that focus on merger control, data sharing, and economic analysis. Even though the DMA aims to facilitate enforcement by limiting economic analysis, it will still be useful for the designation process and effective evaluation.⁷²

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⁷² Guimarães, G. (2024) A comment on ByteDance v Commission: the General Court's take on gatekeeper designation. *JusGov Research Paper Series*, p. 10.

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