

# From Two-Sided Networks to Digital Ecosystems: The Economics of Platform Markets

ANDREAS HEINEMANN\*

Competition law is based on the concept of relevant markets. Thinking in relevant markets is supposed to identify the competitive relationships between undertakings. According to traditional concepts, “competitors” are firms that offer (or demand) products on the same relevant market. The goal of market definition is to find out if two or more firms are standing in a competitive relationship, or if they are active on different relevant markets. In this sense, according to the Market Definition Notice of the European Commission of 1997, the “main purpose of market definition is to identify in a systematic way the competitive constraints that the undertakings involved [...] face”.<sup>1</sup>

The traditional way of market analysis has come under pressure in the digital economy. The interrelationship between different economic activities is seen more clearly now. It is certainly true that also in traditional competition analysis, the interaction between complementary goods, between main and aftermarket, as well as the bond between reader markets and advertising markets in the newspaper and media industry has always been recognized. In the digital economy, however, more recent concepts such as that of two-sided markets and of multi-sided platforms have sharpened the analytical toolbox. Now, a new construct has taken centre stage, and that is digital ecosystems. The Digital Markets Act (DMA)<sup>2</sup>, providing for new rules for gatekeepers, prominently mentions the concept in Recital 3: “Some of these undertakings exercise control over whole platform ecosystems in the digital economy and are structurally extremely difficult to challenge or contest by existing or new market operators, irrespective of how innovative and efficient those market operators may be.” Moreover, the EU General Court has ennobled this concept in its *Google Android* decision by including it in the keywords at the beginning of the judgment.<sup>3</sup> Finally, the German term of “Undertakings of Paramount Significance for Competition Across Markets”, inserted into § 19a of the

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\* Professor of Commercial, Economic, and European Law, Faculty of Law, University of Zurich, Switzerland.

<sup>1</sup> European Commission, Notice on the definition of relevant market for the purposes of Community competition law, OJ 1997 C 372/5, N. 2. The Market Definition Notice is currently under revision, see *infra* note 13.

<sup>2</sup> 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 (Digital Markets Act), OJ L 265/1.

<sup>3</sup> General Court, 14.9.2022, T-604/18 – *Google and Alphabet/Commission (Google Android)*, ECLI:EU:T:2022:541. The importance of the new terminology may be illustrated by a comparison with the list of keywords in the groundbreaking *Microsoft* judgment of the same court that is restricted to traditional concepts like refusal to deal and tying, see Court of First Instance, 17.9.2007, T-201/04 – *Microsoft/Commission*, ECLI:EU:T:2007:289.

German Act Against Restraints of Competition (GWB) by the 10<sup>th</sup> reform of the Competition Act of 2021,<sup>4</sup> is obviously inspired by the idea of digital ecosystems.<sup>5</sup>

The concept of digital ecosystems is a challenge to traditional market analysis. Finding new forms of competitive restraints raises the question whether market definition has to be adapted. For a solid answer, the economics of platform markets has to be taken into consideration. In the following, we will therefore trace how the method of market analysis has been increasingly refined and what conclusions can be drawn from this for digital ecosystems.

### A. “Single-sided” Markets

Of course, there are no “single-sided” or “one-sided” markets since the essence of a market is to bring two sides together, i.e. sellers and buyers, to exchange any type of product (goods or services) or factor (labour or capital). The term is used here to mark the contrast with two-sided markets where one platform is used for two different activities with two different trading partners (see *infra* at paragraph C). A “single-sided” market in this sense is a “normal” market that is usually the starting point for market definition.

### I. Traditional Market Definition and its Shortcomings

It is generally recognized (although not completely undisputed<sup>6</sup>) that markets have to be defined in a product dimension,<sup>7</sup> in a geographic dimension and sometimes also in a time dimension. The main instruments for defining relevant markets are demand substitution, supply substitution and potential competition.<sup>8</sup> For determining demand substitution, the SSNIP test is recommended (*small but significant non-transitory increase in price*), i.e. the question if an increase in price of 5 to 10 % would be profitable. For this purpose, the increase in revenue that comes from the loyal customers has

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<sup>4</sup> Law from 18 January 2021, BGBl. 2021 I, 2.

<sup>5</sup> See the Draft Law of the German Federal Government, 19.10.2020, BT-Drucksache 19/23492, p. 73; Recommendation and Report of the Committee on Economic Affairs and Energy, 13.1.2021, BT-Drucksache 19/25868, p. 112 ff. Overview of the application to date and criticism by Franck, Jens-Uwe/Peitz, Martin, Market Definition and Three 19a Designations Under German Antitrust Law: Alphabet, Meta, and Amazon, Competition Policy International – Antitrust Chronicle: Defining Platform Markets, January 2023, Vol. 1(1), p. 38 ff.

<sup>6</sup> See for example the general criticism against market definition by Kaplow, Louis, Why (Ever) Define Markets?, 124 Harvard Law Review 437 (2010); for further references on the dispensability of market definition see Yildiz, Okan/Weber Rolf H., Market Definition and Market Power in the Era of Blockchain, EuZ 2023, p. C1, C13 fn. 47.

<sup>7</sup> Unfortunately, this terminology is misleading. The use of the term “product” obstructs the view that there are relevant markets also for the factors of production, namely labour and capital. Thinking in “product” markets is one of the reasons for the long-standing neglect of labour markets in competition law, see Heinemann, Andreas, Kartellrecht auf Arbeitsmärkten, WuW 2020, 371, 379, 381 f. The terminology in the German language is more open: The main term here is “sachlich relevanter Markt” which includes products and factors of production.

<sup>8</sup> Market Definition Notice (note 1), N. 13 ff.

to be compared with the losses due to customers that switch to another product as a consequence of the price hike.<sup>9</sup>

This approach no longer makes sense when a pecuniary reward is renounced upon. In the digital economy, users often do not pay with money, but with attention or data so that a test based on an increase in price does not work. For a long time, the phenomenon of products that are given “for free” has caused confusion. In German unfair competition law, for example, the distribution free of charge of advertising bulletins or giveaway newspapers was viewed with suspicion in former times. It is only recently that the interaction between different markets, in particular with the advertising markets, has been perceived more clearly, so that a more positive view has been taken.<sup>10</sup>

Also in Germany, the concept of relevant markets has been applied to narrowly in this context. The opinion was widespread that a relevant market only exists if there is a monetary return. The digital economy with its many “free” online services could not be adequately assessed in this way. Convincingly, the 9<sup>th</sup> reform of the German Competition Act from 2017 brought in § 18 (2a) GWB the following clarification: “The assumption of a market shall not be invalidated by the fact that a good or service is provided free of charge.”<sup>11</sup>

Although it therefore seems clear today that the absence of a monetary remuneration does not exclude the existence of a relevant market in the competition law sense, the question has to be asked how exactly we shall define the relevant market, if the basic concept, i.e. the SSNIP test, does not work any longer since no price exists that we could hypothetically increase.<sup>12</sup> In these cases, the European Commission uses e.g. the following criteria: product functionalities, intended use, substitutability according to industry views, market barriers and switching costs.<sup>13</sup> Moreover, it has been suggested to expand the SSNIP test to a “SSNDQ”-test (*small but significant non-transitory decrease in quality*) for these cases.<sup>14</sup> According to this test, the question has to be asked if it would be profitable for a firm to forego investment and thus reduce quality, or if in this case so many customers would switch to competing services that the loss of revenues, for example from advertising, would be greater than the cost savings. In this case, both services belong to the same relevant market.

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<sup>9</sup> Market Definition Notice (note 1), N. 17. Certain shortcomings of the traditional methodology have been revealed such as the *cellophane fallacy*, see the groundbreaking article of Turner, Donald F., Antitrust Policy and the Cellophane Case, 70 Harvard Law Review 281 (1956); more recently Nachbar, Thomas B., Qualitative Market Definition, 109 Virginia Law Review 373, 384 ff. (2023).

<sup>10</sup> BGH GRUR 2004, 602 – 20 Minuten Köln.

<sup>11</sup> Law from 1 June 2017, BGBl. 2017 I, 1416.

<sup>12</sup> But see attempts to adapt the SSNIP test to the particularities of two-sided markets by considering not only the price level, but also the price structure among the different market sides, for example by Dewenter, Ralf/Heimeshoff, Ulrich/Löw, Franziska, Market Definition of Platform Markets, Helmut Schmidt University Hamburg, Department of Economics, Working Paper No. 176, March 2017.

<sup>13</sup> Draft Commission Notice on the definition of the relevant market for the purposes of Union competition law, 8.11.2022 <[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_6528](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6528)> (accessed 26 May 2023), N. 98.

<sup>14</sup> Gebicka, Aleksandra/Heinemann, Andreas, Social Media & Competition Law, 37 World Competition 149, 158 (2014).

In the *Google Android* case, the SSNDQ test has been used by the European Commission and by the General Court.<sup>15</sup> The question was asked if a deterioration in the quality of *Android* would cause a sufficient proportion of users to switch to other mobile operating systems. According to the findings of the European Commission, confirmed by the General Court, users are not sufficiently sensitive to a deterioration in the quality of the *Android* operating system. Thus, the SSNDQ test has been important for the conclusion that non-licensable mobile operating systems, such as *Apple's*, are not part of the same relevant market as licensable mobile operating systems, such as *Android*.<sup>16</sup> Meanwhile, the European Commission has added the SSNDQ test to the standard toolbox of market definition: The test has been included in the Draft Market Definition Notice.<sup>17</sup>

## II. Interaction between Markets

The preceding remarks show that it is possible to adapt the traditional methodology of defining relevant markets to the challenges of the digital economy. However, other problems arise. For example, the turnover thresholds in merger control fail if no turnover is generated. Or regarding the abuse of a dominant position, prices of zero (or even negative prices) must not automatically be considered predatory pricing because they may make sense in a digital, multi-sided context. While these problems may be solved (by new notification rules in merger control;<sup>18</sup> or by a deeper understanding of predatory strategies), one fundamental challenge remains: If the expectation towards market definition is to identify the competitive constraints that weigh on undertakings,<sup>19</sup> the risk is high that other constraints are overlooked once the definition of the relevant market has been completed. In this sense, the traditional method of defining relevant markets in competition law is criticized by economists. Some prefer the direct measurement of market power, for example by concepts like *Upward Pricing Pressure (UPP)* and *Critical Loss Analysis*.<sup>20</sup> The goal is to include into the analysis any factor that reduces or enlarges the capacity of firms to behave independently from other actors.

In fact, such a holistic approach would avoid the risk of losing sight of the overall context which may arise when thinking in terms of markets is exercised too narrowly. However, this is countered by

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<sup>15</sup> See General Court, 14.9.2022, T-604/18 – *Google and Alphabet/Commission (Google Android)*, ECLI:EU:T:2022:541, N. 172 ff. (under the heading “The SSNDQ test”).

<sup>16</sup> Moreover, the General Court stressed that – due to the hypothetical character of the concept – the SSNDQ does not require evidence that it is in the undertaking’s interest to degrade the quality of its product. Nor is it required to define a precise quantitative standard of degradation of quality since an increase in price can be more easily quantified than a decrease in quality, see General Court – *Android*, N. 179 f.

<sup>17</sup> Draft Market Definition Notice (note 13), N. 32 fn. 47, N. 98.

<sup>18</sup> See for example the new policy of the European Commission with respect to the referral mechanism under Art. 22 of the EU Merger Regulation: European Commission, Guidance on the application of the referral mechanism set out in Art. 22 of the Merger Regulation to certain categories of cases, OJ 2021 C 113/1.

<sup>19</sup> *Supra* note 1.

<sup>20</sup> See Ferro, Miguel Sousa, *Market Definition in EU Competition Law*, Cheltenham 2019, p. 332 ff., and the summary at p. 2: “Economists tend to see market definition as a necessary evil, an imperfect instrument to arrive at an end which would, ideally, be reached through methods of direct assessment of market power”.

major disadvantages (and of course the fact that the law in its current shape is based on the delineation of relevant markets): Huge amounts of data are required for the direct measurement of market power. Moreover, economic models have to be used that are not a perfect reflection of the real world, either. Therefore, it seems more adequate to stick to traditional thinking in relevant markets, but to systematically add insights into the interaction of these markets with other markets.

For this purpose, existing concepts can be built upon. An example is the relationship between primary and secondary markets, e.g. main products and spare parts or the *razor and blades* business model (“give 'em the razor; sell 'em the blades”). At its very end, the EU Market Definition Notice stresses that in this respect the application of the general principles of market definition “has to be undertaken with care”. While the “method of defining markets in these cases is the same”, “constraints on substitution imposed by conditions in the connected markets” have to be taken into account.<sup>21</sup>

This reminder may be generalized. Market definition is not an end in itself, but an instrument to describe competitive relationships. If this description is incomplete, the competitive restraints coming from outside the relevant market, have to be integrated into the analysis. Exactly in this sense, the Draft of a new Market Definition Notice makes a small but important change. According to this text, the “main purpose of market definition is to identify in a systematic way the *immediate* competitive constraints” upon undertakings.<sup>22</sup> Thus, it is highlighted that market definition does not give an exhaustive description of the competitive relationships but just an advanced sketch that has to be complemented by competitive constraints coming from somewhere else. Precisely in this sense, the Draft Market Definition Notice of the European Commission considerably extends its analysis about the interaction between relevant markets. For example, the reflections on connected markets with respect to primary and secondary markets, that are to be found in the final paragraph on “Additional Considerations” in the current Market Definition Notice, form an independent paragraph in the Draft Notice.<sup>23</sup> The analysis is more refined and takes into consideration a variety of factors. Thus, the competitive constraints are much better addressed.

### III. Conclusion

In the digital economy, the art of market definition has become even more complicated. The complexity of an increasingly interwoven economy is a challenge for market definition, or even for the concept of thinking in markets at large. Appropriate results can only be achieved if relevant markets are not interpreted as Leibnizian monads, but if the interaction between products is adequately reflected, be it on the level of the definition of the relevant market itself or when it comes to the overall analysis of competitive pressure. Here it is extremely important to avoid a reductionist

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<sup>21</sup> Market Definition Notice (note 1), N. 56. The headline is “Additional Considerations”.

<sup>22</sup> Draft Market Definition Notice (note 13), N. 5 (emphasis added).

<sup>23</sup> See Draft Market Definition Notice (note 13), paragraph 4.5 entitled “Market definition in the presence of after markets, bundles and digital ecosystems”.

approach and to always include the interaction between separate, but connected markets. The following remarks on network effects and multi-sided markets will fill these abstract insights with substance.

## **B. Network Effects and other Features of the Digital Economy**

The digital economy is characterized by a high rate of innovation (sustaining and disruptive<sup>24</sup>), extreme economies of scale and scope,<sup>25</sup> an increased need for standardization in a context of numerous intellectual property rights, large amounts of data, and – above all – by strong network effects. Positive network effects arise when the benefit for each individual user increases the more participants use the network. A distinction has to be made between direct and indirect network effects. A direct network occurs when utility rises with other participants using the same product. The standard example is the telephone network: A single phone is useless; the value of each phone increases with the total number of phones in the network.<sup>26</sup> In the digital economy, an example would be social media: The individual utility of a social media network depends not only on one's own consumption, but also on the fact that others use the same network and can thus be easily reached.

Direct network effects take place within one group of users. Indirect network effects exist where the utility of one user group rises if the other user group gets bigger. One of many examples is the relationship between operating systems and software developers: The attractiveness of an (personal computer or smartphone) operating system for app developers grows with the number of users of that operating system. Conversely, the availability of numerous apps is a reason for choosing a particular operating system. Indirect network effects are of paramount importance for two- or multi-sided markets which will be looked at in the following chapters.

As far as the assessment of network effects is concerned, it must be underlined that they are first and foremost *positive* externalities. Efficiency is improved, and significant benefits are generated. There have been attempts to quantify the network effect. According to “Metcalfe's law”, the value of a network is proportional to the square of the number of users ( $n^2$ ). While this theorem is discussed controversially, there are empirical studies that confirm the magnitude of the estimation.<sup>27</sup>

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<sup>24</sup> This distinction was coined by Bower, Joseph L./Christensen, Clayton M., *Disruptive Technologies: Catching the Wave*, 73 *Harvard Business Review* 43 (1995): Sustaining innovation remains within the existing business model whereas disruptive innovation takes place outside the existing value network and creates something completely new. For the relationship with competition law see Weber, Rolf H., *Disruptive Technologies and Competition Law*, in: Mathis, Klaus/Tor, Avishalom, *New Developments in Competition Law and Economics*, Cham 2019, p. 223 ff.

<sup>25</sup> The DMA (note 2, recital 2) uses the qualification “extreme” in the context of economies of scale since digital services often cause zero marginal costs.

<sup>26</sup> So, it was a considerable utility gain when *Alexander Graham Bell* on 10 March 1876 passed his first phone call to his assistant in the next room saying: “Mr. Watson—Come here—I want to see you”, see Library of Congress at <[www.americaslibrary.gov/jb/recon/jb\\_recon\\_telephone\\_1.html](http://www.americaslibrary.gov/jb/recon/jb_recon_telephone_1.html)> (accessed 26 May 2023).

<sup>27</sup> Zhang, Xing-Zhou/Liu, Jing-Jie/Xu, Zhi-Wei, Tencent and Facebook Data Validate Metcalfe's Law, 30 *Journal of Computer Science and Technology* 246 (2015).

On the other hand, in certain situations, network effects can be detrimental to competition. They may provide a first mover advantage since networks are more attractive the earlier they grow. Thus, “self-reinforcing feedback loops” are created. To take up the example of operating systems: Since app developers earn their money mainly by app downloads, operating systems with a large user base are more attractive for them. On the other hand, a mobile operating system with many apps is more attractive for consumers. Both effects boost each other.<sup>28</sup> Eventually, markets “tip”, the “winner takes it all”, and the customers are “locked-in”. The result is a natural monopoly.

However, this tendency is not inevitable. A careful analysis is necessary. The overuse of a network may cause congestion (e.g. with respect to customer support), and multi-homing and data portability may allow switching to other networks.<sup>29</sup> And there is always the possibility that disruptive innovation will wash away the established network. Hence, all circumstances of the individual network must be considered to get a sound picture of the market situation.

### C. Two-sided Markets

As already mentioned in the introduction, the interconnection between certain markets, such as reader markets and advertising markets in the media sector, has always been recognized. But only thanks to the fundamental insights of *Jean-Charles Rochet* and *Jean Tirole* regarding the functioning of two-sided markets, the interrelations have been understood in a systematic way.<sup>30</sup>

### I. Characteristics

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<sup>28</sup> For another illustrative example of a self-reinforcing feedback loop see OECD, Handbook on Competition Policy in the Digital Age, Paris 2022, p. 9: “if an online platform uses data generated by its users’ activities to improve its service, it will be able to increase consumer value and thus demand. It may also sell data to third parties, or use the data to better target advertisers, thus improving its revenues. Because these revenues can be invested in further improvements in service quality, demand may rise even further. Thus, an initial user base can generate a self-reinforcing cycle of improvements that cause the user base to increase further, continuing the cycle”.

<sup>29</sup> On the many aspects of data portability in the competition law context see OECD, Data Portability, Interoperability and Digital Platform Competition, OECD Competition Committee Discussion Paper, 2021 <[www.oecd.org/daf/competition/data-portability-interoperability-and-digital-platform-competition-2021.pdf](http://www.oecd.org/daf/competition/data-portability-interoperability-and-digital-platform-competition-2021.pdf)> (accessed 26 May 2023).

<sup>30</sup> See the seminal article of Rochet, Jean-Charles/Tirole, Jean, Platform Competition in Two-Sided Markets, 1 Journal of the European Economic Association 990 (2003); this paper was first circulated in 2001. *Jean Tirole* was awarded the Nobel Memorial Prize in Economic Sciences in 2014 “for his analysis of market power and regulation” <[www.nobelprize.org/prizes/economic-sciences/2014/summary](http://www.nobelprize.org/prizes/economic-sciences/2014/summary)> (accessed 26 May 2023). See also the collection of influential articles in Evans, David S., Platform Economics: Essays on Multi-Sided Businesses, Competition Policy International 2011; on the further development of the concept of two-sided markets see Veisdal, Jørgen, A Definition of Platforms with Meaningful Policy Implications, Competition Policy International – Antitrust Chronicle: Defining Platform Markets, January 2023, Vol. 1(1), p. 46 ff.

A two-sided market is a platform which connects two different user groups and provides to at least one of them positive network externalities.<sup>31</sup> Readers and advertisers are an example, as are many services on the internet that finance their activities by advertising. Moreover, sellers and buyers on online marketplaces are active on two-sided markets: Buyers benefit when there are more sellers and hence more choice and competition, and sellers benefit when there are more buyers because of the increase in sales opportunities. The examples show that the main mechanism of two-sided markets is *indirect* network effects:<sup>32</sup> The users do not necessarily receive direct value from having more participants on their own side of the market, but from the flourishing and thriving of the other market side.

These network effects are internalized by the platform. As the two sides are closely connected with each other it would not be adequate to look only at one side of the market. The platform has to take these effects into account when it makes pricing decisions. It has to strike the right balance in order to maximize the total value over both sides.<sup>33</sup> Often, therefore, one group does not have to pay (for example the consumers), in order to increase the total number of consumers on the one side of the market and thus the attractiveness for the other side.<sup>34</sup> This is often the case when the indirect network effect of group A on group B is bigger than vice versa. The typical example are markets that rely exclusively or predominantly on advertising revenue. Since the advertising revenue depends on the number of users of the platform, services to them will be provided for free in order to maximize income from the advertising side.

It is slightly different for credit card schemes. In the typical Four-Party-System we distinguish issuing banks from acquiring banks. The issuing banks issue credit cards to customers. The acquiring banks connect the merchants to the respective credit card scheme. It is a typical two-sided market: Both user groups, cardholder and merchants, benefit from the widest possible distribution of the respective credit card. Cardholders pay a card-fee, and merchants pay a merchant service charge. Normally, the card-fee is low (sometimes even negative) in order to increase the popularity of the respective card. Compared to the card-fee, the merchant service fee is high and must cover, among other things, the interchange fees paid by the acquiring to the issuing bank.

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<sup>31</sup> Other definitions exist which require *mutual* benefits between the two user groups. However, this definition would exclude platforms where only one side benefits from the interaction (for example the advertising side) while the other side perceives this activity simply as a necessary evil.

<sup>32</sup> Dewenter/Heimeshoff/Löw (note 12), p. 2: "Two-sided or platform markets, are characterized by the existence of indirect network effects".

<sup>33</sup> See Draft Market Definition Notice (note 13), N. 94.

<sup>34</sup> This is the deeper reason for the insight, that the absence of a monetary remuneration should not exclude the assumption of a relevant market; see already *supra* A.I. and Draft Market Definition Notice (*supra* note 13), N. 97: "Zero monetary prices are an integral part of multi-sided platforms' business strategy, so the fact a product is supplied at a zero monetary price does not imply that there is no relevant market for that product". Thus, the assumption of a relevant market in the absence of a pecuniary remuneration is based not only on the fact that the other market side "pays" with attention and data, but also on the fact that the purpose of a zero price is to internalize positive network externalities.



## II. Market Definition in Two-Sided Markets

A central problem for the application of competition law to two-sided markets is the question if “a” two-sided market is composed of two relevant markets for each side of this structure, or if it constitutes just one relevant market.<sup>35</sup> Traditionally, competition authorities had the tendency to assume different relevant markets, for example for recipient markets and advertising markets in media contexts, or for issuing and acquiring activities in the payment cards cases. An exception has to be made for those jurisdictions that had difficulties with the finding of relevant markets in the absence of a monetary remuneration. As already noted, this view overlooks the fact that a remuneration can also consist in providing attention or revealing data and should not be followed.<sup>36</sup>

In economics, it has been suggested to draw a distinction between transaction platforms and non-transaction platforms. A transaction platform exists if the respective transaction is carried out on the platform, or can at least be observed by it. Online marketplaces and credit card systems are examples of such transaction platforms.<sup>37</sup> If, by contrast, the transaction takes place outside the platform and cannot be observed by it, it is a non-transaction platform. An example is advertising on media platforms if the platform gains no knowledge of whether a transaction takes place between the advertising industry and the user.

According to the proposal, a transaction platform constitutes a sole market, whereas separate markets should be supposed in the case of a non-transaction platform. The argument is that non-transaction platforms are not necessarily two-sided since the platform could also exist without one of the groups.<sup>38</sup> In *Ohio v. American Express*, the U.S. Supreme Court has endorsed this proposal thus creating a spectacular difference to the European Court of Justice. The U.S. Supreme Court has confirmed the concept of two-sided markets, but has come to the conclusion that in the case of credit card systems, there is only one product, i.e. the transaction, “that is jointly consumed by a cardholder and a merchant”.<sup>39</sup> Hence, “courts must include both sides of the platform—merchants and cardholders—when defining the credit-card market”, so that there is only one relevant market. Two separate markets, according to the Supreme Court, are only to be assumed if the indirect network effects and the importance of relative pricing are minor, for example in the case of newspaper readers

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<sup>35</sup> Therefore, the use of the singular in the term “two-sided market” should not be understood in a competition law sense.

<sup>36</sup> See *supra* A.I.

<sup>37</sup> The US Supreme Court uses a narrower definition: “The key feature of transaction platforms is that they cannot make a sale to one side of the platform without simultaneously making a sale to the other”, US Supreme Court, *Ohio et al. v. American Express Co. et al.*, 585 U.S. \_\_\_, 2. According to this definition, no transaction platform would exist if the platform can just observe the transaction but does not make it. Credit card systems, which are examined in more detail below, are transaction platforms according to either definition. Regarding this and other possibilities of characterizing platforms see Wismer, Sebastian/Rasek, Arno, Market definition in multi-sided markets, in: OECD, *Rethinking Antitrust Tools for Multi-Sided Platforms*, Paris 2018, p. 55, 57 ff.

<sup>38</sup> Wismer/Rasek (note 37), p. 58.

<sup>39</sup> US Supreme Court, *Ohio et al. v. American Express Co. et al.*, 585 U.S. \_\_\_, 2.

and advertisers.<sup>40</sup> The assumption of one single market has far-reaching practical consequences: If only one market exists, it is not sufficient to show anticompetitive effects on one side of this market, but negative effects on the two-sided market as a whole have to be demonstrated, for example by proving that the cost of credit-card transactions has been increased above a competitive level or that the number of credit-card transactions has been reduced.<sup>41</sup> As the plaintiff did not fulfil this requirement, no antitrust violation was found.

The legal situation is different in the EU. In *Cartes bancaires*, the General Court has confirmed the analysis of the European Commission according to which there are two relevant markets in the context of bank cards – one for the issuing services, the other one for acquiring activities – even if they are interacting with each other.<sup>42</sup> On appeal, the European Court of Justice did not object to this finding but has emphasized another way in which the existence of two-sided markets may influence competition law analysis. According to Art. 101(1) TFEU, we have to distinguish between restrictions “by object” and “by effect”. If an agreement has an anti-competitive object, it is not necessary to show negative effects.<sup>43</sup> This is the case with forms of collusion that “can be regarded, by their very nature, as being injurious to the proper functioning of normal competition”.<sup>44</sup> The whole context of an agreement has to be considered in order to find a restriction by object. This context is not restricted to the relevant market on which the restrictive behaviour occurs, but the interactions with other markets have also to be looked at. According to the European Court of Justice, this is particularly true for “interactions between the two facets of a two-sided system”.<sup>45</sup>

Hence, two-sided markets play an important role in European competition law, too. However, the two-sidedness does not exclude the existence of different relevant markets, but it creates economic complexity that may invalidate the finding of a restriction by object. In this case, an analysis of the negative effects has to be made.<sup>46</sup>

### III. Conclusion

There is no international consensus how to assess two-sided markets in a competition law perspective. The question on the existence of one or several relevant markets is not only *l’art pour l’art*, but has

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<sup>40</sup> *Ibid.*, 12.

<sup>41</sup> *Ibid.*, 15.

<sup>42</sup> General Court, 29.11.2012, T-491/07 – *Groupement des cartes bancaires (CB)*, ECLI:EU:T:2012:633, N. 104.

<sup>43</sup> Settled case law since ECJ, 30.6.1966, 56/65 – *Société Technique Minière / Maschinenbau Ulm*, ECLI:EU:C:1966:38, p. 249; ECJ, 13.7.1966, 56/64 – *Consten and Grundig/Commission*, ECLI:EU:C:1966:41, p. 342.

<sup>44</sup> European Court of Justice, 14.3.2013, C-32/11 – *Allianz Hungária Biztosító and others*, ECLI:EU:C:2013:160, N. 35.

<sup>45</sup> European Court of Justice, 11.9.2014, C-67/13 P – *Cartes bancaires (CB)/Commission*, ECLI:EU:C:2014:2204, N. 78.

<sup>46</sup> In the *Cartes bancaires* case, the European Commission subsequently carried out this examination and came to the conclusion that there were also negative effects; see the insofar confirming decision by the General Court, 30.6.2016, T-491/07 RENV – *CB/Commission*, ECLI:EU:T:2016:379.

practical consequences. If there is only one relevant market, the finding of a competition law violation requires an analysis of the entire market with its both sides. On this basis, the U.S. Supreme Court has rejected the allegation of an antitrust violation in *Ohio v. American Express*: It is not sufficient to show that the behaviour in question results in higher prices on one market side (which would be less difficult to prove), but anti-competitive effects for the entire market have to be revealed. Observers have noted that this requirement creates “near-impossible burdens of proof”.<sup>47</sup> Against this backdrop, the position of the EU institutions seems more convincing, for example the *Cartes bancaires* judgment of the European Court of Justice: Separate markets are identified for both sides of the platform, but the interaction between these markets is taken into consideration, also when it comes to the distinction between restrictions by object and by effect.

The *Cartes bancaires* judgment concerns card schemes. Two-sided markets vary considerably. There may be cases where the assumption of one overarching market is more adequate. In its Draft Market Definition Notice, the European Commission proposes a differentiated view and gives criteria in order to distinguish between the two constellations.<sup>48</sup> In this context, the distinction between transaction and matching platforms is only one aspect of many others. Such a balanced approach seems much more appropriate than a schematic rule based on a criterion that does not sufficiently mirror the competitive situation.

#### **D. Multi-Sided Platforms**

The discovery of two-sided markets was only the beginning. It quickly became clear that markets may be more than two-sided. The existence of a higher number of sides does not affect the principles that have been discovered in the context of two-sided markets, but adds a new layer of complexity.<sup>49</sup>

#### **I. The Concept of Platform**

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<sup>47</sup> Wu, Tim, The American Express opinion, the rule of reason, and tech platforms, 7 *Journal of Antitrust Enforcement* 117, 122 (2019); see also the general assessment at p. 127: “American Express suggests that a judge can keep demanding more proof, in concentric lines, until the government’s lawsuit collapses. [...] At bottom, it offers appellate courts the comfort of the Supreme Court’s support in finding novel ways to throw out antitrust cases with strong evidence of anticompetitive effects”. See also Salop, Steven C./Francis, Daniel/Sillman, Lauren/Spero, Michaela, *Rebuilding Platform Antitrust: Moving on From Ohio v. American Express*, 84 *Antitrust Law Journal* 883 (2022): “may be the worst antitrust decision in many decades” (with further references in footnote 3).

<sup>48</sup> Draft Market Definition Notice (note 13), N. 95. As an example for a relevant market including both sides, the European Commission cites the *Microsoft/LinkedIn* merger case, where it “defined a single market for online recruiting services, encompassing both job seekers and recruiters”, Draft Market Definition Notice (*supra* note 13), N. 95 fn. 110.

<sup>49</sup> In the economic literature, the term “two-sided” has become so influential that even multi-sided markets are often called “two-sided”, see for example Duch-Brown, Nestor/Verbote, Wouter, *The Impact of Economic Analysis on Market Definition in the Context of Digital Platforms*, *Competition Policy International – Antitrust Chronicle: Defining Platform Markets*, January 2023, Vol. 1(1), p. 14, 15 fn. 4: “In line with the economics literature, we refer to multi-sided markets as being two-sided even if there are more than two distinct groups involved”.

The terminology has slowly changed, from two-sided “markets” in 2003<sup>50</sup> to multi-sided “platforms” today. The term “platform” is not legally defined. The Digital Markets Act (DMA), for example, puts the term “platform” at its center as gatekeepers are defined as entities that have a significant impact on the internal market and provide a “core platform service” (Art. 3 DMA). There is an (exhaustive) list of what “core platform services” are (Art. 2(2) DMA), but the term “platform” itself is not explained. A platform in the present context is not only hardware or software on which applications or services can be based. A platform rather is an infrastructure that brings different groups of users together and facilitates interaction and transactions. According to the most condensed definition, proposed by the OECD, platforms “are firms that provide different services to different groups of interconnected consumers”.<sup>51</sup> The definition is not restricted to multi-sided platforms but covers two-sided markets, too. Accordingly, a platform is an intermediary that creates indirect network effects by bringing two or more sides together.

## **II. Multi-Sidedness**

The large internet platforms are regularly multi-sided. A search engine, for example, brings together users of the search engine and content providers: Users are looking for content, and content providers want to be found. The search engine uses automated web crawlers to explore the web and to add pages to the search engine’s index. When a user makes an inquiry, the search engine does not search the web, but the index. Thus, we have already two sides in the search engine business, and we can call these two sides the user market and the market for reception of websites into the index of the search engine. The search engine does not earn money on these markets. There is no cost for doing a search, for being indexed or for appearing in the “organic” search results of the search engine. The search engine mainly earns its money with advertising. This adds a third side to the platform which are the advertising markets, for example sponsored links on the search engine’s own pages or the intermediation of ads shown on third party websites. The number of sides a platform can have is not limited. What is crucial is that different user groups are brought together and that value is created in this way.

## **III. Features of Multi-Sided Platforms**

The economic characteristics of multi-sided platforms are not different from those of two-sided markets. As has already been mentioned, multi-sidedness makes the relations only more

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<sup>50</sup> See the title of the groundbreaking article of *Jean-Charles Rochet* and *Jean Tirole supra* note 30.

<sup>51</sup> OECD (note 28), p. 10. See also the refined definition by Veisdal (note 30), p. 52: “Platforms exploit value propositions which benefit from demand-side economies of scale by subsidizing across customer groups in accordance with customers’ willingness to pay and the nature of the platform’s value proposition” (emphasis removed).

complicated.<sup>52</sup> Indirect network effects are also at the heart of multi-sided platforms: Users on one side of the platform benefit from growth (in number or quality) on another side of that platform. The platform internalizes this (positive) externality. In addition, the other properties of the digital economy play a significant role, like for example economies of scale and scope, the control of big data as well as intellectual property rights and standardization.<sup>53</sup> Competition is stimulated by the high rate of innovation, the acceleration of transactions, the facilitation of market access and the enlargement of markets in geographical respect. But there are also threats to competition associated with the very large multi-sided platforms. The Digital Markets Act (DMA) summarizes them as follows:

“Weak contestability and unfair practices in the digital sector are more frequent and pronounced for certain digital services than for others. This is the case in particular for widespread and commonly used digital services that mostly directly intermediate between business users and end users and where features such as extreme scale economies, very strong network effects, an ability to connect many business users with many end users through the multisidedness of these services, lock-in effects, a lack of multi-homing or vertical integration are the most prevalent. Often, there is only one or very few large undertakings providing those digital services.”<sup>54</sup>

The DMA reacts to these risks by a new type of *ex ante*-regulation and makes an attempt to prevent competition problems from the outset. The DMA does not replace traditional competition law but complements it by a new set of rules that wants to ensure contestability and fairness. It is based on economic analysis, but its application does not have to recur to it because the essence of the DMA is to create detailed do’s and don’ts that are easily applicable. This distinguishes it from the application of competition law that has to embrace all the economic features presented here including the definition of relevant markets and the efficiency defence.

#### IV. Consequences

The DMA contains a concise characterization of competition law. According to the DMA, competition law is a set of rules that is “based on an individualised assessment of market positions and behaviour, including its actual or potential effects and the precise scope of the prohibited behaviour, and which provide for the possibility of undertakings to make efficiency and objective justification arguments for the behaviour in question [...]”.<sup>55</sup> Hence, competition law has to take into consideration the specificities of the digital economy and of platform markets, in particular network effects and multi-sidedness.

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<sup>52</sup> This complexity has led to the fact that there are now specialized textbooks on the topic of platform economics, see e.g. Belleflamme, Paul/Peitz, Martin, *The Economics of Platforms – Concepts and Strategy*, Cambridge 2021; Mansell, Robin/Steinmueller, W. Edward, *Advanced Introduction to Platform Economics*, Cheltenham 2020.

<sup>53</sup> See already *supra* B.

<sup>54</sup> DMA (note 2), recital 13.

<sup>55</sup> DMA (note 2), recital 10.

An example is Art. 101(1) TFEU. As we have seen, the qualification as restriction by object requires that the coordination reveals in itself a sufficient degree of harm to competition.<sup>56</sup> As the European Court of Justice has ruled with respect to credit card systems, economic complexity on multi-sided markets may exclude a restriction by object. Therefore, negative effects have to be proven.<sup>57</sup> Therefore, on multi-sided platforms, even price-related agreements may fall outside the category of restrictions by object if the interaction between different platform sides is such that the collusion does not appear to be a blatant attack on competition.

Regarding Art. 102 TFEU, zero prices are not necessarily predatory pricing because indirect network effects have to be taken into account. To maximise the utility, the platform owner will choose a price structure that takes into account all platform sides. If one platform side is particularly price-sensitive, or if the indirect network effect of that group on another group is much bigger than *vice versa*, the price charged on the first group may be low, zero or even negative.<sup>58</sup> The rules on predatory pricing have to be adapted accordingly. The argument that prices are below an appropriate measure of cost, is therefore only a necessary condition for abusive behaviour, but it is not sufficient. There is no abuse if the low prices are due to a maximization calculation in connection with multi-sided platforms. Within the legal examination, this argument can be attributed to the step of objective justification. So, when the accusation of predatory pricing is made, the defendant may submit the calculation that explains the low prices economically taking into account the indirect network effects.

## **E. Digital Ecosystems**

As already mentioned at the beginning, the term “digital ecosystem” has gained considerable popularity in the last years and is now currently used in legislation and court decisions. The concept of ecosystems is of fundamental importance for understanding the interactions within an economy and is therefore highly relevant for the reality of markets, and thus also for competition law. In the following, we will have a closer look at this concept and take as an example the *Google Android* case, in which the concept makes such a prominent appearance.

### **I. The Discovery of Business Ecosystems**

The term “ecosystem” comes from biology and refers to the entirety of organisms and the physical world that interact with each other. The term was transferred to the economic sphere in 1993 at the latest when *James F. Moore* published his article entitled “Predators and Prey: A New Ecology of Competition”.<sup>59</sup> The essence of the new concept is that firms do not only compete with each other, but that they are part of larger business communities whose interests they defend. The central passage is:

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<sup>56</sup> ECJ – *Allianz Hungária Biztosító and others* (supra note 44).

<sup>57</sup> ECJ – *Cartes bancaires* (supra note 46).

<sup>58</sup> See already *supra* C.I.

<sup>59</sup> Moore, James F., *Harvard Business Review*, Magazine, May-June 1993.

“To extend a systematic approach to strategy, I suggest that a company be viewed not as a member of a single industry but as part of a business ecosystem that crosses a variety of industries. In a business ecosystem, companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations.”<sup>60</sup>

As examples of such business ecosystems, he (in 1993) mentions Apple and IBM that “vie for survival and dominance” in their respective ecosystems for personal computers.<sup>61</sup> *Moore’s* conclusion is: “In fact, it’s competition among business ecosystems, not individual companies, that’s largely fueling today’s industrial transformation”.<sup>62</sup> The leadership in an ecosystem may change as the shift of leadership from IBM to Microsoft & Intel (“*Wintel*”) in the 1990s shows. And even ecosystems themselves may change because they may be “threatened by rising new ecosystems and innovations”.<sup>63</sup>

## II. Features of Digital Ecosystems

*Moore’s* analysis of economic development and his thinking in fundamental paradigms replacing each other is very modern and anticipates the idea of “disruptive” innovation.<sup>64</sup> However, his main concept has undergone considerable change. While for him a “business ecosystem” is a *multi-actor* system whose members are supposed to cooperate and compete at the same time, a “digital ecosystem” in its present sense is a *multi-product* system in which one actor offers a wide range of products. While for *Moore* all members of a business ecosystem, not only the leading company, are called upon to develop the system further, in the digital ecosystems of today there is only one firm that takes the decisions and shapes the ecosystem. There is no recognized definition of the term “ecosystem” (just as there is no official definition of the important term “platform”<sup>65</sup>), but there are several attempts. According to the European Commission, “digital ecosystems can be defined as multiple products linked through technology that increases complementarities among them, and defined by reference to the platform that provides that technology”.<sup>66</sup> According to a definition given by the OECD, an economic ecosystem is “a line of products and services with a technological linkage increasing the complementarity between them”.

These and other definitions have in common, that a leading actor (or “orchestrator”) offers a variety of products and provides benefit to consumers when used together. Users find everything in the same

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<sup>60</sup> Moore (note 59), 2.

<sup>61</sup> Moore (note 59), 3.

<sup>62</sup> *Ibid.*

<sup>63</sup> Moore (note 59), 13.

<sup>64</sup> See *supra* note 24.

<sup>65</sup> See *supra* D.I.

<sup>66</sup> European Commission, The Evolving Concept of Market Power in the Digital Economy, OECD-Document DAF/COMP/WD(2022)30, 9.6.2022, N. 9.

system and do not have to go to other systems. Other actors called “complementors” connect to this universe and integrate their services into the ecosystem.<sup>67</sup> Often, the ecosystem is built around the core business of the orchestrator. If we take the GAFAM companies,<sup>68</sup> the core of Alphabet/Google is the search engine, for Amazon it is online retailing, for Meta/Facebook the social network, for Apple the smartphone and for Microsoft the operating system.<sup>69</sup> Many other services and apps are built around the core product. Depending on the nature of the respective core business, a distinction is made between *device-centric* (Apple) and *ad-centric* ecosystems (Alphabet, Meta). Another distinction is that between production ecosystems and consumption ecosystems. Whereas in production ecosystems digital technology is used in order to better connect interdependent activities, consumption ecosystems strive to identify demand-related complementarity and to co-offer a variety of services that become more valuable compared to being consumed on a stand-alone basis.<sup>70</sup>

### III. Legal Questions

#### 1. Market Definition

The emergence of digital ecosystems raises new legal questions. As in the context of two-sided markets, the definition of relevant markets has to be reconsidered. Are there still many different relevant markets for the services provided by the ecosystem, or do they have to be considered together, thus assuming one single relevant market for the whole ecosystem?

The Draft Notice of the European Commission on market definition expressly deals with this question.<sup>71</sup> According to the Draft Notice, a digital ecosystem may be considered as the combination of a primary product (the core product of the ecosystem<sup>72</sup>) and many secondary products. In this perspective, according to the draft, similar principles should be applied as in the context of aftermarkets. This means that different options exist, on the one hand the definition of one general

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<sup>67</sup> See the in-depth analyses of Jacobides, Michael G./Lianos, Ioannis, *Ecosystems and Competition Law in Theory and Practice*, 30 *Industrial and Corporate Change* 1199 ff. (2021); Petit, Nicolas/Teece, David J., *Taking Ecosystems Competition Seriously in the Digital Economy*, OECD Document DAF/COMP/WD(2020)90, 2 December 2020.

<sup>68</sup> Although Google became Alphabet and Facebook Meta, the former company names still exist for subsidiaries of these groups. A more up-to-date abbreviation would be MAAMA (Meta, Alphabet, Apple, Microsoft, Amazon).

<sup>69</sup> Most of the Chinese platform companies (like for example *Baidu*, *Alibaba* and *Tencent*) do not (yet) systematically compete with Western ones, but there are exceptions like for example *ByteDance* with its video-sharing app *TikTok*, see Mansell/Steinmueller (note 52), p. 124 ff.

<sup>70</sup> Jenny, Frederic, *Competition Law and Digital Ecosystems: Learning to Walk Before We Run*, 30 *Industrial and Corporate Change* 1143, 1146 f. (2021).

<sup>71</sup> Draft Market Definition Notice (note 13), headline “4.5 Market definition in the presence of after markets, bundles and digital ecosystems”.

<sup>72</sup> See *supra* E.II.



system market, or on the other hand the assumption of multiple markets with separate markets for the primary and the secondary products.<sup>73</sup>

For aftermarket, the European Commission proposes to apply different criteria: The assumption of one overarching system market is more appropriate, (i) the more likely it is that customers take the whole-life costs into account for their purchasing decision, (ii) the higher the expenditure on the secondary product is compared to the primary product, (iii) the higher the substitutability between primary products is, and (iv) the fewer suppliers are active only in the secondary markets.<sup>74</sup> These criteria are recognized for spare parts and maintenance services, but they appear only partially useful for digital ecosystems. The Draft concedes that “not all digital ecosystems fit an after market or bundle approach” and emphasizes the importance of other elements such as network effects, switching costs and single- or multi-homing.<sup>75</sup> In our view, this latter point is rather the way to go. As argued in the context of two-sided markets, it is regularly more appropriate to assume different markets whose interaction has then to be taken into account within an overall analysis.<sup>76</sup>

## 2. Market Power and Dominance

Once the markets have been defined, the position of the firm on these markets has to be determined.<sup>77</sup> As far as markets with zero monetary prices are concerned, we cannot use turnover data in order to calculate the market share. This obstacle can be overcome, though, by referring to user or transaction numbers. In the merger case *Microsoft/LinkedIn*, for example, the European Commission has used the number of visits on the respective websites.<sup>78</sup> Even if it is absolutely feasible to calculate market shares this way, it has to be taken into consideration that – because of the many particular economic features of platform markets and digital ecosystems – there is an increased need for integrating market shares in an overall competitive analysis.<sup>79</sup> Thus, in the *Microsoft/Skype* merger case, the General Court stated that even market shares of 80 to 90 percent are not decisive for the assumption of a dominant position if the market in question is in strong expansion and if the introduction of monetary

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<sup>73</sup> Draft Market Definition Notice (note 13), implicit reference in N. 103 to N. 99 ff. In case of several markets, the Draft Notice differentiates further: There may be separate markets for the secondary products for each brand of the primary product or one single market for the secondary product as a whole, see N. 100 of the Draft Notice.

<sup>74</sup> Draft Market Definition Notice (note 13), N. 101.

<sup>75</sup> Draft Market Definition Notice (note 13), N. 103.

<sup>76</sup> See *supra* C.II.

<sup>77</sup> For a systematic analysis see OECD, The evolving concept of market power in the digital economy – Background note by the Secretariat, DAF/COMP(2022)5, 25.4.2022, N. 6 ff.

<sup>78</sup> European Commission, 6.12.2016, M.8124 – *Microsoft/LinkedIn*, N. 283 ff.

<sup>79</sup> See General Court, 14.9.2022, T-604/18 – *Google and Alphabet/Commission (Google Android)*, ECLI:EU:T:2022:541, N. 115: In the digital economy, “traditional parameters such as the price of products or services or the market share of the undertaking concerned may be less important than in traditional markets, compared to other variables such as innovation, access to data, multi-sidedness, user behaviour or network effects”.

prices would cause users to migrate to another service.<sup>80</sup> On the other hand, in the *Google Shopping* case (and in the other *Google* cases), market shares of over 90 percent were a decisive indication of a dominant position in the market for internet search, precisely because there were high barriers to entry at the same time.<sup>81</sup>

Of particular importance in digital ecosystems are economies of scope,<sup>82</sup> e.g. the addition of numerous other functions to a search engine, which make the core product even more attractive and bind users to the search engine in question. In this context, the already existing infrastructure serves as a shareable input for the newly added services. Thus, even if there are no exclusive ties and multihoming is possible, customer loyalty and customer inertia will increase the platform company's room for manoeuvre. Platforms may amplify inertia by making it more attractive for users to use different services from the same ecosystem by establishing a single identification key.<sup>83</sup> Large databases can reinforce these effects and lead to further barriers to market entry, as a well-maintained database enables a customer-specific offer, so that new competitors are unable to achieve a comparable data quality.<sup>84</sup> Economies of scope are often based on the modular character of many services in the digital economy that work together thanks to standardized interfaces. These effects lead to market power of unprecedented proportions, in other words to the emergence of “superstar firms”.<sup>85</sup>

### 3. Competition between Ecosystems

One of the most fundamental questions concerns the relevance of competition between different ecosystems. As we have seen, *James F. Moore* stated that “competition among business ecosystems” is at the heart of industrial transformation. Does this mean that market power of one ecosystem is

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<sup>80</sup> General Court, 11.12.2013, T-79/12 – *Cisco Systems and Messagenet/Commission*, ECLI:EU:T:2013:635, N. 51 ff., 65 ff.

<sup>81</sup> European Commission, 27.6.2017, Case AT.39740 – *Google Search (Shopping)*, C(2017) 4444 final, N. 273 ff. The General Court which largely confirmed the decision of the European Commission did not have to deal with the question of dominance because the firm did not dispute this finding, see General Court, 10.11.2021, T-612/17 – *Google and Alphabet/Commission (Google Shopping)*, ECLI:EU:T:2021:763, N. 119. An appeal is pending before the European Court of Justice under case number C-48/22 P.

<sup>82</sup> European Commission, Market Power in the Digital Economy (note 66), p. 15.

<sup>83</sup> This is the reason why Art. 5(7) DMA prohibits gatekeepers from requiring users to use a specific identification service. However, the prohibition of a formal obligation does not eliminate the practical advantages of using the same identification system for different services.

<sup>84</sup> See the *Google/Fitbit* case: The merger led to the combination of vast data sets. However, according to the European Commission, the *Fitbit* data were not “unique”. Consequently, the Commission approved the merger but imposed commitments: *Fitbit's* user data have to be kept separate in a “data silo”, and they must not be used for *Google's* advertising activities. Moreover, competitors must have access to the *Fitbit* data and the relevant interfaces. It is noteworthy that the duration of these commitments is ten years and may be extended to an additional ten years, see European Commission, 17.12.2020, Case M.9660 – *Google/Fitbit*, OJ 2021 C 194/7. The analysis of the European Commission is based on the “four V” character of big data, i.e. variety, velocity, volume and value. In this sense already European Commission, 6.9.2018, Case M.8788 – *Apple/Shazam*, OJ 2018 C 417/4.

<sup>85</sup> Autor, David/Dorn, David/Katz, Lawrence F./Patterson, Christina/Van Reenen, John, The Fall of the Labor Share and the Rise of Superstar Firms, 135 *The Quarterly Journal of Economics* 645 (2020).

reduced by the threat of competing ecosystems? The economic literature is divided as regards the extent of such “inter-system” competition.<sup>86</sup> On the one hand, the economies of scope and the attractiveness of many inter-linked products may lock the consumer in so that she is not receptive to the services of a different ecosystem. On the other hand, ecosystems may compete vigorously with one another in order to attract consumers from the very beginning. The competition-for-the-market discussion leads to the most fundamental question of all: is market power in the digital economy eternal or time-bound? Sceptics point to developments in the past that show that supposedly almighty players can also quickly disappear again. This argument can be countered by saying that developments in the past do not allow a forecast for the future.<sup>87</sup> Competition authorities are well advised not to remain abstract here, but to investigate concretely whether market entry or even disruption is to be expected in a foreseeable time frame.

It seems useful to have a look at the *Google Android* case in this context. This case not only reflects almost everything that has been discussed so far, but also uses the “ecosystem” terminology for the first time with such consistency.<sup>88</sup> Moreover, it illustrates how a competition authority should deal with the “inter-system” competition argument.

#### IV. The Google Android Case

##### 1. Background

As mentioned at the beginning, the *Google Android* case is fundamental for the concept of digital ecosystems in European competition law. In fact, *Google* has managed to anticipate and avert threats to its ecosystem built around the search engine. The shift from desktop PCs to mobile Internet (starting in the years 2000) brought the risk of disruption for Google search. In 2005, *Google* acquired the Android mobile operating system in order to carry the search engine over into the world of mobile devices. This strategy was successful: Today, about two-thirds of smart mobile devices in Europe run on Android.<sup>89</sup> The Android mobile operating system has become an important part of the *Google*

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<sup>86</sup> OECD (note 77), N. 58; see the survey in European Commission, *The Evolving Concept of Market Power in the Digital Economy* (note 66), p. 19.

<sup>87</sup> See for example Eeckhout, Jan, *Dominant Firms in the Digital Age*, UBS Center Public Paper #12, November 2022, p. 17: “What we have seen in the last decades is indeed the rise of monopoly power by a selection of firms. However, it is not Schumpeterian creative destruction, because the market power is not temporary and is much more long-lasting. This indicates that rather than innovation by challenging firms trying to leapfrog incumbents, we see that past innovators have managed to consolidate their position and maintain their dominance for a long time”. In the same sense Podszun, Rupperecht, *Empfiehl sich eine stärkere Regulierung von Online-Plattformen und anderen Digitalunternehmen?*, *Ergänzungen zu Gutachten F zum 73. Deutschen Juristentag, Munich 2022*, F 127: “Dennoch sind die großen Intermediäre auf absehbare Zeit in ihrer Position nicht mehr angreifbar. Hier haben sich monopolartige Stellungen verfestigt”.

<sup>88</sup> The other (and earlier) groundbreaking case, *Google Shopping* (see supra note 81), does not even mention the term “ecosystem”.

<sup>89</sup> The other third run on *Apple*’s iOS. These figures are not intended to anticipate the delineation of the relevant market. Regarding the difference between licensable and non-licensable operating systems such as *Apple*’s iOS,

ecosystem together with its pillars *Google* search, the *Chrome* browser and *Google Play* (appstore) around which dozens of other apps are grouped (for example *Google Maps*, *Gmail* and *YouTube*). The time and attention devoted by users to these apps increase traffic and generate more data and thus more income from advertising. These funds can be used to further develop the search engine and the other apps which leads to self-reinforcing feedback loops described above.<sup>90</sup> *Android* is open source, but *Google* has proprietary apps and services like for example the *Play Store*, the search engine and the *Chrome* browser. Device manufacturers wishing to install these apps have to conclude a contract with *Google* which is important for the understanding of the *Google Android* case.<sup>91</sup>

In 2018, the European Commission fined *Google* €4.34 billion for anti-competitive practices related to the *Android* operating system.<sup>92</sup> In 2022, the General Court largely confirmed, but reduced the fine to €4.125 billion.<sup>93</sup> For our context, the *Google Android* case is highly enlightening. A closer look at the issues of market dominance and abuse is therefore instructive.

## 2. Market Dominance: How to Assess Market Power in the Context of “Ecosystems”

The European Commission has identified separate relevant markets for licensable smart mobile device operating systems, *Android* app stores, general search services and non OS-specific mobile web browsers and has found dominant positions on these markets.<sup>94</sup> The definition of several relevant markets does not go without saying, as the European Commission starts from the idea, as we have seen above,<sup>95</sup> that in an ecosystem context it is conceivable to assume only one general system market. In its *Android* decision, the European Commission indeed discusses this question, applies several criteria and on this basis comes to the conclusion that a mobile operating system (such as *Android*) and an app store do not compete together as a system but constitute different relevant markets.<sup>96</sup>

The General Court confirmed<sup>97</sup> and emphasized in particular that non-licensable operating systems (like *Apple’s iOS* or *Blackberry*) are not part of the same market since manufacturers of mobile

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see immediately in the text. With respect to licensable operating systems, competing systems like *Windows Phone* have discontinued or have market shares close to zero.

<sup>90</sup> See *supra* B.

<sup>91</sup> See *infra* E.IV.3.

<sup>92</sup> European Commission, 18.7.2018, Case AT.40099 – *Google Android*, C(2018) 4761 final, OJ 2019 C 402/19.

<sup>93</sup> General Court, 14.9.2022, T-604/18 – *Google and Alphabet/Commission (Google Android)*, ECLI:EU:T:2022:541; an appeal is pending before the European Court of Justice under case number C-738/22.

<sup>94</sup> European Commission – *Google Android* (note 92), N. 210 ff., 431 ff. The geographical market definition varied: Whereas the markets for mobile operating systems and app stores are worldwide but excluding China, the search services markets are national and the market for non OS-specific mobile web browsers is truly global, see *ibid.*, N. 400 ff.

<sup>95</sup> *Supra* E.III.1.

<sup>96</sup> European Commission – *Google Android* (note 92), N. 299: The Commission argues for example that app stores and smart mobile operating systems are separate products satisfying different user needs, and that the choice of an app store is determined by the choice of the smart mobile device and its operating system. Moreover, there are software developers that only offer an app store but not an operating system.

<sup>97</sup> General Court – *Google Android* (note 93), N. 102 ff.

devices cannot obtain licences from them.<sup>98</sup> Even more importantly, the General Court confirmed the way the European Commission had taken into account the argument of competing ecosystems (in particular *Google vs. Apple*). A central argument of *Google* in this case is that the company cannot behave to an appreciable extent independently from other actors, and hence is not dominant, since the competitive restraints exerted by *Apple*'s ecosystem limit *Google*'s room for manoeuvre.<sup>99</sup>

The General Court confirmed that in the digital context the concept of competitive pressure indeed must be interpreted conceivably broadly and may require “multi-level or multi-directional examination in order to determine the fact and extent of the various competitive constraints that may be exerted on that undertaking”.<sup>100</sup> For this purpose, the General Court draws a distinction between, on the one hand, “internal competitive restraints” specific to the relevant market, and, on the other hand, “external competitive restraints” exerted by products or regions outside the relevant market.<sup>101</sup> The former may be called “direct constraint”, the latter “indirect constraint”.<sup>102</sup> With respect to digital ecosystems, according to the Court, it is particularly important to take into account the connection of relevant markets in this indirect sense.<sup>103</sup> The Court emphasises that the relevant markets of the case “cannot be artificially separated in so far as they all had complementary aspects” and confirms that this was correctly seen by the Commission.<sup>104</sup> The Court comes to the conclusion that “the Commission was correct to find that the indirect competitive pressure exerted by Apple on Google remained insufficient”.<sup>105</sup>

The General Court summarises the European Commission's conclusion as follows: “Apple and the iOS ecosystem were not in a position to exercise a sufficient competitive constraint on Google and the Android ecosystem”.<sup>106</sup> Emphasising the distinction between direct and indirect constraints, the Court dissociates itself from a viewpoint according to which there is a broad market for digital ecosystems encompassing the Google, the Apple and possibly even other digital ecosystems.<sup>107</sup> Hence, in a competition law sense, there is no competition between the Apple/iOS and the Google/Android

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<sup>98</sup> General Court – *Google Android* (note 93), N. 130 ff. and Press Release 147/22, p. 2. See the analysis of the judgement by Giardino-Karlinger, Liliane/Kotzekva, Rossitza, Platform Market Definition in EU Antitrust Law: The Case of *Android*, Competition Policy International – Antitrust Chronicle: Defining Platform Markets, January 2023, Vol. 1(1), p. 20 ff., with the conclusion at p. 24: “In particular, the General Court sided with the Commission in confirming that, taking account of the specific facts and circumstances of the case, competition from iOS at the user and app developer level is not sufficient to constrain Google's market power vis-a-vis device manufacturers for licensable mobile OSs, and that a multiple-market approach is warranted whereby app stores for Android form a separate (secondary-product) market”.

<sup>99</sup> For an in-depth analysis of the state of competition between the *Google* and the *Apple* mobile ecosystems see the British Competition & Markets Authority, Mobile Ecosystems – Market Study Final Report, 10.6.2022 <[www.gov.uk/government/publications/mobile-ecosystems-market-study-final-report](http://www.gov.uk/government/publications/mobile-ecosystems-market-study-final-report)>.

<sup>100</sup> General Court – *Google Android* (note 93), N. 117.

<sup>101</sup> General Court – *Google Android* (note 93), N. 109.

<sup>102</sup> Compare General Court – *Google Android* (note 93), N. 122.

<sup>103</sup> General Court – *Google Android* (note 93), N. 116.

<sup>104</sup> General Court – *Google Android* (note 93), N. 126.

<sup>105</sup> General Court – *Google Android* (note 93), N. 268.

<sup>106</sup> General Court – *Google Android* (note 93), N. 122.

<sup>107</sup> See the cautious wording in General Court – *Google Android* (note 93), N. 270.

ecosystems since there is no integrated market for ecosystems.<sup>108</sup> What exists, are indirect competitive restraints originating from products of the other ecosystem, but in the present context are not strong enough to control *Google*'s freedom to behave independently.

### 3. Abuse of the Dominant Position(s)

The European Commission found three abusive practices, firstly, illegal tying of *Google*'s search and browser apps to the Google Play Store in Mobile Application Distribution Agreements (“MADAs”) with the hardware manufacturers, secondly, payments to manufacturers and mobile network operators to exclusively pre-install Google Search based on Revenue Sharing Agreements (“RSAs”), and thirdly, Anti-Fragmentation Agreements (“AFAs”) with mobile device manufacturers not to develop or to sell Android “forks”, i.e. versions of the open source software developed by others and not authorized by *Google*. According to the Commission, these three types of agreements used Android as an instrument to draw traffic to the *Google* search engine and prevented rivals to compete on the merits.<sup>109</sup>

The General Court dismissed *Google*'s complaints with respect to the reproaches of tying and prohibiting Android forks, but accepted it with respect to the payments for exclusivity (in the RSAs). On the latter point, the General Court referred to the recent case law, for example the *Intel* judgment of the European Court of Justice, that has established new requirements with respect to the abusiveness of exclusivity agreements, in particular with respect to the necessity of an “as efficient competitor” test (AEC test).<sup>110</sup> This aspect of the judgment is certainly highly interesting since the consequences of the new approach are far from being clear.<sup>111</sup> However, it is a general question of competition law without specific relevance for the topic of ecosystems dealt with here. Therefore, reference should be made to the general discussion.<sup>112</sup> The same applies to the tying aspect of the case. The European Commission had found a *status quo bias* because of the pre-installation of the search engine and the browser to the detriment of competing apps,<sup>113</sup> and the General Court agreed.<sup>114</sup> Thus,

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<sup>108</sup> See in this sense also Yildiz/Weber (note 6), EuZ 2023, p. C18: “It is rare that consumers will consider whole ecosystems as interchangeable; they rather care about single products in an ecosystem”.

<sup>109</sup> European Commission – *Google Android* (note 92), N. 1268, 1319.

<sup>110</sup> General Court – *Google Android* (note 93), N. 637 ff.

<sup>111</sup> See for example Di Giovanni Bezzi, Raffaele, Burden of Proof in Article 102 Cases: Lessons from the Google Shopping Case, *Journal of European Competition Law & Practice* 2022, 112; Heinemann, Andreas, Comment on European Court of Justice, *Lietuvos geležinkeliai AB/European Commission*, EuZW 2023, 292.

<sup>112</sup> Which is intensified by the plan of the European Commission to draft Guidelines on exclusionary abuses of dominance; see European Commission, 27.3.2023, Press Release IP/23/1911. See also European Commission, A dynamic and workable effects-based approach to abuse of dominance, Competition policy brief March 2023 <[https://competition-policy.ec.europa.eu/document/40413680-4eda-4ba0-96b1-e3e9d4e22106\\_en](https://competition-policy.ec.europa.eu/document/40413680-4eda-4ba0-96b1-e3e9d4e22106_en)> (accessed 26 May 2023).

<sup>113</sup> European Commission – *Google Android* (note 92), N. 778 ff.

<sup>114</sup> General Court – *Google Android* (note 93), N. 326 ff.

the *Google Android* case is one of the examples for the reception of behavioural economics within competition law. Again, reference can be made to the general literature on this topic.<sup>115</sup>

What is directly relevant for our topic, though, are the Anti-Fragmentation Agreements (“AFAs”) by which *Google* wants to prevent the emergence of new “forks” of the open-source Android operating system. In the procedure before the European Commission, *Google* had advanced the argument that “the anti-fragmentation obligations are necessary to prevent fragmentation that would be detrimental to the Android ecosystem”.<sup>116</sup> The European Commission and the General Court rejected this argument: The anti-fragmentation obligations are not necessary to ensure the interoperability of the Android eco-system; and fragmentation is not detrimental to the Android ecosystem nor to its reputation. The General Court confirmed the European Commission’s finding that the AFAs prevent the emergence of devices that can be used by competing search engines, and that they deterred innovation.<sup>117</sup> Or, as Commission *Margrethe Vestager* had put it: By the “requirement not to modify the Android source code [...], Android is locked down in a Google-controlled ecosystem.”<sup>118</sup>

## V. Conclusion

The concept of digital ecosystems has appeared in competition law analysis only recently, but all the more powerfully. The term is now used in administrative decisions, court rulings and official documents, in particular in the context of market definition, the establishment of dominance and the finding of an abuse. Regarding market definition, the European Commission has proposed an open approach according to which a digital ecosystem may or may not constitute one large system market or different separate markets interacting with each other. However, in its case law, e.g. the *Google Android* case, the Commission has clarified that the products of the large digital platforms, like for example mobile operating systems, app stores and search engines, constitute separate markets.<sup>119</sup>

Market definition obviously has a great influence on the finding of dominance, but is not in itself determinative. Even if markets are delineated below the system level, the interactions between these modular markets and other markets, situated for example in third party ecosystems, have to be taken into account. Thus, according to the terminology proposed by the European Commission and the General Court in the *Google Android* case, not only “internal competitive restraints” from within the

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<sup>115</sup> See for example Heinemann, Andreas, Behavioural Antitrust – A “More Realistic Approach” To Competition Law, in: Mathis, Klaus (ed.), *European Perspectives on Behavioural Law and Economics*, Cham u.a. 2015, p. 211 ff.

<sup>116</sup> See European Commission – *Google Android* (note 92), N. 1155.

<sup>117</sup> General Court – *Google Android* (note 93), N. 828 ff. (with rejection of intellectual property-based arguments in N. 854 ff.).

<sup>118</sup> Vestager, Margrethe, 18.7.2018, STATEMENT/18/4584, p. 2.

<sup>119</sup> The same is true for social media, see the reflections on relevant markets for the private use of social networks (excluding professional networks like e.g. LinkedIn) and its relevance for the freedom of consent under the General Data Protection Regulation by Picht, Peter Georg/Akeret, Cédric, *Back to Stage One? – AG Rantos' Opinion in the Meta (Facebook) Case* <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4414591](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4414591)> (accessed 26 May 2023), paragraph II.

relevant market, but also “external competitive restraints” exerted by other markets or ecosystems can restrict the freedom to behave independently. However, both forms of constraint, be they direct or indirect, have to be assessed for their strength. It is a question of all circumstances of the individual case whether these constraints are strong enough to control the powerful firm.<sup>120</sup> This shows that the existence of digital ecosystems does not alter the fundamentals of competition law analysis. As always, it must be determined empirically whether a firm is sufficiently independent in order to find dominance.

## F. Outlook

Intuitively, the existence of different market sides has always played a role in competition law, as the distinction between reader markets and advertising in the newspaper context demonstrates. But it was only thanks to the concept of two-sided markets that a better analytical understanding has been achieved. This has made it possible to properly assess further complications, namely the transition from two-sided markets to multi-sided platforms and digital ecosystems. However, much will still need to be clarified.<sup>121</sup> An example is the delineation of relevant markets, in particular the question whether there is only one big platform market comprising all market sides, or if each market side constitutes its own relevant market. It does not seem appropriate to answer this question using a single criterion as the US Supreme Court did in its *Amex* decision where it predominantly relied on the transaction platform aspect. The multi-factor analysis proposed by the European Commission seems much more convincing in this respect.<sup>122</sup> It is crucial to bring the economic insights on multi-sided markets and network effects into the analysis.<sup>123</sup>

Hence, defining rather narrow relevant markets does not mean ignoring the interaction between these markets as elaborated by the economic literature on multi-sided markets. On the contrary: Recent case law like for example the *Google Android* case has shown how to deal with the phenomenon of distinct but interconnected markets. The competitive pressure exerted by other markets or ecosystems is an indirect restraint that has to be evaluated for its strength. The formula of “competition of ecosystems” therefore does not obviate the need for a precise competitive assessment. Platform economics has become an indispensable part of this analysis.

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<sup>120</sup> See the clear findings by Podszun (note 87), F 123, who expresses strong doubts regarding the intensity of competition between the BigTech companies: “Wettbewerb findet dann nicht mehr nach den Regeln des freien Marktes, sondern nach denen der Titanen statt”.

<sup>121</sup> See Veisdal (note 30), p. 53: “Although research on platforms in two- and multi-sided markets has come a long way in the last twenty years, the field has arguably only begun scratching the surface of important topics related to competition and policy”.

<sup>122</sup> On these opposing views see *supra* C.II.

<sup>123</sup> See also Pike, Chris, Introduction and Key Findings, in: OECD, Rethinking Antitrust Tools for Multi-Sided Platforms, Paris 2018, p. 9, 15: “For the purposes of a competitive assessment there is little meaningful distinction between defining a two-sided market and defining two interrelated markets, as long as the effect of the cross-platform network effect is recognised and analysed”.