

## Algorithms and collusion

Excerpt from Chapter I of the XXII. Biennial Report of the Monopolies Commission (“Competition 2018”) in accordance with Section 44 Paragraph 1 Sentence 1 of the German Act against Restraints of Competition

The full Report (in German) is accessible at:  
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The Monopolies Commission is a permanent, independent expert committee which advises the German government and legislature in the areas of competition policy-making, competition law and regulation. Its legal responsibilities encompass, among others, the preparation of a Main Report analysing the development of competition on a biannual basis. The Monopolies Commission has five Members appointed by the Federal President based on a proposal of the German government. Prof. Achim Wambach, Ph.D., is the chairman of the Monopolies Commission.

# Chapter I

## Algorithms and collusion

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## Summary

Despite the numerous advantages associated with the use of pricing algorithms, potential disadvantages are increasingly being discussed. Anti-competitive effects through the use of pricing algorithms are considered possible, particularly in the form of collusion. Collusion is typically understood as a market outcome in which companies achieve higher profits than in competition through forms of coordination, for example, by coordinating prices or quantities. Collusive behaviour is therefore to the detriment of customers and is undesirable from the point of view of society as a whole.

The influence that pricing algorithms have on collusion depends largely on the structural characteristics of the relevant market and other supply and demand factors. Depending on how these factors are structured, pricing algorithms can foster collusion as an additional element. However, from today's perspective, it is not possible to make reliable statements as to whether collusion will occur more frequently in the future. In any case, collusion will continue to be expected primarily in markets that offer appropriate conditions for collusion. These include high market entry barriers, a rather small number of companies and a high degree of market transparency.

In data-intensive sectors such as the digital economy, pricing algorithms can facilitate collusion by automating collusive behaviour and thus technically accelerating it. For example, they can stabilize collusion by allowing the collection of information on competitors' prices and sanctioning deviations from collusive market outcomes more quickly. The use of pricing algorithms can also render explicit anticompetitive agreements or concerted practices dispensable. Lastly, in the case of self-learning algorithms, the decisive business decision is moved to the time of the decision on the pricing algorithm and is not only made during pricing.

It is regularly difficult for the competition authorities to detect collusive behaviour on the part of companies. This concerns, in particular, the determination of whether a concerted practice is actually taking place. Difficulties tend to increase when the parties use pricing algorithms. This also concerns the proof of a possible price increase.

Therefore, markets should be monitored for collusive risks. The Monopolies Commission, in particular, considers it necessary to strengthen market monitoring through sector inquiries. As consumer associations are most likely to obtain relevant information on possible collusive overpricing, the Monopolies Commission recommends that consumer associations obtain the right to initiate competition sector inquiries. The rejection of the application would have to be explained in more detail by the cartel authority. If, in the context of market observation, there are concrete indications that the use of pricing algorithms contributes considerably to collusive market outcomes and that the enforcement of the competition rules is permanently inadequate, a reversal of the burden of proof with regard to the economic damage created by an infringement of competition law could be considered. In this way, the liability for pecuniary disadvantages that the collusive use of pricing algorithms can entail could be assigned to the users of such algorithms whenever the situation remains unclear.

Finally, pricing algorithms are often not developed by the sales companies themselves, but are provided by IT service providers with special expertise. The question of whether such a third party is liable for violations of competition law typically depends on the responsibility of the companies using the pricing algorithm. This means that IT service providers can either be subject to particularly far-reaching liability or, conversely, benefit from liability gaps, depending on whether the decision on the design of the concrete pricing algorithm lies more with the user or the respective IT service provider. The liability of such third parties should be fundamentally reviewed.

## 1 Introduction

**164.** In the digital economy, the analysis and economic use of large amounts of data ("big data") are becoming increasingly important.<sup>1</sup> The instruments used for this purpose are grouped together using the common term "algorithms". Such algorithms are used, among other things, for pricing (pricing algorithms).

**165.** The use of algorithms – including pricing algorithms – brings economic benefits to market participants. On the companies side, algorithms are used to optimize prices and quantities, among other things. For example, pricing algorithms are used in the air transport and hotel industry to dynamically adjust prices for seats and hotel nights to changing market conditions. In the e-commerce sector, too, a considerable proportion of online retailers use software solutions to monitor competitors' prices and adjust their own prices accordingly.<sup>2</sup> In addition, algorithms are used to improve the quality of products and services such as search results or personalized product recommendations.

**166.** Consumers can benefit directly and indirectly through the use of algorithms, e.g., through reduced search and transaction costs. Comparison portals, for example, make it possible to compare large numbers of products and services and to select the best offer from them. At the same time, possible information asymmetries between companies and customers as well as between customer groups can be reduced, which makes it difficult for companies to discriminate unfairly between customers. Greater market transparency can also lead to increased competition between companies, which in turn benefits consumers indirectly.

**167.** However, concerns have been expressed as well. These relate to the fact that the use of pricing algorithms can increase the risk of economically undesirable parallel pricing (collusion). Although collusion may infringe the competition rules, the parties may be able to achieve the same result without such an infringement, e.g., if they use the pricing algorithms provided by IT service providers in a uniform manner without an explicit agreement. There is therefore reason to examine whether countermeasures developed by the market itself are sufficient or whether additional regulatory measures are necessary to counter the increased risk of collusion. This question is addressed in this section.

**168.** In the following, the functionality of pricing algorithms is briefly outlined (Section 2). It is then explained how the use of algorithms increases the risk of collusion (Section 3). On this basis, it is then discussed to what extent market-based solutions to reduce the existing collusion risks can be expected (Section 3.2.3) or whether and to what extent a further development of the legal framework appears necessary (Section 4).

## 2 Characteristics of pricing algorithms

**169.** Algorithms are instructions in the form of program code that can be used to solve certain problems. Algorithmic pricing takes place within a more or less complex system in which one or more algorithms can be used simultaneously. The algorithms map input values in deterministic or probabilistically determined output values. Deterministic means that the input values in the output values are mapped according to clear specifications (true/false relationship), whereas a probabilistic mapping also takes probabilities into account. Pricing algorithms thus enable more or less rule-based pricing. This requires a predefined target function that evaluates the data entered according to predefined or excluded rules.

**170.** Currently, static and, less frequently, dynamic algorithms are primarily used for pricing. Algorithms are static if they follow an operation plan defined by the function for the execution of individual tasks, which is not changed after its creation. With dynamic algorithms, the operation plan is variable. However, the borderline between input parameters

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<sup>1</sup> See Autorité de la concurrence/Federal Cartel Office, Competition Law and Data, 10 May 2016; JFTC, CPRC, Report of Study group on Data and Competition Policy, 6 June 2017; Competition Bureau, Big data and innovation: key themes for competition policy in Canada, Report of 19 February 2018; id., Big data and Innovation: Implications for Competition Policy in Canada, Draft Discussion Paper of 18 September 2017, on the competition-economic assessment of Big Data.

<sup>2</sup> European Commission, Staff Working Document accompanying the Final Report on the E-commerce Sector Inquiry, document SWD (2017) 154 final of 10 May 2017, para. 149.

and function is fluid. Algorithms can therefore, depending on the leeway granted to them, further develop or completely circumvent the previously defined processes and not use parameters explicitly given to them. Furthermore, with self-learning pricing algorithms, the operation plans are not only variable, but also not necessarily interpretable by humans. Such algorithms uncover patterns in data and independently find solutions instead of simply following pre-programmed rules. Self-learning algorithms in particular can therefore develop other rules with which the same or a better result is achieved.<sup>3</sup>

**171.** An effective exclusion of certain rules is therefore difficult or not possible at all, depending on the algorithm. A program code can also be changed in such a way that there is no practicable way to trace the code and thus the solution path (so-called "obfuscation"). This is the case in the present context of interest, for example, if pricing algorithms used in a cartel are programmed in such a way that the parties involved appear to set prices autonomously and thus the proof of concerted practice is made more difficult. This can lead to the situation in which proving the cartel is hardly possible and only with considerable effort.

### **3        Algorithms and collusion**

**172.** Although there are many advantages associated with the use of modern algorithms for economic actors, potential disadvantages of this new technology are increasingly being discussed. Anticompetitive effects related to the use of modern algorithms are currently presumed particularly in connection with collusion.<sup>4</sup>

#### **3.1      What is collusion? (economic foundations)**

**173.** In economics, collusion is typically understood as a market outcome in which competitors achieve higher profits than in competition through a form of coordination, for example by coordinating prices or quantities.<sup>5</sup> Such behaviour is at the expense of consumers because, for instance, they have to pay higher prices. Collusion is also undesirable in society as a whole, since the decline in consumer surplus is typically higher than the additional profits of companies.

**174.** Two types of collusion are distinguished. In explicit collusion, competitors communicate directly with each other, e.g., in written or oral form. In implicit collusion, the participants align their behaviour without direct communication.<sup>6</sup> Both types of collusion are similarly harmful to welfare.

**175.** Despite the prospect of higher profits, collusion is rather rare, as particularly explicit collusion is in general prohibited under competition law. In addition, companies have a coordination problem in all forms of collusion.

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<sup>3</sup> The use of self-learning algorithms is a feature of so-called artificial intelligence (AI); see dazu OECD (2017), Algorithms and Collusion: Competition Policy in the Digital Age, p. 8 ff., [www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm](http://www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm), accessed on 29 March 2018. Die Verbesserungspotenziale von selbstlernenden Algorithmen schließen nicht aus, dass eine fehlerhafte Konfiguration auch zu unklaren Verantwortlichkeiten beitragen kann; vgl. hierzu, e.g., BITKOM e. V./DFKI, Decisionsunterstützung mit Künstlicher Intelligenz, 2017, p. 89 f., <https://www.uni-kassel.de/fb07/fileadmin/datas/fb07/5-Institute/IWR/Hornung/170901-KI-Gipfelpapier-online.pdf>, accessed on 16 April 2018.

<sup>4</sup> OECD, a. a. O.; Ezrachi, A./Stucke, M. E., Virtual Competition, The Promise and Perils of the Algorithm-Driven Economy, Cambridge, Massachusetts 2016; Käseberg, T./von Kalben, J., Herausforderungen der Künstlichen Intelligenz für die Wettbewerbspolitik, Wirtschaft und Wettbewerb of 5 January 2018, p. 2-8; Gal, M. S./Elkin-Koren, N., Algorithmic Consumers, Harvard Journal of Law and Technology, 2017.

<sup>5</sup> In addition to an coordination of prices and quantities, collusion can also lead to a division of markets in terms of geographical characteristics or customer groups. Ivaldi, M./Jullien, B./Rex, P./Seabright, P./Tirole, J., The Economics of Tacit Collusion, Final Report for DG Competition, European Commission, 2003, p. 58. [http://ec.europa.eu/competition/mergers/studies\\_reports/the\\_economics\\_of\\_tacit\\_collusion\\_en.pdf](http://ec.europa.eu/competition/mergers/studies_reports/the_economics_of_tacit_collusion_en.pdf), accessed on 23 March 2018.

<sup>6</sup> Since implicit collusion does not require communication, the term collusion is sometimes perceived as misleading in this context. Some authors therefore propose to speak of implicit coordination instead. Ivaldi, M. et al., a. a. O., p. 4 (Fn. 2). The Monopolies Commission uses the more common term implicit collusion.

Whether an explicit or implicit form of collusion is sought, a number of conditions must be met for companies to solve the coordination problem and align their behaviour.<sup>7</sup>

**176.** First, competitors must have a uniform understanding of the terms (e.g., prices and quantities) on which they want to offer their goods on the market. These conditions must be designed in such a way that all the companies involved are better off than they would be without collusion. Secondly, potential deviations from the agreed collusive target must be observable. If deviations cannot be detected promptly and with sufficient certainty, an individual company would have an incentive to deviate from the collusive outcome in order to maximize its own profit. Thirdly, there needs to be a credible threat of retaliation against those who deviate. In this context, retaliatory measures means reactions from other companies. These may consist, for example, in a return to competitive prices, resulting in a loss of potential gains from a deviation from the collusive outcome. Without retaliatory measures, any deviation would have no consequences for the deviating company.

**177.** Moreover, collusion is not equally likely in all markets. The economic literature has identified a number of factors that can influence the possibility of collusion. These factors can be roughly divided into the categories (i) market structure (e.g., number of competitors, barriers to market entry, frequency of interactions and market transparency), (ii) characteristics of the demand side (development of demand, fluctuations and cycles in demand) and (iii) characteristics of the supply side (degree of product differentiation, symmetry of companies e.g., with regard to cost structures and production capacities, frequency of innovations).<sup>8</sup>

### 3.2 Influence of algorithms on collusion

**178.** In light of the increasing use of pricing algorithms, the question arises as to what extent collusive market outcomes are actually more likely. To this end, the influence of algorithms on certain market characteristics that may favour collusion are discussed first (Section 3.2.1). Next, different collusion scenarios are considered in which algorithms could play a role (Section 3.2.2). Finally, the influence of algorithms used on the demand on the emergence of collusion on the supply side is described (Section 3.2.3).

#### 3.2.1 Algorithms can facilitate collusion

**179.** The likelihood of collusion is influenced by a number of factors. Not all of these factors are changed in the same way by algorithms. A rather large influence of algorithms can be expected on the two structural factors, namely frequency of price adjustments and market transparency.

**180.** Collusion is easier to maintain in markets where more frequent interactions occur because deviations from the collusive outcome can be detected and sanctioned more quickly.<sup>9</sup> Similarly, markets where companies can adjust their prices more often facilitate collusion. Frequent price adjustments allow companies to react more quickly to possible deviations, which in turn reduces incentives to deviate. Especially in digital markets, algorithms can be used to dynamically adjust prices very quickly to the respective market conditions. This enables companies to react to possible deviations in real time or even to anticipate them. The relatively high speed with which it is possible to react prevents deviations from being profitable, at least in the short term, as they can be identified quickly.<sup>10</sup>

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<sup>7</sup> Stigler, G. J., A Theory of Oligopoly, *The Journal of Political Economy*, Vol. 72, Issue 1, 1964, pp. 44-61.

<sup>8</sup> Ivaldi, M. et al., a. a. O.

<sup>9</sup> It may therefore make sense, for example, to conduct auctions and other procurement procedures rather rarely. Frequent procurement procedures make it easier for the companies involved to monitor compliance with agreements, e.g., with regard to bidding behaviour and to react more quickly in the event of deviations. This reduces the incentive to disregard the agreement because the benefits of a deviation are lost more quickly. Ivaldi et al., a. a. O., p. 19 ff.

<sup>10</sup> Federal Cartel Office/Autorité de la concurrence, Competition Law and Data, 10 May 2016, p. 14 f. [https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf?\\_\\_blob=publicationFile&v=2](https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf?__blob=publicationFile&v=2) accessed on 19 April 2018.

**181.** A high degree of market transparency can increase the likelihood of collusion.<sup>11</sup> In order to be able to react to possible deviations, it is necessary that these are promptly recognizable. Transparent markets in which the behaviour of other companies can easily be observed make deviations therefore less attractive. The use of algorithms can further increase the transparency of markets because they are able to obtain information from very large amounts of data that could not be obtained using conventional methods. Algorithms also make it possible to distinguish more reliably between intentional deviations from the collusion and market-related adjustments (e.g., to fluctuations in demand) that would not result in sanctions by the other companies.<sup>12</sup>

**182.** In addition, other factors, such as the number of market participants, influence the possibility of collusion. For example, a larger number of companies involved makes collusion less likely because it becomes more difficult to make agreements and monitor their compliance. Collusion is therefore typically to be expected in relatively concentrated markets.<sup>13</sup> The ability to quickly analyse large amounts of data using algorithms makes it easier to coordinate and monitor the behaviour of a large number of companies. Therefore algorithms make collusion in less highly concentrated markets possible .

**183.** With other factors important for collusion, it is currently less clear what could change through the use of algorithms. For example, it is not clear how (pricing) algorithms influence the entry of new providers into a market. In general, low barriers to market entry make collusion difficult because new entrants either do not participate in the collusion or the number of companies involved and thus the coordination effort increases. Algorithms could reduce barriers to entry if the opportunities and risks of market entry can be better assessed. On the other hand, it is conceivable that algorithms will also make market entries more difficult as they can be identified and fended off more quickly by established providers with the help of algorithms.<sup>14</sup>

### 3.2.2 The role of algorithms in collusion

#### 3.2.2.1 Algorithms as an instrument

**184.** An obvious and already observed role of algorithms in collusion scenarios is that of an instrument with which upstream economic decisions of the users of the algorithm are technically implemented. This includes the implementation of agreed price adjustments as well as the monitoring of agreements. Algorithms can also be used to automate the signalling of an intention to collude.

**185.** In the situation also known as the “messenger scenario”, algorithms function as an instrument with the help of which previously reached agreements are implemented within the framework of explicit collusion. Examples are the proceedings of the US Department of Justice (DoJ) and the Competition & Markets Authority (CMA) of the United Kingdom regarding the distribution of posters via the Amazon Marketplace.<sup>15</sup> The companies involved had initially agreed by e-mail that they would no longer underbid each other. After a manual adjustment of the prices had proved too complex, both companies used (different) repricing software.<sup>16</sup> Among other things, this software made it possible to monitor competitors’ prices and dynamically adjust one’s own prices to those of competitors. In this case, the software was set so that the products were offered at the same price as long as no third (uninvolved) dealer with a lower price was active on the market.

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<sup>11</sup> Ivaldi et al., a. a. O., pp. 22 ff.

<sup>12</sup> OECD, a. a. O., p. 22.

<sup>13</sup> In terms of cartels detected by the European Commission in the EU between 2001 and 2015, cartels consisted on average of seven companies. Hellwig, M.,/Hüschelrath, K., Cartel Cases and the Cartel Enforcement Process in the European Union 2001–2015: A Quantitative Assessment, ZEW Discussion Paper No. 16-063 of September 2016.

<sup>14</sup> OECD, a. a. O., p. 21.

<sup>15</sup> DoJ, Plea Agreement of 30 April 2015, Case U.S. v. David Topkins; DoJ, Plea Agreement of 11 August 2016, Case U.S. v. Daniel William Aston and Trod Limited; CMA, Case 50223 – Online sales of posters and frames, Decision of 12 August 2016.

<sup>16</sup> CMA, Case 50223 – Online sales of posters and frames, Decision of 12 August 2016, p. 25 (Rn. 3.62 f.).

**186.** In addition to implementing arrangements, algorithms can also be used to monitor compliance with arrangements and, if necessary, to sanction deviations.<sup>17</sup> In this function, algorithms can be used both for scenarios with explicit collusion and implicit collusion. In the above example, the repricing software would simply have to be configured to automatically undercut prices below the agreed level. Sanctioning in this case would consist of a return to competitive pricing behaviour.

**187.** One method with which companies can solve the coordination problem without communicating directly with each other is through signalling. Signalling can take place on the basis of an agreement or in the context of independent behaviour. Companies can signal their willingness to collude by unilaterally increasing their prices, at least for a short time. Other companies can then react by raising their prices as well, with the first price increase acting as a common orientation point. Such a strategy carries the risk that competitors will refrain from raising their own prices. In such a case, the company incurs costs in the form of lost sales due to the unilateral price increase.

**188.** The signalling of a willingness to collude and the setting of orientation points can be carried out by corresponding programmed algorithms. Other companies that also use algorithms can observe these signals and adjust their prices accordingly. Since algorithms allow this process to run much faster than before, the costs of signalling in the form of lost sales can be significantly reduced. Thus, the use of algorithms should lead more often to the signalling of a willingness to collude and thus ultimately to collusion itself.

### 3.2.2.2 Collusion by using the same algorithm

**189.** Collusive market outcomes may also occur in scenarios in which the behaviour of companies using similar algorithms or even the same algorithm is harmonized.

**190.** Many markets are characterized by a dynamic that makes it necessary for companies to constantly adapt their behaviour to changing circumstances. As already explained at the outset, it is now common practice in many sectors such as the hotel industry and aviation to adjust prices dynamically to market developments, which should in many cases reflect competitive pricing behaviour on the part of companies. At the same time, the dynamics of such markets make collusion more difficult because companies would have to coordinate their price adjustments more frequently. By using the same algorithm, companies could coordinate their behaviour for the purpose of collusion and have it automatically adapted to changing market conditions.

**191.** A variant of this scenario is the use of algorithms in so-called star or hub-and-spoke cartels. These are characterized by the fact that not (only) competitors at the same value-added level align their behaviour horizontally, but that this behaviour is organized by a central actor (hub) towards several companies (spokes). In such a constellation, the same or similar algorithms can be used to ensure that the participants align their behaviour.<sup>18</sup>

**192.** In the Internet economy, this scenario may become particularly relevant in relation to platforms that act as transaction platforms for two or more user groups and also determine the prices for these transactions. A current example of this is Uber's business model. On its platform, it mediates, among other things, driving services to passengers provided by private individuals with their own vehicles.<sup>19</sup> The drivers act as independent contract partners vis-à-vis Uber, which means that there is no employment relationship with the intermediary platform. The fare is set by Uber using a price algorithm used by all drivers. In addition to the vehicle class and the distance to be covered, demand fluctuations are taken into account in real time and prices are adjusted dynamically (so-called "surge pricing").<sup>20</sup> Price competition between the actually self-employed drivers is thus practically impossible, since the price is controlled by the same software for all drivers.

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<sup>17</sup> European Commission, Staff Working Document accompanying the Final Report on the E-commerce Sector Inquiry, document SWD(2017) 154 final of 10 May 2017, para. 608; regarding monitoring algorithms, see OECD, a. a. O., pp. 26-27.

<sup>18</sup> Ezrachi, A./Stucke, M. E., a. a. O., pp. 46 ff; Käseberg, T./von Kalben, J., a. a. O., p. 4.

<sup>19</sup> See for a detailed discussion Monopolies Commission, XXI. Hauptgutachten, Wettbewerb 2016, Baden-Baden 2016, paras 1242 ff.

<sup>20</sup> <https://www.uber.com/de/drive/partner-app/how-surge-works/>; accessed on 28 March 2018

**193.** In this constellation Uber acts as a hub and the individual drivers as spokes.<sup>21</sup> If a platform (Uber) or provider (driver) has a margin of manoeuvre due to market power, they could use this to demand excessive prices.<sup>22</sup> This is unlikely in the market for driving services as long as classic taxis are a close substitute for Uber rides. Typically, Uber drivers currently undercut the (regulated) prices of the taxi competition. However, where, for example, taxis have a competitive disadvantage compared to Uber drivers for quality reasons, Uber rides already cost more than classic taxi rides.<sup>23</sup>

**194.** Nevertheless, the example suggests the impact such algorithm-based pricing systems can have in terms of coordinated pricing. As independent competitors leave their pricing to a platform that optimizes prices uniformly on the basis of the data available to it, independent companies may align their prices across the industry if necessary.<sup>24</sup>

### **3.2.3 The effect of demand side algorithms**

**195.** Given the potential danger of algorithmic collusion, the question is whether the market itself is developing solutions to counter this danger. Some authors argue that consumers themselves could use algorithms to at least partially offset the negative effects of collusion.<sup>25</sup> Under the heading "Algorithmic Consumers" it is discussed that algorithms could observe prices for consumers and predict their development in order to advise them in their purchasing decisions. Already today, digital personal assistants support consumers in everyday life by providing up-to-date information (e.g., on traffic conditions or weather) and accepting orders.<sup>26</sup> It is expected that algorithms will make more decisions for consumers and make purchases autonomously in the future. Decision processes are thus made faster and more efficient than before.

**196.** With regard to the problem of algorithm-based collusion, consumers could use algorithms to avoid excessive prices or to bundle their buying power. In both cases, the enforcement of higher prices for the supply side would become more difficult. The effectiveness of such market-based solutions seems at least questionable from today's perspective. The bottom line would be which side would have access to better data and algorithms. In such a race between buyers and sellers, the dealers would be in a better position in case of doubt. Demand side coordination also seems difficult because the number of consumers is usually significantly higher than that of companies in an oligopolistic market. Moreover, there is a risk that such market-driven solutions may arise too late or possibly not at all.

## **3.3 Interim conclusion**

**197.** It can be concluded that the influence of algorithms on the probability of a collusive market outcome strongly depends on the respective structural characteristics of a market as well as other supply and demand side factors. Depending on how these factors are structured, algorithms can promote collusion as a further element in individual cases. From today's perspective, it is not possible to make reliable statements as to whether collusion will occur more frequently in the future. Ultimately, collusion will continue to be expected primarily in markets that offer appropriate conditions for collusion. These include high market entry barriers, a rather small number of companies and a high degree of market transparency.

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<sup>21</sup> United States District Court Southern District of New York (S.D.N.Y.), Case Meyer v. Kalanick of 31 March 2016. Ezrachi, A./Stucke, M. E., a. a. O., pp. 50 ff. Kritisch auch Monopolies Commission, XXI. Hauptgutachten, Wettbewerb 2016, Baden-Baden 2016, para. 1279.

<sup>22</sup> Ezrachi, A./Stucke, M. E., a. a. O., p. 55.

<sup>23</sup> The Economist, Where Uber costs more than a cab, 24 March 2018.

<sup>24</sup> OECD, Algorithmic Collusion: Problems and Counter-Measures – Note by A. Ezrachi & M. Stucke of 31 May 2017, p. 10.

<sup>25</sup> Gal, M. S./Elkin-Koren, N., Algorithmic Consumers, Harvard Journal of Law and Technology, 2017; see auch OECD, Directorate for financial and enterprise affairs – Competition Committee, Algorithms and Collusion – Note from the European Union, 21-23 June 2017, DAF/COMP/WD(2017)12, para. 31.

<sup>26</sup> Examples of such assistants are Amazon's Alexa, Microsoft's Cortana, Google Assistant and Apple's Siri.

**198.** Especially in data-intensive sectors such as the Internet economy, the use of algorithms can facilitate collusion by automating collusive behaviour and thus technically accelerating it. For example, algorithms can be designed to give signals to competitors to increase prices by adjusting prices. Algorithms can also help to stabilize collusion by collecting information on competitors' prices and sanctioning deviations from collusive market outcomes more quickly.

**199.** The use of algorithms could also have an impact on the nature of the collusion. It cannot be ruled out that especially implicit collusion could occur more frequently in the future because algorithms reduce the need for explicit agreements between companies. For example, in markets where collusion without algorithms could only be achieved with the help of explicit agreements, implicit collusion could occur more frequently. Explicit collusion would thus be replaced in these cases by algorithm-based implicit collusion and thus occur less frequently. However, since there is also an opposite effect – explicit collusion is facilitated by algorithms – the overall effect with regard to the occurrence of explicit collusion is unclear.

## 4 Further development of the legal framework

### 4.1 Introduction

**200.** The competition rules (Art. 101-102 TFEU) do not contain a general prohibition of collusion.<sup>27</sup> This is at least true if collusion is understood as a market outcome.<sup>28</sup> A general prohibition of collusive market outcomes would be difficult to enforce because it would remain open who is legally responsible for either avoiding or responding to this market outcome. In order to establish such a responsibility, the competition rules are always linked to market behaviour that is controllable by market participants and restrictive of competition. As far as pricing is concerned, according to the case law of the European Court of Justice, market behaviour restricts competition if

*"by the way in which they ac[t], the undertakings [...] eliminat[e] with respect to prices some of the preconditions for competition on the market which [stand] in the way of the achievement of parallel uniformity of conduct."*<sup>29</sup>

However, it is not yet sufficient to establish parallel behaviour as such (i.e., similar market behaviour) in order to assume that the behaviour is anticompetitive in the legal sense.<sup>30</sup> This is despite the fact that parallel behaviour may lead to exactly the same prices, and thus to a collusive market outcome.

**201.** The competition rules must also be observed if pricing is algorithm-based and if this can contribute to a collusive market outcome. It does not matter whether the collusion results from the parallel use of static or dynamic algorithms or whether the algorithm is even self-learning and thus adapts autonomously to the market environment. Nor is it important that the use of pricing algorithms may be accompanied by advantageous economic effects. The competition rules allow the taking of such effects into account.

**202.** However, there are two challenges in applying the competition rules that complicate this application when pricing algorithms are used:

- According to mathematical principles, the creation of such algorithms only requires the definition of a goal function (e.g., profit maximization). That being said, the transition between the parameters entering the

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<sup>27</sup> In German law, see also §§ 1 ff. of the Competition Act (*Gesetz gegen Wettbewerbsbeschränkungen* – GWB).

<sup>28</sup> See paras 173 ff. above; and European Commission, Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements (Horizontal Guidelines), OJ C 11 of 14 January 2011, p. 1, paras 65 ff.

<sup>29</sup> See (identical): ECJ, Judgments of 14 July 1972, 48/69 – ICI, ECR 1972, 619, ECLI:EU:C:1972:70, para. 99/103; 49/69 – BASF, ECR 1972, 713, ECLI:EU:C:1972:71, para. 30 f.; 51/69 – Bayer AG, ECR 1972, 745, ECLI:EU:C:1972:72, para. 33; 52/69 – Geigy AG, ECR 1972, 787, ECLI:EU:C:1972:73, para. 34; 54/69 – Francolor, ECR 1972 p. 851, ECLI:EU:C:1972:75, para. 86/90; 55/69 – Cassella Farbwerte, ECR 1972, 887, ECLI:EU:C:1972:76, para. 38.

<sup>30</sup> See ECJ, Judgment of 31 March 1993, C-89/85 et al. – Ahlström Osakeyhtiö, ECR 1993, I-1307, ECLI:EU:C:1993:120, paras 71 ff.

function and the function itself is smooth, depending on the design of the algorithm.<sup>31</sup> There is therefore a lack of clearly distinguishable facts to which legal rules can easily be applied.

- A collusive market outcome comes about on the basis of economic laws. However, not only an anticompetitive behaviour in the legal sense, but – depending on market conditions – also parallel behaviour that is not captured by the law can lead to such a market outcome.<sup>32</sup> The determination of a collusive market outcome is usually very difficult, as it typically requires a comparison with the situation in markets without collusion. These difficulties can be seen, for example, in the identification of damages resulting from breaches of competition law.

The use of pricing algorithms therefore gives rise to challenges concerning the facts of the case, both with regard to the input conditions and with regard to the outcome.

**203.** The competition cases decided so far have mainly concerned relatively simple static pricing algorithms, with which the market participants have pursued strategies that could also be regarded as anticompetitive irrespective of the algorithm.<sup>33</sup> However, the characteristics of pricing algorithms may make it more difficult to apply the competition rules in the future. The possibility of achieving the same result through a different design of such algorithms opens up scope for circumventing existing rules. In addition, the possibility that the result may be due to both non-compliance with the competition rules and other market behaviour raises the question of the added value of enforcement of the competition rules in the cases concerned. It also makes it difficult to prove a possible violation of the competition rules.

**204.** In any case, it is foreseeable that the behaviour possibly giving rise to collusion will increasingly be moved forward to the time of the decision on a more or less complex pricing algorithm. In addition, the behaviour is becoming less and less dependent on the users. This is because more complex algorithms in particular are incomprehensible (“black box”). Users only specify the goals they wish to pursue, which may then be implemented by independent IT service providers. In doing so, the users may also take into account the interests of other third parties, such as platform operators on whose platforms the algorithm is to be used. When designing the algorithm in individual cases, it depends on the implementation of the respective specifications by the IT service providers.

**205.** Two questions follow from these considerations:

- Are the competition rules sufficient to prevent collusion as such?
- Is it sufficient to link legal responsibility for the emergence of collusive market outcome to user behaviour as before?

These questions are addressed in the following sections (sections 4.2 and 4.3).

## 4.2 Are the competition rules sufficient to prevent collusion?

**206.** According to current knowledge, the use of pricing algorithms may help ensure that collusive market outcomes can occur to a greater extent than in earlier times.<sup>34</sup> However, while cases of explicit collusion are in principle covered by the prohibition on cartels in Article 101 TFEU, implicit collusion can only be covered by the prohibition of abuse of market power under strict conditions (Art. 102 TFEU) (section 4.2.1 and 4.2.2). From the Monopolies Commission’s perspective, the existing competition rules should be supplemented by rules which would neutralize as far as possible a potential contribution of pricing algorithms to collusive market outcomes (section 4.2.3).

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<sup>31</sup> See para. 170 above.

<sup>32</sup> See paras 174 ff., 199 above.

<sup>33</sup> See ECJ, Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42; U.S. v. Airline Tariff Publishing Company, 836 F. Supp. 9 (D.D.C. 1993); CMA, press releases of 21 July and 12 August 2016 – Trod Limited/GB eye Limited; U.S. v. Topkins, Case 3:15-cr-00201-WHO, filed: 6 April 2015 and para. 214 below.

<sup>34</sup> See sections 3.2.1 and 3.2.2 above.

#### **4.2.1 Prohibition of cartels in principle applicable to explicit collusion**

**207.** Article 101(1) TFEU prohibits agreements and concerted practices which are related to the internal market and have as their object or effect a restriction of competition, subject to justification by the consumer benefits they bring. An agreement requires the communication of a joint intention (expression of the intention). A concerted practice requires a market behaviour to be explained by a joint intention (actuation of the intention).

**208.** In accordance with Article 101(1) TFEU, such an agreement or concerted practice restricts competition if it has as its objective appreciable negative effects on one or more parameters of competition or if such effects are to be expected.<sup>35</sup> It is not necessary for a collusive market outcome to actually occur and for consumers to be harmed.<sup>36</sup> Nor is a restriction of competition in the legal sense ruled out by the fact that the relevant conduct is accompanied by beneficial economic effects. However, such effects may justify the restriction of competition (Art. 101(3) TFEU).

**209.** In contrast to agreements and concerted practices restricting competition, parallel conduct restricting competition remains permissible under Article 101 TFEU. Such parallel behaviour can only be inadmissible as an abuse of a joint dominant position under Article 102 TFEU in exceptional circumstances, provided that market power-enhancing measures are used.<sup>37</sup>

**210.** Accordingly, in its established case law on Article 101 TFEU, the ECJ stresses that

*"each economic operator must determine independently the policy which he intends to adopt on the common market. [This obligation strictly precludes] any direct or indirect contact between such operators, the object or effect whereof is either to influence the conduct on the market of an actual or potential competitor or to disclose to such a competitor the course of [the operator's own] conduct which they themselves have decided to adopt or contemplate adopting on the market."*<sup>38</sup>

**211.** Any agreement or concerted practice covered by Article 101 TFEU requires some "meeting of minds". According to ECJ case law, agreements and concerted practices are

*"forms of collusion having the same nature which are distinguishable from each other only by their intensity and the forms in which they manifest themselves".<sup>39</sup>*

Even an attempt to reach an agreement on prices is sufficient, since the market behaviour of the economic entity concerned no longer corresponds to the postulate of independent behaviour under these circumstances.<sup>40</sup> However, it is nevertheless necessary for each economic operator involved that it

*"intend[s] to contribute by its own conduct to the common objectives pursued by all the participants and that it [is] aware of the actual conduct planned or put into effect by other undertakings in pursuit of the same objectives or that it [can] reasonably [foresee] it and that it [is] prepared to take the risk."*<sup>41</sup>

<sup>35</sup> ECJ, Judgment of 28 May 1998, C-7/95 P – Deere, ECR 1998, I-3111, ECLI:EU:C:1998:256, paras 76-77; European Commission, Guidelines on the application of Article 81(3) of the Treaty, OJ C 101 of 27 April 2004, p. 97, para. 24; Horizontal Guidelines, paras 72-73, 75 (on information exchange).

<sup>36</sup> It is therefore also in line with Art. 101-102 TFEU that German law provides for a reversal of the burden of proof with regard to the occurrence of damage caused by cartels; § 33a (2) sentence 1 GWB.

<sup>37</sup> See section 4.2.2 below.

<sup>38</sup> ECJ, Judgment of 16 December 1975, 40/73 – Suiker Unie, ECR 1975, p. 1663, ECLI:EU:C:1975:174, para. 173/174; Judgment of 4 June 2009, C-8/08 – T-Mobile Netherlands, ECR 2009, I-4529, ECLI:EU:C:2009:343, paras 32-33; Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42, para. 27; see also European Commission, Horizontal Guidelines (fn. 35), paras 60-61.

<sup>39</sup> ECJ, Judgment of 4 June 2009, C-8/08 – T-Mobile Netherlands, ECR 2009, I-4529, ECLI:EU:C:2009:343, para. 23.

<sup>40</sup> ECJ, Judgment of 26 January 2017, C-609/13 P – Duravit, ECLI:EU:C:2017:46, para. 73.

<sup>41</sup> ECJ, Judgment of 8 July 1999, C-49/92 P – Anic Partecipazioni, ECR 1999, I-4125, ECLI:EU:C:1999:356, para. 87; Judgment of 21 July 2016, C-542/14 – VM Remonts, ECLI:EU:C:2016:578, para. 29.

The fact that a collusive market outcome is objectively predictable is therefore not enough unless there is both the knowledge and the will to accept such a collusive market outcome.<sup>42</sup>

**212.** The conditions under which case law recognizes a common intention are low, at least in the case of a mutual exchange of information, as:

*"subject to proof to the contrary, which it is for the economic operators concerned to adduce, there must be a presumption that the undertakings participating in concerting arrangements and remaining active on the market take account of the information exchanged with their competitors when determining their conduct on that market."*<sup>43</sup>

This is all the more true if the coordination takes place regularly over a longer period of time.<sup>44</sup>

**213.** The question of whether an exchange of information has the object or effect of restricting competition must be answered separately from the question of whether an agreement or coordination of conduct exists. With regard to the possible effects, the assessment depends on the market structure, the type of information and the type of exchange according to the applicable guidelines.<sup>45</sup> Pricing algorithms are instruments that can influence the market structure by facilitating the exchange of information and, thus, increasing market transparency.<sup>46</sup>

**214.** The cases decided or discussed so far confirm this understanding of the cartels prohibition. These cases can be assigned to several case groups:

1. Cartel by agreement between competitors on price parameters or the functioning of a pricing algorithm or to achieve price equality using algorithms. Here, the agreement is aimed at using algorithms as a means of price coordination and thereby achieving a collusion outcome. In these cases, algorithms can also be used to monitor compliance with such a price agreement.<sup>47</sup>
2. Hub-and-spoke cartel including the participation of an undertaking which is not itself active in the market concerned, which coordinates a cartel between the undertakings colluding on prices there (e.g., platform operators, IT service providers).<sup>48</sup> Here, the algorithm is particularly relevant if the external party is configuring the algorithm so that it can be used as a means of price adjustment.
3. Use in distribution relationships to enable manufacturers or other distributors to monitor price maintenance or to enforce other restrictions along the distribution chain.<sup>49</sup>

**215.** In all the cases mentioned, the algorithm only reflects the users' already existing joint intention of coordinating their prices in the market. The use of dynamic or self-learning algorithms can lead to a further shift in liability. This is because here, the relevant user sets the task for its IT service provider to design an algorithm with its own scope for

<sup>42</sup> ECJ, Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42, para. 45.

<sup>43</sup> ECJ, Judgment of 8 July 1999, C-49/92 P – Anic Partecipazioni, ECR 1999, I-4125, ECLI:EU:C:1999:356, para. 121; Judgment of 8 July 1999, C-199/92 P – Hüls, ECR 1999, I-4287, ECLI:EU:C:1999:358, para. 162; Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42, para. 44.

<sup>44</sup> ECJ, Judgment of 8 July 1999, C-199/92 P – Hüls, ECR 1999, I-4287, ECLI:EU:C:1999:358, para. 162; Judgment of 4 June 2009, C-8/08 – T-Mobile Netherlands, ECR 2009, I-4529, ECLI:EU:C:2009:343, para. 51.

<sup>45</sup> European Commission, Horizontal Guidelines (fn. 35), paras 72 ff.

<sup>46</sup> See paras 181, 184 ff. above.

<sup>47</sup> See the cases cited in fn. 33; generally on the relevant issues, see OECD, Directorate for Financial and Enterprise Affairs, Competition Committee, Algorithms and Collusion - Note from the European Union, 21-23 June 2017, JT03415981, 17 ff.; Canadian Competition Bureau, Big data and Innovation: Implications for Competition Policy in Canada, Draft Disc. Paper, pp. 28 ff.

<sup>48</sup> See again ECJ, Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42, paras 26 ff.

<sup>49</sup> As examples, see: European Commission, 40.469 Denon & Marantz - (vertical restraints); 40.308 – Holiday Pricing; 40.524 – REWE/DER (Holiday Pricing); 40.525 – TUI (Holiday Pricing); 40.526 – Thomas Cook (Holiday Pricing); 40.527 – Kuoni (Holiday Pricing); 40.528 – Melia (Holiday Pricing).

action and (potentially) autonomous development. Such an order may still lie before the agreement to form a cartel. If the algorithm then adjusts its pricing to that of later cartel participants, the scope granted to the algorithm may justify that the user of the algorithm is also held liable as a cartel participant.<sup>50</sup>

**216.** Finally, it is irrelevant for the assessment under Article 101 TFEU that by acting in parallel without coordination (parallel behaviour), the parties may achieve the same restriction of competition as in the cartel cases described above. In isolation, the existence of a specific restriction of competition is not sufficient for an infringement of Article 101 TFEU.

#### **4.2.2 Prohibition of abuse of market power only covers implicit collusion to a limited extent**

**217.** In the case of parallel behaviour, a collusive market outcome may be covered by the competition rules under strict conditions under Article 102 TFEU. This is the case when the parties are jointly dominant and behave in parallel (i.e., without a joint intention) in such a way as to contribute to the market outcome and abuse their dominant position. In practice, proving these facts poses considerable difficulties.<sup>51</sup>

**218.** The “dominant position” referred to in Article 102 TFEU

*“relates to a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by giving it the power to behave to an appreciable extent independently of its competitors, customers and ultimately of its consumers.”<sup>52</sup>*

Several undertakings can be jointly dominant if they “constitute a collective entity [...] on a particular [relevant] market”.<sup>53</sup>

**219.** The determination of a dominant position is made in relation to individual relevant markets. In the case of goods and services also marketed via the Internet, the relevant markets often need to be defined further geographically than was previously the case in stationary trade.<sup>54</sup> On the other hand, markets may be narrowly defined in terms of substance and timing, provided that price discrimination is possible.<sup>55</sup> In order to demonstrate dominance, it must then be demonstrated that the undertaking operating on the relevant market has significant leeway under the market conditions which distinguishes its market position from that of competing players.

**220.** In the case of undertakings potentially jointly dominating the market, it must be examined whether a close economic link exists between the undertakings concerned which justifies considering them as a collective entity in relation to the other market participants.<sup>56</sup> If the undertakings behave in parallel internally on the relevant market, this indicates the existence of a close economic relationship. In addition, the undertakings must have considerable scope to act independently in their external relationships.<sup>57</sup> From an economic point of view, both aspects are related to one

<sup>50</sup> According to the case law on Art. 101 TFEU, it is decisive whether each party involved can at least "reasonably foresee [the] conduct [of the other parties], and [is] prepared to accept the risk."; see ECJ, Judgment of 8 July 1999, C-49/92 P – Anic Partecipazioni, ECR 1999, I-4125, ECLI:EU:C:1999:356, para. 203.

<sup>51</sup> Vgl. Federal Cartel Office, B8-200/09 – Fuel sector Inquiry, final report of May 2011 (English version), p. 29 (sec. C.III).

<sup>52</sup> ECJ, Judgment of 14 February 1978, 27/76 – United Brands, ECR 1978, 207, ECLI:EU:C:1978:2227/76, para. 65; Judgment of 13 February 1979, 85/76 – Hoffmann-La Roche, ECR 1979, 461, ECLI:EU:C:1979:3685/76, para. 38.

<sup>53</sup> ECJ, Judgment of 16 March 2000, C-395/96 P and C-396/96 P – Compagnie Maritime Belge Transports et al., ECR 2000, I-1365, ECLI:EU:C:2000:132, para. 39.

<sup>54</sup> European Commission, DG Competition, Market definition in a globalised world, Policy Brief 2015-12, p. 1, pp. 2-3 with further references.

<sup>55</sup> See European Commission, Commission notice on the definition of the relevant market for the purposes of Community competition law, OJ C 372 of 9 December 1997, p. 5, para. 43; more elaborate: U.S. DOJ and FTC, Horizontal Merger Guidelines, version of 19 August 2010, section 3.

<sup>56</sup> Cf. ECJ, Judgment of 16 March 2000, C-395/96 P and C-396/96 P – Compagnie Maritime Belge Transports et al., ECR 2000, I-1365, ECLI:EU:C:2000:132, para. 41.

<sup>57</sup> ECJ, Judgment of 31 March 1998, C-68/94 and C-30/95 – France and Société commerciale des potasses et de l'azote and Entreprise minière et chimique, ECR 1998, I-1375, ECLI:EU:C:1998:148, para. 221.

another.<sup>58</sup> This suggests that a joint dominant position should always be taken into consideration where no cartel infringement exists and where the existing market conditions as such lead to parallel conduct.<sup>59</sup> However, such conduct is also likely to exist where undertakings adapt to the collusive behaviour of other undertakings without being themselves able to act independently due to market power (so-called umbrella effect).<sup>60</sup>

**221.** The existence of a common dominant position does not in itself infringe the prohibition of abuse of a dominant position. There must also be abusive behaviour. In this respect, the ECJ requires an examination of whether the respective sole or jointly controlling undertaking shows a

*"behaviour [...] which is such as to influence the structure of a market where, as a result of the very presence of the undertaking in question, the degree of competition is weakened and which, through recourse to methods different from those which condition normal competition in products or services on the basis of the transactions of commercial operators, has the effect of hindering the maintenance of the degree of competition still existing in the market or the growth of that competition".<sup>61</sup>*

This concept of abuse essentially consists of two elements. Firstly, the market structure must already be weakened because of the presence of the undertaking concerned (= consequence of market dominance). Secondly, the undertaking must behave in a manner that deviates from normal competitive behaviour and additionally restricts competition.<sup>62</sup>

**222.** An abuse in the aforementioned sense can also consist in a pricing that leads to – in the legal sense – “unfairly” inflated prices. It is not enough for several jointly dominant undertakings to set parallel prices on the basis of market conditions, even if these prices are higher than competitive prices (so-called coordinated effects). Parallel pricing is, in principle, normal market behaviour under such conditions.<sup>63</sup> According to jurisprudence, the preconditions for abuse are however fulfilled if, for example, the collusive pricing leads to an excessive profit margin (= “no reasonable relation” between costs and price) for the parties involved when viewed in normative terms, and the price is either unfair in itself or when compared to competing products.<sup>64</sup>

**223.** Liability is shifted forward also in the aforementioned cases if the joint pricing is carried out using pricing algorithms.<sup>65</sup> The decisive factor for the finding of an abuse is that the users ensure that the pricing algorithms

<sup>58</sup> See para. 177 above.

<sup>59</sup> See, with such tendency, European Commission, Decision 89/93/EWG of 7 December 1988, 31.906 – Flat Glas, OJ L 33 of 4 February 1989, p. 44, paras 78 ff.; further, see Weiß in: Calliess/Ruffert, EUV/AEUV, 5th Ed. 2016, Art. 102 AEUV para. 20; Wessely, Frankfurter Kommentar Kartellrecht, FK Lfg. 57 (April 2005), Art. 82 EG (Normadressaten) paras 139 ff.; Wirtz in: Mäger, Europäisches Kartellrecht, 2nd Ed. 2011, Kap. 6 paras 26 ff.; Mestmäcker/Schweitzer, Europäisches Wettbewerbsrecht, 3rd Ed. 2014, § 17 para. 59.

<sup>60</sup> Cf. ECJ, Judgment of 5 June 2014, C-557/12 – Kone, ECLI:EU:C:2014:1317, paras 29 ff.

<sup>61</sup> ECJ, Judgment of 13 February 1979, 85/76 – Hoffmann-La Roche, ECR 1979, 461, ECLI:EU:C:1979:36, para. 91 (established case law); cf. Monopolies Commission, Special Report No 68, Competition policy: The challenge of digital markets, 1st ed. 2015, para. 493.

<sup>62</sup> ECJ, Judgment of 13 February 1979, 85/76 – Hoffmann-La Roche, ECR 1979, 461, ECLI:EU:C:1979:36, para. 123.

<sup>63</sup> This does not preclude the prohibition in principle of a merger that changes market conditions so that coordinated effects arise; see Art. 2 (3) Regulation 139/2004 on the control of concentrations between undertakings (“EC Merger Regulation”), OJ L 024 of 29 January 2004 p. 1; see also ECJ, Judgment of 10 July 2008, C-413/06 P - Bertelsmann and Sony Corporation of America/Impala, ECR 2008, I-4951, ECLI:EU:C:2008:392, para. 119-125 (on the previous regulation in Regulation 4064/89); see also European Commission, Guidelines for the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings, OJ C 31 of 5 February 2004, p. 5, para. 39 ff.; Guidelines for the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings, OJ C 265 of 18 October 2008, p. 6, paras 79 ff., 119 ff.

<sup>64</sup> ECJ, Judgment of 14 February 1978, 27/76 – United Brands, ECR 1978, 207, ECLI:EU:C:1978:22, para. 248/257. That being said, the conditions for an unreasonable price increase can also be determined in a way other than by the two-stage test mentioned above.

<sup>65</sup> See para. 215.

concerned are unreasonably inflated as a result of their specifications for the design of the pricing algorithms concerned. The pricing algorithms only implement these specifications automatically.

**224.** In summary, it is just as insufficient for an abuse liability under Article 102 TFEU as for cartel liability under Article 101 TFEU that the parties involved set parallel prices on the basis of the individual use of pricing algorithms. The parties are only liable if they are also dominant and it can be established that the pricing also meets the conditions of an abusive price increase (i.e., that the prices demanded are unreasonable in amount).

#### **4.2.3 Should the competition rules be supplemented to neutralize a potential contribution of pricing algorithms to collusion?**

##### **4.2.3.1 Collusive market outcomes as a separate competition problem**

**225.** Users use pricing algorithms for their own benefit. Consumers are not involved in the underlying economic decisions. The algorithms can maximize profits, among others, by contributing to collusive market outcomes.<sup>66</sup>

**226.** The European Commissioner for Competition Vestager has pointed out the need to protect competition consistently even under such conditions:

*“[A]s competition enforcers, I think we need to make it very clear that companies can't escape responsibility for collusion by hiding behind a computer program.”<sup>67</sup>*

It is also recognized in the case law on Articles 101-102 TFEU that when companies take a collusive approach in order to maximize their own profits, this approach has corresponding adverse effects for consumers in the form of higher prices and less choice.<sup>68</sup>

**227.** However, the competition rules do not prohibit the achievement of collusive market outcomes on a general basis, but only if they are based on the anticompetitive behaviour described in the previous sections.<sup>69</sup> This leaves some scope for companies to intelligently adapt to the identified or expected behaviour of their competitors.<sup>70</sup> Such scope also exists if the parties involved use pricing algorithms. The use of such algorithms is generally permissible as long as users only use them to intelligently adjust their pricing to that of their competitors. This is not prevented by the fact that the use of pricing algorithms can also favour collusive market outcomes.<sup>71</sup>

**228.** Further, with regard to the conditions for an infringement of competition law under Article 101 et seq. of the TFEU, there are no particularities in light of the fact that the parties involved use pricing algorithms. It has already been pointed out that a violation of Article 101 TFEU requires a prior agreement or coordination of conduct that restricts competition.<sup>72</sup> In contrast, an infringement of Article 102 TFEU requires the determination of joint dominance and proof that the price increase – in the interest of the dominant undertaking – is unfair. In both cases, the pricing algorithm merely implements the intention of the companies involved in terms of information technology.

<sup>66</sup> See sections 3.2.1 and 3.2.2 above.

<sup>67</sup> European Commissioner Vestager, Algorithms and competition, Federal Cartel Office 18th Conference on Competition, Berlin, 16 March 2017.

<sup>68</sup> Cf. ECJ, Judgment of 7 January 2004, C-204/00 P et al. – Aalborg Portland, ECR 2004, I-123, ECLI:EU:C:2004:6, para. 53. Further, see Art. 101 (3) TFEU in conjunction with European Commission, Guidelines on the application of Article 81(3) of the Treaty, para. 13.

<sup>69</sup> See sections 4.2.1 and 4.2.2. This is not prevented by the horizontal guidelines explicitly addressing a collusive outcome as an objective to be prevented; see European Commission, Communication - Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal cooperation agreements, paras 65 ff.

<sup>70</sup> Cf. ECJ, Judgment of 26 January 2017, C-609/13 P – Duravit, ECLI:EU:C:2017:46, para. 72. See also paras 209-47 and the jurisprudence cited in fn. 38.

<sup>71</sup> See again section 3.2.1.

<sup>72</sup> See para. 215 above.

**229.** Nevertheless, the determination of a collusive market outcome is very important for consumer protection when pricing algorithms are used. Firstly, it cannot be ruled out from the outset that collusive price increases (or the associated consumer disadvantages) may be the result of a cartel or of coordinated behaviour that runs foul of the prohibition of abuse of market power (= indicative effect). Secondly, the collusive market outcome determines the damage for which consumers can claim compensation in the event of a demonstrable infringement of competition law.

**230.** The increasing use of pricing algorithms makes collusion-related consumer damages more likely in the future. Wherever collusive market outcomes are possible, the use of pricing algorithms can facilitate collusive parallel behaviour. At the same time, it may dispense with the need for agreements or agreements restricting competition.<sup>73</sup> It is therefore conceivable that algorithms will be used in the future to achieve the effect of a cartel without restrictive agreements or concerted practices. The relevant practices could instead be reviewed in light of the prohibition of common abuse of market power. It should be noted, however, that this prohibition applies to implicit collusion only under restrictive conditions and that its application in practice also poses considerable difficulties.<sup>74</sup>

**231.** This raises the question of whether consumers will in future be sufficiently protected from the contribution of pricing algorithms to the increasing risk of collusive market outcomes. This question may be divided into two subquestions:

- How can collusion in algorithm-based pricing be identified (section 4.2.3.2)?
- What additional measures should be considered to neutralize the additional collusion risks associated with the use of pricing algorithms? (section 4.2.3.3)?

#### **4.2.3.2 How can collusion in algorithm-based pricing be identified?**

**232.** Protection of consumers against collusion-related damages caused by algorithmic pricing presupposes that this collusion is identified at all. This is possible, for example, by comparing pricing on different relevant geographic or product markets or at different points in time in order to uncover patterns or (conversely) anomalies that may indicate collusive market outcomes.<sup>75</sup>

**233.** In this respect, the competition authorities have much more extensive investigative powers than private plaintiffs (e.g., consumer associations or individual consumers). The competition authorities continuously monitor market developments in order to identify anticompetitive practices and may conduct sector inquiries where reason exists to believe that competition may be restricted or distorted.<sup>76</sup> The authorities can carry out all investigations necessary to detect possible infringements of competition law and have very extensive powers of information.

**234.** However, the protection offered by antitrust market surveillance can only be effective if all suspicious cases are investigated and not only those cases in which the competition authorities consider a closer investigation to be necessary. In this respect, the problem is that the competition authorities only have the task of enforcing the competition rules. However, it is not their job to prevent collusion-related prices as such and to take away the resulting

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<sup>73</sup> See para. 199 above.

<sup>74</sup> See para. 217 above.

<sup>75</sup> Cf. (identical) ECJ, Judgments of 14 July 1972, 48/69 – ICI, ECR 1972, 619, ECLI:EU:C:1972:70, para. 64/67; 49/69 - BASF, ECR 1972, 713, ECLI:EU:C:1972:71, para. 22; 51/69 – Bayer AG, ECR 1972, 745, ECLI:EU:C:1972:72, para. 25; 52/69 – Geigy AG, ECR 1972, 787, ECLI:EU:C:1972:73, para. 26; 54/69 – Francolor, ECR 1972 p. 851, ECLI:EU:C:1972:75, para. 51/54; 55/69 – Cassella Farbwerke, ECR 1972, 887, ECLI:EU:C:1972:76, para. 30; 57/69 – ACNA, ECR 1972, 933, ECLI:EU:C:1972:78, para. 55/58; 53/69 – Sandoz AG, ECR 1972, 845, ECLI:EU:C:1972:74, headnote 10; 56/69 – Hoechst AG, ECR 1972, 927, ECLI:EU:C:1972:77, headnote 9 (“conditions of competition which do not correspond to the normal conditions of the market”).

<sup>76</sup> Art. 17 VO 1/2003; § 32e GWB. The same applies under German law also in the case of justified suspicion of considerable, permanent or repeated violations of consumer law regulations, e.g., those which concern the exploitation of information advantages vis-à-vis consumers (§ 32e (5) GWB).

pecuniary advantage.<sup>77</sup> This is more in the interest of consumer associations, as collusive prices entail a corresponding consumer damage. The associations' interest is likely to increase with the number of suspected cases in which algorithm-based collusive pricing is suspected. Consideration should therefore be given to giving consumer associations the right to request an antitrust investigation into certain sectors where there is a suspicion of consumer-damaging collusion due to excessive prices. This should apply at least if the consumer associations would use the results of the sector inquiry to bring an action for damages or – in German law – to absorb the pecuniary advantage in accordance with § 34a GWB.<sup>78</sup>

**235.** The provision of § 34a GWB has so far led a shadowy existence.<sup>79</sup> This is because it only has a supplementary function (transfer of the pecuniary advantage to the federal budget!) and at the same time places high demands on the quantification of the advantage to be absorbed.<sup>80</sup> The introduction of a right to require the investigation of certain sectors could thus also help consumer associations to make more effective use of the existing § 34a GWB.

**236.** A provision within the meaning of the previous paragraphs could be worded as follows:

*"In the cases of [Art. 17 (1) Regulation 1/2003 and § 32e (1) GWB] it is sufficient that the presumption is asserted by a justified application of an institution within the meaning of [Art. 4 (3) Council Directive 2009/22/EC and § 4 UKlaG]. The application must state that in a particular economic sector consumer damages are likely to result from excessive prices and that the institution needs the results of the investigation to bring an action [for damages under national law/for benefit absorption under § 34a GWB]. Reasons shall be given for rejecting the application."*

The last sentence (p. 3) of the provision would clarify that the competition authority can reject the application, e.g., if the requirements for substantiating the application (p. 2 of the provision) are not fulfilled, where the competition authority has decided to initiate a separate procedure for the absorption of the pecuniary advantage (in German law: § 34 GWB) or where the effort of the sector inquiry is not proportional to the pecuniary advantage possibly obtained through collusion.

**237.** In this context, the Monopolies Commission points out that an increasing number of sector inquiries can be expected in Germany in areas where collusive or other consumer disadvantages are suspected.<sup>81</sup> This could in the foreseeable future make it necessary to supplement the rules on the conduct of sector inquiries and also the legal protection required in this context.

#### **4.2.3.3 What additional measures are to be considered to neutralize algorithm-specific collusion risks?**

**238.** The introduction of a special regulation of pricing algorithms to limit the collusion risks associated with their use is currently being discussed internationally.<sup>82</sup> However, the regulatory proposals made in the discussion so far often

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<sup>77</sup> This is not precluded by the fact that the German competition authorities can order the absorption of the economic advantage that companies have obtained from an infringement of the competition rules in accordance with § 34 GWB. The provision does not play any role in practical competition law enforcement.

<sup>78</sup> Under German law, consumer associations are only entitled to absorb the pecuniary advantage obtained by companies through a violation of Art. 101-102 TFEU or German competition law, but cannot assert any further consumer damage.

<sup>79</sup> Raible in: Kamann/Ohlhoff/Völcker, Kartellverfahren and Kartellprozess, 1st Ed. 2017, § 28 para. 2.

<sup>80</sup> Raible in: Kamann/Ohlhoff/Völcker, Kartellverfahren and Kartellprozess, 1st Ed. 2017, § 28 para. 22.

<sup>81</sup> See Chapter III, Section 3.9.1 in this Biennial Report concerning the competences for competition agencies to conduct sector inquiries in areas of relevance for consumer protection, which were introduced by the 9th amendment to the German Competition Act.

<sup>82</sup> See, e.g., OECD (2017), Algorithms and Collusion: Competition Policy in the Digital Age, section 5-6, [www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm](http://www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm), accessed on 17 April 2018, for an overview

require a more precise agency understanding of the pricing algorithms used.<sup>83</sup> They often record the contribution of such algorithms to collusive market outcomes only relatively roughly and, if implemented, would go hand in hand with far-reaching market interference. This applies, for example, where fundamental changes to the competition rules (e.g., a ban on collusion) or additional restrictions on algorithmic pricing (e.g., disclosure of algorithms; asymmetric approval of price increases/reductions or price caps) are called for.<sup>84</sup>

**239.** In this context, it has also been proposed to impose the burden of proof that the use of the algorithm has not contributed to the infringement on the companies using the pricing algorithms in cases where other indications indicate prohibited competitive behaviour.<sup>85</sup>

**240.** From the point of view of the Monopolies Commission, however, the situation should be monitored first. It should be borne in mind that, despite the discussion about the possible collusion risks involved, pricing algorithms have so far only played a very isolated role in the context of on file competition violations. The infringements could be easily identified, not least because the agreements often concern individual pricing parameters and the use of more complex pricing algorithms, which could conceal the prerequisites for pricing or the pricing procedure, has so far not been widespread. In addition, the following aspects must be taken into account:

- At this stage it is still not clear that agency and civil enforcement of competition rules will be insufficient to protect consumers from collusive disadvantages arising from the use of pricing algorithms in the future.
- At the same time, legal intervention could adversely affect market development if it acts as a deterrent to the further development of digital pricing tools.<sup>86</sup>

Therefore, further legislative measures should only be considered if, during the monitoring of market developments, concrete evidence emerges that the use of pricing algorithms furthers collusive market outcomes significantly and that the enforcement of competition rules is permanently inadequate to protect consumers from such damage.

**241.** If further measures are considered necessary in such circumstances, the proposed reversal of the burden of proof appears to be an appropriate measure. In case of doubt, the liability for the adverse consequences that the use of pricing algorithms can entail would be assigned to the users of such algorithms. However, it would stand to reason that an EU-wide regulation should be introduced so that the new rules would complement the existing competition rules in their entire scope. If the burden of proof were to be reversed, it is moreover unclear whether the reversal should apply to the conditions of an infringement of competition law (paras 242 ff.) or to the creation of a collusive market outcome (paras 246 ff.).

#### **No reversal of the burden of proof in relation to the conditions of an anticompetitive violation**

**242.** A reversal of the burden of proof in relation to the conditions of an anticompetitive behaviour would make it easier for the competition authorities to pursue anticompetitive behaviour through algorithmic pricing. However, it would be legally problematic and is unlikely to be appropriate. This is not precluded by those in favour of such a regulation arguing

<sup>83</sup> See, e.g., Ezrachi/Stucke, Algorithmic Collusion: Problems and Counter-Measures, Diskussionspapier (Note) zum Roundtable on Algorithms and Collusion, 21-23 June 2017, DAF/COMP/WD(2017)25, para. 105 ff., 133 ff.; Mehra, p. K. (2015). Antitrust and the robo-seller: Competition in the time of algorithms, 100 Minn. L. Rev. 1323, 1368 ff. (2016).

<sup>84</sup> On the state of discussion, see e.g., Ezrachi/Stucke, Algorithmic Collusion: Problems and Counter-Measures, Diskussionspapier (Note) zum Roundtable on Algorithms and Collusion, 21-23 June 2017, DAF/COMP/WD(2017)25, para. 108 ff. 113 ff., 123 ff., 129 ff.; Haucap, WirtschaftsWoche 18/2018, 74; Mehra, p. K. (2015). Antitrust and the robo-seller: Competition in the time of algorithms, 100 Minn. L. Rev. 1323, 1371 ff. (2016); Göhsl, WuW 2018, 121 (123 f.); Janka/Uhsler, ECLR 2018, 112 (121 f.); Käseberg/von Kalben, WuW 2018, 2 (3, 5 ff.); Oxera, When algorithms set prices: winners and losers, Diskussionspapier of 19 June 2017, p. 29 ff.; Pereira, ECLR 2018, 212 (220); Roman, ECLR 2018, 37 (42 ff.); more generally Spindler, DB 2018, 41 (45 f.).

<sup>85</sup> See Ezrachi/Stucke, Algorithmic Collusion: Problems and Counter-Measures, Note for the Roundtable on Algorithms and Collusion, 21-23 June 2017, DAF/COMP/WD(2017)25, para. 87; Roman, 39 ECLR 37, 44 (2018).

<sup>86</sup> See also para. 249 below (strict liability).

that it is necessary to prevent the competition rules from running dry without objective justification in the case of the use of pricing algorithms.

**243.** Firstly, it must again be borne in mind that parallel conduct must be assessed neutrally under Article 101 et seq. of the TFEU, unless the companies involved also exclude the conditions of competition which prevent such parallel conduct.<sup>87</sup> The ECJ has therefore ruled that

*"parallel conduct cannot be regarded as furnishing proof of concertation unless concertation constitutes the only plausible explanation for such conduct."*<sup>88</sup>

It also follows from recognized procedural principles for adducing evidence that it is for the party or authority alleging conduct amounting to a competition law infringement under Articles 101-102 TFEU to prove that conduct.<sup>89</sup> Parallel behaviour can be an important indicator in this respect. However, this only applies if it leads to competitive conditions which do not correspond to normal market conditions.<sup>90</sup> In any case, provisions deviating from these principles would not be covered by Articles 101-102 TFEU and would therefore only be possible outside the existing competition rules.

**244.** Secondly, apart from the requirements of Articles 101-102 TFEU, parallel pricing is only a market outcome. If this market outcome is to be regarded as undesirable due to a reassessment, then this must apply irrespective of whether it was caused by an infringement of the competition rules or otherwise. A reversal of the burden of proof relating to the conditions of an infringement of competition would not be in line with this principle.

**245.** Finally, these considerations are not called into question by recent developments in other legal systems. This applies in particular to Australian law, which has recently undergone legal changes.<sup>91</sup> These amendments are intended to make concerted practices subject to the competition rules. The objective is to bring these rules onto the same footing as EU law and British law.<sup>92</sup> The changes obviously do not seek to penalize algorithm-based parallel behaviour according to the competition rules, even if this is sometimes circulated differently.

#### **Where appropriate, reversal of the burden of proof in relation to the achievement of a collusive market outcome**

**246.** It is an open question whether a reversal of the burden of proof could make sense as to the extent that the use of pricing algorithms can contribute to achieving a collusive market outcome. On the merits, the refutable presumption of cartel damage under Directive 2014/104/EU and the German implementing provision in Section 33a (2) GWB would, thus, be extended to all cases in which pricing algorithms are used for infringements of competition law. Such a provision would directly benefit consumers disadvantaged by collusive price increases in damages actions.

**247.** The reversal of the burden of proof would have the consequence that the user would have to prove that its pricing algorithm did not contribute to the claimed damage. In particular in cases of joint dominance, the extended reversal of

<sup>87</sup> See paras 209-210 and 227 above.

<sup>88</sup> ECJ, Judgment of 31 March 1993, C-89/85 et al. – Ahlström Osakeyhtiö, ECR 1993, I-1307, ECLI:EU:C:1993:120, para. 71.

<sup>89</sup> Vgl. ECJ, Judgment of 17. December 1998, C-185/95 P – Baustahlgewebe, ECR 1998, I-8417, ECLI:EU:C:1998:608, para. 58; Judgment of 8 July 1999, C-49/92 P – Anic Partecipazioni, ECR 1999, I-4125, ECLI:EU:C:1999:356, para. 87; Judgment of 22 November 2012, C-89/11 P – E.ON Energie, ECLI:EU:C:2012:738, para. 71; cf. also Judgment of 7 January 2004, C-204/00 P et al. – Aalborg Portland, ECR 2004, I-123, ECLI:EU:C:2004:6, para. 78 (referring to recital 5 of Reg. No. 1/2003). See also the express provision on the burden of proof in Art. 2, sentence 1 VO 1/2003.

<sup>90</sup> See again the case law cited in fn. 76 (also as concerns Art. 101 TFEU).

<sup>91</sup> Section 45 of the Competition and Consumer Act 2010; see ACCC, New competition laws a protection against big data e-collusion, press release of 16 November 2017. The provisions broadens the prohibition of section 44ZZW, which was introduced in 2011 and relates to pricing signals; see Harper et al., The Australian Government Competition Policy Review, Final Report of 29 March 2015 (“Harper Report”), Recommendation No. 29 and Australian Government Response to the Competition Policy Review, 24 November 2015, p. 24; accessible: <http://competitionpolicyreview.gov.au/>.

<sup>92</sup> The Parliament of the Commonwealth of Australia, House of Representatives, Competition and Consumer Amendment (Competition Policy Review) Bill 2017, Explanatory Memorandum, para. 3.16 ff.; ACCC, Draft framework for concerted practices guidelines, September 2016, pp. 2-3.

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the burden of proof would additionally reduce the requirements for plaintiffs to prove an abuse through price increases. However, this would only apply in damage claims litigation and not in agency proceedings.<sup>93</sup>

**248.** Such a provision appears at first glance to be supported by the fact that a collusive market outcome means economic disadvantages for consumers in the form of higher prices than under competitive conditions. Consumers are also not easily in a position to protect their interests on their own. It is true that they can use price comparison tools, price trackers and similar tools to identify the cheapest price available on the Internet. However, the users of pricing algorithms can also use these tools and optimize their algorithms accordingly.<sup>94</sup>

**249.** With the standard algorithms used so far, the users of pricing algorithms should also relatively easily be able to provide the proofs required to relieve them from liability. This is because the users have extensive control over the pricing behaviour of the algorithm. With more complex pricing algorithms (especially self-learning algorithms), in contrast, such a proof would hardly be possible, since the users cannot control the price-setting behaviour of such an algorithm.<sup>95</sup> The reversal of the burden of proof would therefore constitute a form of strict liability. However, a parallel to the use of self-driving cars suggests itself in some respect. In these cases, dangers to life and limb in road traffic can likewise not be made dependent on the mastery of the algorithms used.<sup>96</sup>

**250.** Nevertheless, on the basis of the available information, the actual situation cannot be examined sufficiently at this point in time to recommend reversing the burden of proof. It should be borne in mind that the reversal of the burden of proof should not be limited to the digital economy and would therefore also be applicable in other economic sectors where pricing algorithms are used (e.g., also in the petrol station markets). The actual circumstances can differ considerably from one another in individual cases. Nevertheless, a liability risk that is not immaterial would arise in all relevant markets, even if algorithm-based pricing were legally permissible and economically efficient in the cases concerned, because the companies only adapt intelligently to the behaviour of their competitors. The only decisive factor would be whether the companies can prove that the pricing algorithm they used did not contribute to the claimed damage.

**251.** The mentioned liability risk could be reduced by an appropriate selection or design of the algorithms used on the market (compliance by design). However, this would set companies to algorithmic pricing standards for which it is currently unclear whether they are objectively justified at all. This would impair the ability of companies to adjust their pricing to market conditions and create market entry barriers through regulatory costs.<sup>97</sup>

#### **4.3 Is it sufficient to attach legal responsibility for the emergence of collusive market outcomes to user conduct as before?**

**252.** The involvement of third parties in illegal collusion is particularly likely where pricing algorithms are used in the digital economy. On the one hand, platform operators are often intermediaries in the distribution of goods and services. On the other hand, the algorithms used to set prices for goods and services sold online are often not developed by the companies involved in sales, but are provided by IT service providers with special expertise.

**253.** Existing competition law allows, under certain conditions, the attribution of infringements of the competition rules to third parties (section 4.3.1). The contribution of platform operators is adequately covered by the existing competition

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<sup>93</sup> In competition authority proceedings on fines, on the other hand, the investigative principle would remain authoritative according to which the authority has to prove that all positive and negative conditions for abuse have been met. A derogation would be incompatible with the presumption of innocence as a general legal principle of the Member States, Council document 15-435/02 ADD 1 of 10 December 2002.

<sup>94</sup> See also paras 195-196.

<sup>95</sup> See para. 204 above (black box).

<sup>96</sup> See, e.g., Borges, NJW 2018, 977 (980 ff.) on the details.

<sup>97</sup> See Gomes, Disruptive innovation, Big Data and Algorithms, presentation for the OECD of 31 August 2017, slide 40, <http://www.sic.gov.co/sites/default/files/documentos/092017/antonio-ferreira-gomes-disruptive-innovation-big-data-and-algorithms.pptx>, accessed on 18 April 2018.

rules (section 4.3.2). In contrast, competition law do not fully cover the behaviour of IT service providers and do not take into account the particular interests of such third parties (Section 4.3.3).

### **4.3.1 Criteria for attributing violations of competition law in the case of third-party participation**

**254.** The question of whether a third party is liable for an infringement of competition law depends on the responsibility of the undertakings operating on the market affected by that infringement. With regard to the latter undertakings, European case law recognizes that the conduct of an independent service provider can be attributed to the undertakings participating in a cartel if both the service provider and the other cartel participants are aware of the anticompetitive objectives of the other parties and wish to contribute to them by their own behaviour.<sup>98</sup>

**255.** In addition, the third party itself may also be liable, at least where the undertakings operating on the market in question are liable. An infringement of Article 101 TFEU does not require that the undertakings concerned are active in the market affected by the restrictions of competition or in any other market.<sup>99</sup> In principle, the ban on cartels applies

*"irrespective of the market on which the parties operate, and that only the commercial conduct of one of the parties need be affected by the terms of the arrangements in question".<sup>100</sup>*

**256.** The third party is therefore liable at least if it participated actively and in full knowledge of the facts in the implementation or supervision of a cartel.<sup>101</sup> The context is relevant to the question of whether the participation has been sufficient in nature.<sup>102</sup> A sufficient contribution is at least obvious if the third party was aware of the collusion of the other parties and its contribution had a supplementary function that goes beyond a neutral service per se.<sup>103</sup> However, a purely incidental service which has nothing to do with the agreement or coordination of behaviour of the other parties and the resulting restrictions of competition would not be sufficient.<sup>104</sup>

**257.** Finally, it is still open at EU level whether infringements of Article 101 TFEU are also possible by the fact that competitors interested in a collusion refrain from an exchange among themselves and form the cartel solely through independent, bilateral coordination with a third party. Such an infringement seems conceivable, however, if the third party is a supplier to competitors interested in the cartel and they take into account the information that the supplier passes on about the prices or conditions of the other competitors when selling the goods and services supplied to them.<sup>105</sup>

### **4.3.2 Appropriate liability of platform operators**

**258.** The attribution of competition infringements to platform operators through which other companies distribute the goods and services affected by the infringement does not pose any particular problems. It is irrelevant here that the role of the platform operator can be very different in the individual case, depending on the business model pursued with the platform.

<sup>98</sup> ECJ, Judgment of 21 July 2016, C-542/14 – VM Remonts, ECLI:EU:C:2016:578, para. 25, 28-30, 33. See moreover the British jurisprudence in cases Argos Ltd v Office of Fair Trading [2006] EWCA Civ 1318, para. 102-103; Tesco Stores Ltd v Office of Fair Trading [2012] CAT 31, §§ 44 ff. (relevant EU case law), 57.

<sup>99</sup> ECJ, Judgment of 22 October 2015, C-194/14 P – AC-Treuhand, ECLI:EU:C:2015:717, para. 34.

<sup>100</sup> ECJ, Judgment of 22 October 2015, C-194/14 P – AC-Treuhand, ECLI:EU:C:2015:717, para. 35.

<sup>101</sup> ECJ, Judgment of 22 October 2015, C-194/14 P – AC-Treuhand, ECLI:EU:C:2015:717, paras 26, 36.

<sup>102</sup> ECJ, Judgment of 22 October 2015, C-194/14 P – AC-Treuhand, ECLI:EU:C:2015:717, paras 29-31; GC, Judgment of 10 November 2017, T-180/15 – Icap, ECLI:EU:T:2017:795, paras 100, 120 (not final).

<sup>103</sup> GC, Judgment of 10 November 2017, T-180/15 – Icap, ECLI:EU:T:2017:795, para. 142, 171, 180 (not final).

<sup>104</sup> ECJ, Judgment of 22 October 2015, C-194/14 P – AC-Treuhand, ECLI:EU:C:2015:717, para. 39.

<sup>105</sup> In that context, see Federal Cartel Office, Activity Report 2011/2012, BT-Drs. 17/13675, pp. 59-60; Becker, 45. FIW-Symposium, „Preis- und Markenpflege“ bei Lebensmitteln im Lichte des Wettbewerbsschutzes, 2 March 2012, slide 14.

**259.** The platform operators have a fundamental interest in attracting many users to their platform. For this reason, they may also have an interest in influencing the pricing of goods and services distributed via their platform in individual cases. For example, in cases where pricing is difficult for users on both the supplier and the customer side, it may make sense for a platform operator to set an algorithmically determined price which is more or less binding and which is fair to both sides. Such pricing may restrict competition if users on the supplier side take pricing into account and no longer set their own prices in competition with each other (Art. 101 (1) TFEU). However, this may still be justifiable because of the economic benefits it brings to customers (Art. 101(3) TFEU). Such price specifications exist, for example, for overnight accommodation and travel services.<sup>106</sup>

**260.** For platforms whose operators have no information advantage over the users, other factors such as competition at platform level and the interest in making the platform attractive specifically to one of the user sides may become relevant to the question of how the platform operator acts with regard to a possible cartel of platform users. Active participation in a cartel of users on the supplier side may occur if the platform operator has an interest of its own in influencing the algorithmically determined prices of the relevant users in a way that restricts competition (Art. 101(1) TFEU).<sup>107</sup> However, a justification of the restriction of competition is, in principle, possible here as well (Art. 101(3) TFEU). In recent years, there have been several court and administrative proceedings in the EU over cases where the operators of air and hotel booking portals or online marketplaces had actively influenced the pricing of platform users.<sup>108</sup> However, the individual cases were very different from each other. Their economic and legal assessment has in part also remained controversial.<sup>109</sup>

**261.** In any case, a platform operator that consciously and actively participates in an infringement using pricing algorithms, as described above, has a vested interest in the market outcome. It therefore appears entirely appropriate that the platform operator is held liable for its participation in an agreement restricting competition or any other competition violation, subject to the non-existence of countervailing consumer benefits.

#### 4.3.3 Problematic liability of IT service providers

**262.** A completely different situation exists in the case of IT service providers whose algorithm is used in the context of collusive pricing. This applies irrespective of whether this pricing takes place as part of an infringement of the competition rules or as part of parallel conduct not covered by these rules. IT service providers are contractors who provide the pricing algorithm as a product in a contractual exchange relationship.

**263.** It may happen that such an IT service provider sells an algorithm that it knows or accepts could contribute to a collusive market outcome. It is even conceivable that individual IT service providers see such a contribution as an advantage, as it makes the algorithm more attractive for users interested in profit maximization. However, even in this case, the IT service provider concerned has an interest only in marketing the pricing algorithm as an attractive product. In contrast, it typically has no further interest in the profits associated with the collusion.

**264.** This circumstance cannot, however, be taken into account separately, especially within the framework of Article 101 TFEU. Article 101 TFEU merely provides for a uniform liability of all parties to an agreement restricting competition, without prejudice to the special interests of individual parties. The effect can be that the liability of IT service providers goes too far or, conversely, not far enough. This depends on whether the decision to design and implement the pricing algorithm in such a way that it contributes to a collusive market outcome lies more with the companies operating on the affected market or with the IT service provider.

<sup>106</sup> Vgl. Meyer v. Kalanick, Opinion and Order of 31 March 2016, 15 Ci. 9796 (N.Y.S.D. 2016), where the court found concertation within the meaning of the U.S. cartel prohibition (15 U.S.C. § 1); see also paras 192-193 above.

<sup>107</sup> See, e.g., ECJ, Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42.

<sup>108</sup> ECJ, Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42, paras 43-45; Federal Cartel Office, B6-46/12, press releases of 27 August and of 26. November 2013 and CaseReport (*Fallbericht*) of 9 December 2013 – Amazon Market Place; Federal Cartel Office, Order of 20 December 2013, B9-66/10 – HRS; Order of 22 December 2015, B9-121/13 – Booking.

<sup>109</sup> This applies particularly to the cases concerning hotel booking portals; see most recently Monopolies Commission, XXIIth Biennial Report, paras 980 ff.; in the literature, see, e.g., Hamelmann/Haucap/Wey, ZWeR 2015, 245.

**265.** In the event that the relevant decisions are made by the companies operating in the affected market, there is a far-reaching liability risk for the IT service provider. This is because it is sufficient if the service provider provides the pricing algorithm while being aware of and agreeing to the fact that later users can use the algorithm in the context of collusive pricing (= it acts, so to speak, as an “assistant”). This applies regardless of the fact that the IT service provider has no influence on whether and when the customers using the algorithm form the joint intention necessary for a violation of the competition rules.

**266.** Conversely, liability gaps can open up if the IT service provider brings about a collusive market outcome without the approval of the parties involved.<sup>110</sup> It is possible that several users use pricing algorithms whose use leads to collusive pricing. However, users may not be able to recognize this collusive market outcome themselves – e.g., due to the complexity of the product or the market conditions – and therefore may not form a joint intention necessary to create a cartel. At the same time, however, the IT service provider that provided the pricing algorithms may be well aware of the possibility of collusive pricing and may also approve of it. In such a case, the situation is comparable to that of an external consultant advising several companies in such a way that they act in parallel without the joint intention of all parties involved. Such constellations (= the IT service provider acts as an “indirect perpetrator”, so to speak) cannot or only with difficulty be addressed pursuant to Article 101 TFEU.

**267.** It also does not seem easily possible to base the IT service provider’s liability under Article 101 TFEU on the fact that it was the contract for the provision of the respective algorithm that produced the collusive market outcome, and that this contract constitutes an agreement within the meaning of the provision.<sup>111</sup> For the object of the contract is solely the provision of the algorithm, but not the exchange of strategic information or the use of the algorithm to coordinate the users’ market conduct. Nevertheless, the fact that the IT service provider is not liable seems unfair, since there is behaviour to which liability could well be attached and which leads to a collusive market outcome.<sup>112</sup>

**268.** Under Article 101 TFEU, the special role of the IT service provider can only be taken into account in the first constellation described above. In that context, the assessment of the role of third parties under the case law depends, among others, on their relationship to the market affected by the infringement.<sup>113</sup> In the case of third parties who, like IT service providers, are not active on the affected market, this generally indicates that the competition authorities should exercise their enforcement powers with some caution. In the second constellation described, Article 101 TFEU does not apply to the conduct of undertakings operating on the market affected by the collusive agreement. Thus, there is no interference with legal rules from the liability of the IT service provider could follow.

#### **4.3.4 Recommendation: Review and, where appropriate, regulate the responsibility of third parties according to their respective contribution to collusive market outcomes**

**269.** Previously, it was recommended to consider supplementing the competition rules in order to neutralize the contribution of pricing algorithms to collusive market outcomes, depending on the information available on market developments. It also makes sense to consider supplementary rules on the responsibility of third parties who, by contributing their IT expertise to algorithmic pricing, make an independent contribution to such collusive market outcomes for which liability under the competition rules is possible.

**270.** The foregoing recalls a request made by the European Commission, whose Competition Commissioner has clarified:

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<sup>110</sup> ECJ, Judgment of 21 July 2016, C-542/14 – VM Remonts, ECLI:EU:C:2016:578, para. 30; ECJ, Judgment of 21 January 2016, C-74/14 – Eturas, ECLI:EU:C:2016:42, para. 45.

<sup>111</sup> See para. 257 above.

<sup>112</sup> On the liability of external advisors, see ECJ, Judgment of 22 October 2015, C-194/14 P – AC-Treuhand, ECLI:EU:C:2015:717 (seminal).

<sup>113</sup> Cf. EuG, Judgment of 8 September 2010, T-29/05 – Deltafina, ECR 2010, II-4077, ECLI:EU:T:2010:355, para. 51.

*"[P]ricing algorithms need to be built in a way that doesn't allow them to collude."*<sup>114</sup>

**271.** The regulation under consideration here would apply in particular to IT service providers that provide users with pricing algorithms as economic products. According to the above, responsibility should be structured in such a way that liability does not depend on the behaviour of the users of the algorithm as before, but exclusively on the behaviour of the IT service provider itself. Through a responsibility linked to the own behaviour of the IT service providers, the service providers could be induced to refrain from a collusion-promoting design of the algorithm or to change or render algorithms in which competition problems only become apparent during their use in order to reduce their own liability risks. This would essentially amount to an ongoing product monitoring obligation and, where appropriate, product liability for the functioning of the algorithm concerned.

**272.** It was also pointed out, however, that a more far-reaching problem lies behind these considerations, as the overall liability of third parties is only partially regulated.<sup>115</sup> Apart from the responsibility of IT service providers for the pricing algorithms they provide, liability gaps can also arise, for example, if consultants or other companies not themselves active on the relevant market cause collusion among the companies operating there without their knowledge. However, the question of how the liability of consultants and other third parties should be adequately regulated actually goes beyond what is the subject of this section.

**273.** The Monopolies Commission therefore recommends that the liability of companies which are not themselves active on the relevant market for collusion on the part of market participants there should be fundamentally reviewed. The aim should be to supplement the previously incomplete liability regime under Article 101 et seq. TFEU for all relevant third parties in a coherent manner.

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<sup>114</sup> See Vestager (European Commission), Algorithms and competition, Federal Cartel Office 18th Conference on Competition, Berlin, 16 March 2017.

<sup>115</sup> See para. 266 above.