

# Article 101 TFEU's Association of Undertakings Notion and Its Surprising Potential to Help Distinguish Acceptable from Unacceptable Algorithmic Collusion

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## Abstract

The machine learning capabilities of new technologies raise provocative questions and challenges for the development of competition law within the digital economy. Academic discussions have focused on how antitrust law should avoid, anticipate, and respond to such behavior. The predominant emerging narrative is that antitrust law, in its current form, is unable to distinguish between acceptable and unacceptable algorithmic collusion. The purpose of this article is to challenge that claim in the context of Article 101 Treaty on the Functioning of the European Union (EU). The reference within Article 101 TFEU to “associations of undertakings” plays a crucial role in that regard and offers a promising tool to better identify and regulate forms of unacceptable algorithmic collusion. Against that background, this article will propose an alternative compliance-focused way forward that could be set up without requiring modifications to the EU legal framework.

## Keywords

digital platforms, algorithmic collusion, associations of undertakings, co-regulation, EU competition law enforcement

## I. Introduction

The machine learning capabilities associated with the introduction of new digital technologies have captured the imagination of competition law scholars globally. Fears of algorithmic collusion—namely, anticompetitive behavior linked to self-learning algorithms, which may arise with little or no human intervention—have given rise to debates about where to draw, and whether to redraw more

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firmly, the line between acceptable and unacceptable forms of coordinated market behavior.<sup>1</sup> The typical response among those who believe that algorithmic collusion requires an immediate regulatory response is either that technology must be reined in or that the antitrust laws must be extended. More skeptical voices, however, argue that any modification of the existing legal framework should be postponed at least until it is clearly established that machine learning technologies are indeed able to trigger collusive behavior, so that it is possible to better define when such behavior should be deemed unacceptable in antitrust terms. From both perspectives, however, the predominant general perception is that the current antitrust framework must be modified or stretched to some extent. Within the

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1. Literature in this field has been booming over the past few years. See in that regard, ARIEL EZRACHI & MAURICE E. STUCKE, *VIRTUAL COMPETITION: THE PROMISE AND PERILS OF THE ALGORITHM-DRIVEN ECONOMY* (2016); Andreas Heinemann & Aleksandra Gebicka, *Can Computers Form Cartels? About the Need for European Institutions to Revise the Concertation Doctrine in the Information Age*, 7 J. EUR. COMP. LAW & PRAC. 431 (2016); Ariel Ezrachi & Maurice E. Stucke, *Virtual Competition*, 7 J. EUR. COMP. L. & PRAC. 585 (2016); Salil K. Mehra, *US v. Topkins: Can Price-Fixing Be based on Algorithms?*, 7 J. EUR. COMP. L. & PRAC. 470 (2016); Salil K. Mehra, *Antitrust and the Robo-Seller: Competition in the Time of Algorithms*, 100 MINN. L. REV. 1323 (2016); Antonio Capobianco & Pedro Gonzaga, *Algorithms and Competition: Friends or Foes?*, COMP. POL'Y INT. 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A Closer Look at Algorithms as the New Price-Fixing Tool in EU Competition Law* (2018), [https://www.europeanlawinstitute.eu/fileadmin/user\\_upload/p\\_eli/YLA\\_Award/Submission\\_ELI\\_Young\\_LawyersAward\\_Manon\\_van\\_Roozendaal\\_2018.pdf](https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/YLA_Award/Submission_ELI_Young_LawyersAward_Manon_van_Roozendaal_2018.pdf); STEVEN VAN UYTSEL, *Artificial Intelligence and Collusion: A Literature Overview*, in ROBOTICS, AI AND THE FUTURE OF LAW 155 (Marcelo Corrales et al., eds., 2018); Catalina Gonzalez Verdugo, *Horizontal Restraint Regulations in the EU and the US in the Era of Algorithmic Tacit Collusion*, 7 UCL J. L. & JURIS. 114 (2018); Pinar Akman, *An Agenda for Competition Law and Policy in the Digital Economy*, 10 J. EUR. COMP. L. & PRAC. 1 (2019); Emilio Calvano et al., *Algorithmic Pricing and Collusion: What Implications for Competition Policy*, 55 REV. IND. ORG. 155 (2019); Michal S. 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L. & ECON. 123 (2019); Stefan Thomas, *Harmful Signals: Cartel Prohibition and Oligopoly Theory in the Age of Machine Learning*, 15 J. EUR. COMP. L. & ECON. 159 (2019). See also Report drafted by the ORGANIZATION OF ECONOMIC COOPERATION AND DEVELOPMENT (OECD), *ALGORITHMS AND COLLUSION: COMPETITION POLICY IN THE DIGITAL AGE* (2017), <http://www.oecd.org>. For a critique as to the limited relevance of the threats of algorithmic collusion, see ASHWIN ITTOO & NICOLAS PETIT, *Algorithmic Pricing Agents and Tacit Collusion: A Technological Perspective*, in L'INTELLIGENCE ARTIFICIELLE ET LE DROIT 241-256 (Hervé Jacquemin & Alexandre de Streele eds., 2017); and Thibault Schrepel, *The Fundamental Unimportance of Algorithmic Collusion for Antitrust Law*, *Harvard Journal of Law and Technology Digest* (2020), <https://jolt.law.harvard.edu/digest/the-fundamental-unimportance-of-algorithmic-collusion-for-antitrust-law>.

European Union (EU), debates about algorithmic collusion have typically focused on the need to extend the notions of “agreement” and “concerted practice” as found in Article 101(1) of the Treaty on the Functioning of the European Union (TFEU).<sup>2</sup> This article, by contrast, suggests a means by which algorithmic collusion can be more effectively accommodated within the *existing* EU competition rules, namely, through a progressive reading of the “association of undertakings” concept similarly contained within Article 101(1).

This article does not propose to offer a direct definitive answer to the vexed question of what types of algorithmic collusion specifically may pose antitrust challenges.<sup>3</sup> Instead, it aims to refocus the underlying academic debate by proposing an analytical framework by which the issue of unacceptable algorithmic collusion may be advanced more effectively within the European Commission’s existing enforcement practice. The practical relevance of this scholarly exercise is demonstrated, *inter alia*, by EU Competition Commissioner Vestager’s recent call for the design of new technologies to factor in compliance with the rules on competition.<sup>4</sup> In order to identify a constructive way forward, this article will advance the ostensibly unorthodox claim that platforms that rely on algorithms, and which use those in particular to balance supply and demand, may be considered as “associations of undertakings” within the meaning of Article 101. While this may appear counterintuitive, it will be demonstrated that the case law of the Court of Justice nonetheless can support this approach.

To the extent that platforms that use algorithms with self-learning capacities thus qualify as associations of undertakings, moreover, they have a responsibility to ensure compliance in their day-to-day activities with the requirements of Article 101. Recognition of such a responsibility could accordingly become the departure point for the development of a co-regulation-oriented enforcement framework, which may better address future algorithmic collusion problems. The latter portion of this article will

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2. Article 101(1) Treaty on the Functioning of the European Union (TFEU) prohibits all agreements between undertakings, decisions by associations of undertakings, and concerted practices which may affect trade between the Member States and which have as their object or effect the prevention, restriction, or distortion of competition within the internal market. Any such agreements, decisions, or practices are void (Article 101(2)), unless they contribute to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit, and do not (a) impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives and (b) afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question (Article 101(3)). The notions of agreement and concerted practice have been defined by the Court of Justice of the European Union. On the notion of agreement, *see* Joined Cases C-2/01 P & C-3/01 P, *Bundesverband der Arzneimittel-Importeure eV & Commission v. Bayer*, EU:C:2004:2, para. 69, and Peter Willis & Paul Hughes, *What Is an Agreement?*, 6 *COMP. L. J.* 123 (2007); and, for a more critical perspective, Oliver Black, *Agreement: Concurrence of Wills or Offer and Acceptance*, 4 *EUR. COMP. J.* 103 (2008). On the concept of concerted practice, *see* Case C-8/08, *T-Mobile Netherlands BV, KPN Mobile NV, Orange Nederland NV and Vodafone Libertel NV v. Raad van bestuur van de Nederlandse Mededingingsautoriteit*, EU:C:2009:343 para. 26, referring to classic judgments in Joined Cases 40/73 to 48/73, 50/73, 54/73 to 56/73, 111/73, 113/73, and 114/73, *Suiker Unie and Others v. Commission*, EU:C:1975:174, para. 26, and Joined Cases C 89/85, C 104/85, C 114/85, C 116/85, C 117/85, and C 125/85 to C 129/85 *Ahlström Osakeyhtiö and Others v. Commission (Woodpulp II)*, EU:C:1993:120, para. 63 and Case C-199/92 P, *Hüls v. Commission*, EU:C:1999:358, para. 167. *See also* Peter Whelan, *CISAC: How Difficult It Is to Prove a Concerted Practice*, 4 *J. EUR. COMP. LAW & PRAC.* 486-488 (2013); and Pieter Van Cleynenbreugel, *Article 101 TFEU and the EU Courts: Adapting Legal Form to the Realities of Modernisation?*, 51 *COMMON MKT. L. REV.* 1381 (2014). In the particular context of algorithmic pricing, *see* Siciliani, *supra* note 1, 31, 34; Gal (2019), *supra* note 1; Jan-Frederik Göhsl, *Algorithm Pricing and Article 101 TFEU: Can Competition Law Deal with Algorithm Pricing?*, 68 *WIRTSCHAFT UND WETTBEWERB* 121 (2018); Thomas, *supra* note 1; and Joe E. Gata, *Controlling Algorithmic Collusion: Short Review of the Literature, Undecidability, and Alternative Approaches* (2019), [https://rem.rc.iseg.ulisboa.pt/wps/pdf/REM\\_WP\\_077\\_2019.pdf](https://rem.rc.iseg.ulisboa.pt/wps/pdf/REM_WP_077_2019.pdf).
  3. Many of the works of scholarship referred to in fn. 1 have raised or tried to address that question. *See also* Timo Klein, *Autonomous Algorithmic Collusion: Q-Learning Under Sequential Pricing* (2019), <https://papers.tinbergen.nl/18056.pdf>.
  4. *See* speech by Competition Commissioner Margrethe Vestager on Mar. 16, 2017, entitled *Algorithms and Competition*, available at [https://ec.europa.eu/commission/commissioners/2014-2019/vestager/announcements/bundeskartellamt-18th-conference-competition-berlin-16-march-2017\\_en](https://ec.europa.eu/commission/commissioners/2014-2019/vestager/announcements/bundeskartellamt-18th-conference-competition-berlin-16-march-2017_en).

briefly sketch the possible contours of such a framework and suggest how it may be of use in revealing and distinguishing the parameters of acceptable from unacceptable coordinated algorithmic behavior.

This argument will be developed in two main parts. The first part briefly revisits the algorithmic collusion literature and considers the extent to which scholars have tackled the question of distinguishing acceptable from unacceptable collusive behavior (II). Proposing a pragmatic way forward to overcome the stalemate, the second part of this article will argue that Article 101 and the concepts within that provision constitute a more constructive way forward. Focusing on the extensive interpretation given to the concept of an “association of undertakings” by the Court of Justice, this article will lay out the case for a co-regulation-oriented enforcement strategy going forward (III).

## II. Algorithmic Collusion: When “Acceptable Cartels” Meet Technological Innovation

The rise of self-learning algorithms has prompted much academic debate on the relevance of so-called algorithmic collusion, which will be revisited briefly (1). The future risk of such collusion has given rise, in particular, to questions regarding the need to modify or adapt the existing competition law framework to address these new forms of potentially anticompetitive behavior (2). At the same time, however, more fundamental questions about where and how to draw a line between acceptable and unacceptable algorithmic collusion have been neglected to date (3).

### A. Algorithmic Collusion: Sketching the Possible Scenarios

New technologies are, increasingly, changing the manner in which collusive business behavior may occur: specifically, we are moving from a world in which businesses had to communicate in order to coordinate, to one in which explicit communication is no longer a prerequisite. The increasing use of self-learning software programs or algorithms plays a particular role in this regard.<sup>5</sup> In its barest essence, an algorithm is a programmed procedure for solving a mathematical problem in a finite number of steps that frequently involves repetition of an operation.<sup>6</sup> Self-learning refers to techniques and methods allowing algorithmic software to improve its problem-solving abilities when repeating the same operation over time.<sup>7</sup> When programmed as such into software, algorithms can be made to repeat an operation that involves the determination of the price of a product on the basis of certain preprogrammed indicators.<sup>8</sup> Those programmed algorithms can process much larger volumes of data than individuals.<sup>9</sup> As a result, they can increase market transparency, which could either promote or restrict competition.<sup>10</sup> The literature identifies situations where this newfound transparency would result in the creation of new barriers to entry and resultant restrictions on competition,<sup>11</sup> a practice referred to generally as algorithmic collusion.

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5. Ezechia & Stucke, *Artificial Intelligence & Collusion*, *supra* note 1. *See also*, Beneke & Mackenrodt, *supra* note 1.

6. This basic definition can be found in the *Merriam-Webster dictionary*, see <http://www.merriam-webster.com/dictionary/algorithm>.

7. The methods referred to in this regard concern notably statistical regression methods of different kinds. For a good summary of approaches, *see* SERGIOS THEODORIDIS, *MACHINE LEARNING—A BAYESIAN AND OPTIMIZATION PERSPECTIVE* (2015). Newer machine learning approaches allow for the so-called deep learning by algorithms. On that phenomenon, *see* IAN GOODFELLOW et al., *DEEP LEARNING* (2016).

8. *See*, for a general analysis, ROBERT SEDGEWICK & KEVIN WAYNE, *ALGORITHMS* (2011). *See also* STEVE S. SKIENA, *THE ALGORITHM DESIGN MANUAL* (2008); and THOMAS H. CORMEN, *ALGORITHMS UNLOCKED* (2013). For a critical law and society perspective, *see* FRANK PASQUALE, *THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION* (2015).

9. Massimiliano Nuccio & Marco Guerzoni, *Big Data: Hell or Heaven? Digital Platforms and Market Power in the Data-Driven Economy*, 23 *COMP. & CHANGE* 312 (2018).

10. Gal (2019), *supra* note 1.

11. Again, Gal (2019), *supra* note 1, 67, 98–99.

Algorithmic collusion thus refers to a situation in which a learning algorithm is instrumental or succeeds in coordinating the pricing behavior of businesses, by means of streamlining prices or other key elements and by tailoring prices to what customers would be willing to pay.<sup>12</sup>

In their pioneering work, Ezrachi and Stucke distinguish four scenarios of potentially anticompetitive algorithmic decision-making. The first three scenarios resemble situations that have been or can be readily addressed by EU competition law and are therefore less likely to raise enforcement problems. The fourth scenario, the so-called autonomous machine scenario, is more problematic.<sup>13</sup> These will be outlined briefly below.

First, an algorithm could function as a messenger between different firms that decide to align their prices or other market behavior.<sup>14</sup> In that scenario, the algorithm or computer program is merely a technological means by which to communicate between the participating firms. Thus, the type of behavior is not so different from the scenario where two businesses speak to each other directly by more conventional means, whether in person, over the phone, or via email,<sup>15</sup> and so is not considered algorithmic collusion as such.<sup>16</sup> Moreover, there is plenty of case law and agency guidance available on the antitrust treatment of such practices, allowing businesses to distinguish acceptable from unacceptable information exchanges.<sup>17</sup>

Second, algorithm operators may function as a hub in the so-called hub-and-spoke cartel.<sup>18</sup> By centralizing information within the algorithm or “hub,” decisions can be made to streamline prices or other parameters of competition between the different “spokes,” typically competing undertakings that each use intermediation services provided by the hub platform. The Court of Justice’s judgment in *Eturas* illustrated this possibility, in which a platform’s central messaging system was used as a communicative device to facilitate price-fixing among travel agents.<sup>19</sup> By concluding agreements with all participants using its platform, *Eturas* acted as cartel facilitator, allowing participants to communicate obliquely with each other and to align their market behavior. Provided that awareness

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12. Van Uytsel, *supra* note 1, 155, 180–183.

13. Those four scenarios also constitute the basis for reflection in the Nov. 2019 joint report of the German Bundeskartellamt and the French Autorité de la Concurrence, ALGORITHMS AND COMPETITION, [https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Berichte/Algorithms\\_and\\_Competition\\_Working-Paper.html](https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Berichte/Algorithms_and_Competition_Working-Paper.html).

14. Ezrachi & Stucke, *Artificial Intelligence & Collusion*, *supra* note 1, 1775, 1785.

15. See to that extent in EU law, Case C-8/08, *T-Mobile Netherlands BV, KPN Mobile NV, Orange Nederland NV and Vodafone Libertel NV v. Raad van bestuur van de Nederlandse Mededingingsautoriteit*, EU:C:2009:343, para. 23; *see also* the speech by Commissioner Vestager on Mar. 16, 2017, *supra* note 4, in which it is argued that humans cannot hide behind a computer program when engaging in anticompetitive behavior.

16. *See also* Schwalbe, *supra* note 1, 568, 572.

17. For the guidelines, *see*, for instance, ORGANISATION OF ECONOMIC COOPERATION AND DEVELOPMENT (OECD), INFORMATION EXCHANGES BETWEEN COMPETITORS UNDER COMPETITION LAW (2010), <http://www.oecd.org>; 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 (O.J. C11/1, 14.1.2011). For cases, *see, e.g.*, Cases C-40/73 etc. *Suiker Unie*, EU:C:1975:174; C-89/85 etc. *Wood Pulp*, EU:C:1993:120, C-7/95 P, *John Deere*, EU:C:1998:256; C-413/06 P, *Sony*, EU:C:2008:392; C-8/08, *T-Mobile Netherlands*, EU:C:2009:343; T-25/95 etc. *Cimenteries*, EU:T:2000:77; T-191/98 etc. *Atlantic Container Line (TACA)*, EU:T:2003:245; and T-202/98 etc. *Tate & Lile v. Commission*, EU:T:2001:185.

18. Ezrachi & Stucke, *Artificial Intelligence & Collusion*, *supra* note 1, 1775, 1787–1788; Maurice E. Stucke & Ariel Ezrachi, *How Pricing Bots Could Form Cartels and Make Things More Expensive*, HAR. BUS. REV. (2016), <http://governance40.com/wp-content/uploads/2018/11/How-Pricing-Bots-Could-Form-Cartels-and-Make-Things-More-Expensive.pdf>; Joseph E. Harrington, Jr. & Patrick T. Harker, *How Do Hub-and-Spoke Cartels Operate? Lessons from Nine Case Studies* (2018) [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3238244](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3238244); Rodrigo Londoño van Rutten & Caroline Buts, *Hub and Spoke Cartels: Incentives, Mechanisms and Stability*, 3 EUR. COMP. & REG. L. REV. 4 (2019); Nicolas Sahuguet & Alexis Walckiers, *A Theory of Hub-and-Spoke Collusion*, 53 INT. J. IND. ORG. 353 (2017); Deng (2017) and (2018), *supra* note 1; Stucke & Ezrachi, *Virtual Competition*, *supra* note 1.

19. Case C-74/14, *Eturas*, EU:C:2016:42, para. 50. *See also* Katri Havu & Neža Zupančič, *Collusion and Online Platforms*, 11 COMP. L. REV. 255 (2016).

of the overall anticompetitive arrangement could be demonstrated, the various travel agents could each be held to have engaged in an anticompetitive *horizontal* concerted practice, prohibited by Article 101.

The third scenario—termed the “predictable agent”<sup>20</sup>—is similar to the first scenario. In this scenario, the algorithm acts as a predictable agent programmed to execute certain price-setting commands beyond merely acting as a price-setting messenger. An example would be an algorithm programmed to respond to price increases by another algorithm in the same way.<sup>21</sup> By programming algorithms to monitor the activities of similar algorithms in the same or related markets, a sort of cooperative game can arise, whereby each algorithm responds to price variations by others in a manner prescribed *ex ante* by the programmer. Algorithms thus act precisely as they have been told, which could be in an anticompetitive way.<sup>22</sup> As with the preceding two situations, however, the algorithm does not think for itself but rather responds to a humanly programmed element. Businesses making the conscious choice to implement and rely on that algorithm to determine their products’ prices would be liable under the antitrust rules. In essence, this scenario resembles the first scenario, where the algorithm functions as a messenger facilitating cooperation between businesses. The main difference with that first scenario is that, in this case, businesses would no longer need to talk to each other less, as they rely on an algorithm programmed at the outset to adopt price-setting decisions in a certain manner. From an enforcement perspective, it would be more difficult to infer the presence of anticompetitive behavior in the absence of additional indications of contact between different competing businesses.

It is the fourth scenario envisaged by Ezrachi and Stucke, however, which is most problematic.<sup>23</sup> Here, algorithms are self-learning agents, accumulating knowledge thanks to the vast amount of data that they collect and retain. Where another algorithm does the same thing, whether within the same or another market, both may learn from each other and respond to nudges given by the other. By learning how to behave and act in order to further certain interests, it is conceivable that the algorithm itself—quite independently from the will of its human creators—may engage in behavior that distorts competition, whether by creating or maintaining barriers to entry or by increasing prices beyond a competitive equilibrium.<sup>24</sup> The major conceptual difficulty in addressing such behavior from an antitrust perspective, however, is that it is the algorithm itself—a nonhuman actor—which colludes with other algorithms, minus any human intervention. Indeed, the only human intervention is the initial design of the learning algorithm by its programmer, who is unlikely to have involvement in subsequent anticompetitive decisions made by the algorithm itself in the context in which it is used.<sup>25</sup> Because no formal agreement or even informal contact has taken place between the *undertakings* concerned, the existing competition law categories of problematic coordinates conduct would be unable to accommodate this scenario.<sup>26</sup>

The likelihood of this fourth scenario arising in practice—that is, autonomous collusion by robots—is disputed.<sup>27</sup> Many commentators contend that chances remain still relatively low that the truly autonomous machine scenario would present itself in the near future.<sup>28</sup> Ittoo and Petit<sup>29</sup> have argued

20. Ezrachi & Stucke, *Artificial Intelligence & Collusion*, *supra* note 1, 1775, 1790.

21. Schwalbe uses the example of two simple algorithms responding to each other on Amazon continuously increasing the price of a secondhand product, *see* Schwalbe, *supra* note 1, 568, 572–73.

22. *See* Deng (2018), *supra* note 1, 88, 89.

23. Ezrachi & Stucke, *Artificial Intelligence & Collusion*, *supra* note 1, 1775, 1794.

24. *See* Schwalbe, *supra* note 1, 568, 575; and Deng (2018), *supra* note 1, 88, 89–90.

25. *See* in that regard Ariel Ezrachi & Maurice Stucke, *Sustainable and Unchallenged Algorithmic Tacit Collusion*, 17 Nw. J. TECH. & INTELL. PROP. 217 (2020).

26. According to Gal (2019), *supra* note 1, 67, 116; *see also* Capobianco & Nyeso, *supra* note 1, 25.

27. *See*, for a skeptical account, Schwalbe, *supra* note 1, 568, 575. *See also* Mehra (2016), *Antitrust and the Robo-Seller*, *supra* note 1.

28. *See* Calvano et al., *supra* note 1; Klein, *supra* note 3; Mehra (2016), *Antitrust and the Robo-Seller*, *supra* note 1; and Deng (2017) and (2018), *supra* note 1.

29. ASHWIN ITTOO & NICOLAS PETIT, *supra* note 1, 241, 250-256.



convincingly that the materialization of this scenario depends on certain technological developments and particular market conditions,<sup>30</sup> which are unlikely to be realized in the short term. Nonetheless, the mere fact that automatic algorithmic collusion is not yet possible today does not preclude the possibility that it may emerge in the more distant future.<sup>31</sup>

## B. Addressing Algorithmic Collusion: An Apparent Consensus on the Limits of the Current Legal Frameworks in Place

As learning algorithms and deep learning technology continue to be refined, it is likely that the four scenarios of algorithmic business coordination discussed above will emerge more frequently. It is unsurprising, therefore, that scholars have sought to address these risks by proposing modifications to existing enforcement practices and/or the legal frameworks in place.

More particularly, questions have been raised regarding the fourth scenario. As will be explained in detail in Section III(1), it is doubtful whether automated algorithmic collusion activities would qualify as an “agreement” restrictive of competition, given the absence of any explicit or even implicit concurrence of wills between legal or natural persons.<sup>32</sup> In the same way, the behavior of algorithms does not amount to a “concerted practice,” which similarly requires at least some form of knowing or deliberate contact.<sup>33</sup> To the extent that, in the context of automated algorithmic collusion, the algorithms involved have merely been programmed to adapt their behavior by learning from data and each other, the strategies that they engage in would seem to be a rational *unilateral* response based on the learning experience.<sup>34</sup> Such a *prima facie* rational response would not trigger liability under Article 101.<sup>35</sup> Confronted with this potential problem, scholars have suggested two different types of legal solutions in order to bring restrictive automated collusion activities within the purview of the competition rules.

The first category of the solution consists of reigning in the underlying technology, namely, imposing an *ex ante* regulatory prohibition on the design or use of automatically colluding algorithms.<sup>36</sup> An obligation not to collude would thus be coded or designed into the legal framework in order to avoid such behavior from occurring,<sup>37</sup> an approach that was proposed, in essence, by the EU’s

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30. For a recent economics literature review on those possibilities and limits, see Schwalbe, *supra* note 1, 568, 580–94.

31. See also Calvano et al., *supra* note 1.

32. Gal (2019), *supra* note 1, 67, 115–16. See also van Roozendaal, *supra* note 1.

33. See on those difficulties, Daniel Mandrescu, *When Algorithmic Pricing Meets Concerted Practices—The Case of Partneo*, *CoreBlog* (June 7, 2018), <https://coreblog.lexxion.eu/when-algorithmic-pricing-meets-concerted-practices-the-case-of-partneo/>.

34. The Court of Justice has long recognized that an undertaking’s intelligent adaptation to the competitive conduct of others is unproblematic from the point of view of Article 101, provided that an undertaking does so unilaterally and not in concert with other undertakings. In *Suiker Unie*, the Court indeed stated that “each economic operator must determine independently the policy which he intends to adopt on the common market including the choice of the persons or undertakings to which he makes offers or sells. Although it is correct to say that this requirement of independence does not deprive economic operators of the right to adapt themselves intelligently to the existing and anticipated conduct of their competitors, it does however strictly preclude 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 the course of conduct which they themselves have decided to adopt or contemplate adopting on the market.” See Cases 40/73 etc. *Suiker Unie and Others v. Commission*, EU:C:1975:174, para. 174; see also Cases C-89/85 etc. *Wood Pulp*, EU:C:1993:120, para. 71.

35. Siciliani, *supra* note 1, 31, 34–35.

36. See, for propositions in that direction, Ai Deng, *From the Dark Side to the Bright Side: Exploring Algorithmic Antitrust Compliance* (2019) [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3334164](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3334164); Ai Deng, *Four Reasons We May Not See Colluding Robots Anytime Soon* (2018), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3271904](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3271904); Deng (2017) and (2018), *supra* note 1; Fransisc I. Toma, *Should the EU Reshape Its Competition Legal System to Regulate Algorithmic Cartels* (2018), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3222199](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3222199); and Jia Juinn Lee, *Algorithmic Collusion & Its Implications for Competition Law and Policy* (2019), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3213296](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3213296).

37. A perspective familiar to cyberlaw scholars since LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* 6 (1999).

Competition Commissioner Margrethe Vestager in 2017.<sup>38</sup> This solution would generate two potential negative consequences, however. First, as it involves the express legal prohibition of certain types of technology,<sup>39</sup> it could have adverse effects on innovation in algorithmic design. Second, there may be difficulties associated with the enforcement of such an obligation. *Ex post* enforcement of by-design obligations would create significant upfront uncertainty as to their exact scope and associated expectations,<sup>40</sup> while a regime premised upon *ex ante* approval by public authorities would require significant new procedures and enforcement bodies.<sup>41</sup>

The second solution would be simpler from a legal perspective. It calls for the continuous application of competition law to algorithmic activities. In the first three scenarios outlined above, such an approach would be largely unproblematic. In the fourth scenario, however, competition law cannot capture the impugned behavior as no concurrence of wills or knowing recourse to coordinated conduct is involved. To plug this obvious gap within the coverage of the competition rules, it has been suggested that the relevant competition rules be expanded to explicitly cover the algorithmic automatic collusion scenario.<sup>42</sup> In practice, it would require an additional prohibition added to the antitrust rulebook.

Both the *ex ante* regulation and *ex post* competition enforcement solutions agree on one thing, however: that the current legal framework is unable to address all four scenarios predicted by Ezrachi and Stucke. Although it is unlikely that the fourth scenario will materialize in the short term,<sup>43</sup> there is a growing recognition that the current antitrust provisions cannot address such behavior, meaning that further legislative intervention will be necessary to ensure that unacceptable algorithmic cartels can be distinguished from acceptable algorithmic activities.

Against that background, provocative questions have been asked about the potential applicability of either Articles 101 or 102 to algorithmic activities. Concerns have focused, *inter alia*, on the difficulties of holding a software developer liable for anticompetitive action that results from an algorithm later communicating with similar algorithms,<sup>44</sup> on platforms that act as the agents of suppliers and therefore form part of a single economic entity, so that the underlying platform-supplier contract falls outside the realm of competition law,<sup>45</sup> on the difficulty of determining when

38. Speech by Commissioner Vestager on Mar. 16, 2017, *supra* note 4, calling for a compliance-by-design approach to be implemented.

39. This has been proposed in so many words by Harrington, *supra* note 1, 331–63.

40. On the difficulty to envisage by-design obligations, see PIETER VAN CLEYNENBREUGEL, *By-Design Regulation in the Algorithmic Society: Promising Way Forward or (EU) Constitutional Nightmare in-the-Making?*, in CONSTITUTIONAL CHALLENGES IN THE ALGORITHMIC SOCIETY 1-20 (Oreste Pollicino et al., eds., 2021).

41. On the difficulties to regulate algorithms *ex ante*, see Michael Guihot et al., *Nudging Robots: Innovative Solutions to Regulate Artificial Intelligence*, 20 VAND. J. ENT. & TECH. L. 385 (2017); CHRIS REED, *How Should We Regulate Artificial Intelligence?*, 376 PHIL. TRANS. MATH PHYS ENG SCI 1 (2018); Ugo Pagallo & Massimo Durante, *The Pros and Cons of Legal Automation and Its Governance*, 7 EUR. J. RISK REG. 323 (2016); and Nicolas Petit, *Law and Regulation of Artificial Intelligence and Robots: Conceptual Framework and Normative Implications* (2019), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2931339](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2931339).

42. Ezrachi & Stucke, *Artificial Intelligence & Collusion*, *supra* note 1, 1775, 1807. See also 2018 Report by the German Monopolies Commission pointing in that direction, available at [https://www.monopolkommission.de/images/HG22/Main\\_Report\\_XXII\\_Algorithms\\_and\\_Collusion.pdf](https://www.monopolkommission.de/images/HG22/Main_Report_XXII_Algorithms_and_Collusion.pdf).

43. *Supra* note 36.

44. Pierre Honoré & Guillaume Fabre, *European Union—Algorithmic Pricing under Article 101 TFEU*, GLOB. COMP. L. REV., <https://globalcompetitionreview.com/insight/e-commerce-competition-enforcement-guide/117725/european-union-%E2%80%9393-algorithmic-pricing-under-article-101-tfeu>.

45. Pinar Akman, *Online Platforms, Agency and Competition Law: Mind the Gap*, 43 FORDHAM. INT'L L.J. 209 (2019).



and whether a platform may have a dominant economic position falling within Article 102,<sup>46</sup> and on whether self-learning algorithms colluding would meet the requirements of a concerted practice covered by Article 101.<sup>47</sup>

What has received less attention thus far, however, is an in-depth consideration of what types of algorithmic activities should fall within the scope of competition law and on what bases those activities should be deemed unacceptable. The existing literature has focused almost exclusively on price-fixing, the archetypal “hard core” cartel activity.<sup>48</sup> Rather less attention has been directed, however, at other “hard core” restrictions (such as output restrictions or market partitioning) or at more nuanced practices that may be restrictive of competition (such as exchanges of information). For the latter practices, it remains to be determined, on a case-by-case basis, whether they harm competition to a sufficient extent so that antitrust liability for algorithmic activities comes into play. By focusing on price-fixing behavior, therefore, the abovementioned solutions have largely circumvented the broader question of the kinds of behavior by algorithms that may be (un)acceptable.

### III. Article 101 TFEU as an Unexpected Vehicle for Co-Regulation-Focused Enforcement

Given the recognition that the existing competition laws require modification in order to distinguish acceptable from unacceptable cartel behavior in the digital economy, this article now turns to test—and contest—that argument by focusing on Article 101. Although this provision’s foundational concepts of “agreements” and “concerted practices” may indeed be difficult to apply to automatic activities engaged in by learning algorithms, this article argues that such a conclusion need not completely exclude the application of Article 101 to such behavior. Instead, it will be argued that the somewhat neglected notion of “associations of undertakings” offers uncharted potential by which to capture and regulate such conduct, through a co-regulation-based strategy where this notion takes center stage.

To do so, this section briefly revisits the formal and substantive legal tests that are utilized in Article 101, confirming the conventional position that algorithmic collusion does not fit well within the established categories (1). Having identified an open-textured substantive test and an extensively interpreted formal test, the formal category of associations of undertakings will be considered (2). This provides the starting point for a co-regulation framework by which to elaborate upon the distinction between acceptable and unacceptable algorithmic collusion through a process of trial and error (3). Utilizing this framework, it is submitted, will allow for more precise identification of unacceptable cartel behavior in the future.

#### A. The *Prima Facie* Difficult or Uncertain Application of Article 101 TFEU to Algorithmic Collusion

It is trite law that Article 101(1) prohibits restrictions of competition by means of agreements, decisions, or concerted practices. In order to prohibit such collusive behavior, four elements must be

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46. See Mark R. Patterson, *Algorithmic Opacity and Exclusion in Antitrust Law*, 2 RIVISTA ITALIANA DI ANTITRUST—ITALIAN ANTITRUST REVIEW 23–31 (2018).

47. To that extent, see Lorenz Marx et al., *Liability for Outsourced Algorithmic Collusion: A Practical Approximation*, CONCURRENCES (2019), <https://www.concurrences.com/en/review/issues/no-2-2019/legal-practice/liability-for-outsourced-algorithmic-collusion-a-practical-approximation-89925-en>.

48. For analyses explicitly referring to the hard core nature of algorithmic pricing cartels, see most notably Calvano et al., *supra* note 1, 155–71; GERADIN, *supra* note 1; Hansen et al., *supra* note 1; Ezrachi & Stucke (2018), *supra* note 1, 624–48; and Stucke, *supra* note 1, 1113–134. For general background on price-fixing as a traditional “hard core” antitrust activity, see Louis Kaplow, *Price-Fixing Policy*, 61 INT. J. IND. ORG. 749–76 (2018).

proven. First, Article 101(1) prohibits business coordination between two or more *undertakings*, which under EU law requires two different and separate entities each engaged in economic activity.<sup>49</sup> Second, business coordination between undertakings comes within the purview of Article 101(1) only if its effects occur within the internal market and if it (at least potentially) affects trade between Member States. Each of these conditions is relatively easy to satisfy and would certainly catch digital platforms that make use of algorithmic technologies. Third, Article 101(1) captures several distinct forms of coordinated business behavior, namely, agreements, decisions of associations of undertakings, and concerted practices. Once those three formal criteria are satisfied, fourthly, it must still be determined whether and to what extent the measure is restrictive of competition in substance. Article 101(1) prohibits those arrangements that, by virtue of their *object* (that is, purpose) or *effect* (i.e., consequence), prevent, restrict, or distort competition. The “object box” label is typically applied to certain obvious restrictions of competition, such as price-fixing and market partitioning, where no analysis of the relevant behavior’s effects on competition needs to be conducted prior to deeming it anticompetitive.<sup>50</sup> For conduct lying outside the object box, it is necessary to consider whether and to what extent the behavior concerned has changed the competitive dynamics in the market, applying a counterfactual approach.<sup>51</sup> Restrictions on competition, whether by object or effect, can nonetheless still be justified by invoking the four cumulative conditions of Article 101(3) in appropriate circumstances.

Accordingly, in principle, it is necessary to demonstrate that each of these formal and substantive requirements has been satisfied in order for coordinated behavior to be prohibited under Article 101(1). In the context of algorithmic collusion—and, more particularly, the fourth scenario set forth by Ezrachi

49. Case C-41/90 Klaus Höfner and Fritz Elser v. Macrotron GmbH., EU:C:1991:161, para. 21.

50. See Arianna Andreangeli, *From Mobile Phones to Cattle: How the Court of Justice Is Reframing the Approach to Article 101 (Formerly 81 EC Treaty) of the EU Treaty*, 34 *WORLD COMP.* 215, 236 (2011); Saskia King, *The Object Box: Law, Policy or Myth?* 7 *EUR. COMP. J.* 269 (2011); and Munesh Ram Mahtani, *Thinking Outside the Object Box: An EU and UK Perspective*, 8 *EUR. COMP. J.* 1 (2012). See ALSO DENIS WAELBROECK & DAVID SLATER, *The Scope of Object vs. Effect under Article 101 TFEU, in TEN YEARS OF EFFECTS-BASED APPROACH IN EU COMPETITION LAW ENFORCEMENT* 131-158 (J. Bourgeois & D. Waelbroeck eds., 2012). For the impact of that reference on the CJEU’s case law, see also Van Cleynebreugel, *supra* note 2, 1381, 1409.

51. See more particularly, Case C-32/11, Allianz Hungária Biztosító Zrt v. Gazdasági Versenyhivatal EU:C:2013:160. See also Cases C-8/08, T-Mobile Netherlands and Others EU:C:2009:343; and C-67/13P, Groupement des cartes bancaires v. European Commission EU:C:2014:2204. In Case C-307/18, Generics (UK), EU:C:2020:52, para. 67, the Court repeated its consistent case law, following which the concept of restriction of competition “by object” must be interpreted strictly and can be applied only to concerted practices which reveal, in themselves and having regard to the content of their provisions, their objectives, and the economic and legal context of which they form part, a sufficient degree of harm to competition for the view to be taken that it is not necessary to assess their effects. At the same time, however, that does not mean that the existence of potential procompetitive effects cannot be taken into account when appraising the existence of a restriction by object. As the Court states in paragraph 103 of that judgment, where the parties to that agreement rely on its procompetitive effects, those effects must, as elements of the context of that agreement, be duly taken into account for the purpose of its characterization as a “restriction by object,” insofar as they are capable of calling into question the overall assessment of whether the concerted practice concerned reveals a sufficient degree of harm to competition. That weighing of procompetitive effects does not, however, entail the introduction of a rule of reason in EU competition law. According to the Court in paragraph 104, “[s]ince taking account of those pro-competitive effects is intended not to undermine characterisation as a ‘restriction of competition’ within the meaning of Article 101(1) TFEU, but merely to appreciate the objective seriousness of the practice concerned and, consequently, to determine the means of proving it, that is in no way in conflict with the Court’s settled case-law that EU competition law does not recognise a ‘rule of reason,’ by virtue of which there should be undertaken a weighing of the pro- and anticompetitive effects of an agreement when it is to be characterised as a ‘restriction of competition’ under Article 101(1) TFEU.” See on that distinction in general, Csongor Ivan Nagy, *The Distinction between Anti-Competitive Object and Effect after Allianz: The End of Coherence in Competition Analysis?*, 36 *WORLD COMP.* 547, 559 (2013); and BERNARD AMORY et al., *The Object-Effect Dichotomy and the Requirement of Harm to Competition: On the Road to Clarity After Cartes Bancaires?*, in *THE NOTION OF RESTRICTION OF COMPETITION: REVISITING THE FOUNDATIONS OF ANTITRUST ENFORCEMENT IN EUROPE* 65–86 (Damien Gerard et al., eds., 2017).

and Stucke—it appears difficult, at first sight, to meet the necessary formal criterion of establishing the presence of an agreement or concerted practice.

Within the framework of Article 101, an agreement has been defined broadly as any “concurrence of wills”<sup>52</sup> between competitors or between different actors in the production or distribution chain.<sup>53</sup> This concept essentially implies that two undertakings involved have agreed to behave in a certain way, or put differently, that some consensus exists regarding their collective willingness to behave in such a way.<sup>54</sup> In the abovementioned fourth scenario, such concurrence of wills is absent as the algorithms themselves engage potentially in collusive behavior. To qualify behavior as falling within the agreement category, one should in principle be willing to engage in anticompetitive behavior.

With respect to the concerted practice concept, the Court has defined this notion as a form of coordination between undertakings which, without having reached the stage where an agreement properly so-called has been concluded, knowingly substitutes practical cooperation between them for the risk of competition.<sup>55</sup> To establish that coordination, evidence of “contacts” between the undertakings involved as well as evidence of subsequent anticompetitive behavior needs to be adduced. The Court of Justice confirmed in *T-Mobile* that a single meeting could suffice if that meeting is followed by some kind of coordinated behavior between the undertakings involved.<sup>56</sup> The requirement of contact is problematic from the point of view of automated algorithmic collusion, however, as algorithms render unnecessary the kind of contact between business actors that is required for behavior to qualify as a concerted practice.<sup>57</sup> Accordingly, algorithms taking autonomous decisions do not always or automatically engage in agreements or concerted practices. That would raise problems from the point of view of Article 101, which would risk not to apply for lack of meeting the formal criteria outlined in that provision.<sup>58</sup> Additional risks would also exist if algorithms were outsourced. It would then be difficult to hold a software developer liable under EU law for having designed a self-learning algorithm that, in the longer run, promotes or imposes anticompetitive behavior.<sup>59</sup>

## ***B. Associations of Undertakings as an Unexpected Yet Constructive Way Forward***

Although autonomously colluding platforms generally cannot be considered to engage in concerted practices or agreements under Article 101, an alternative way of satisfying that provision exists. This is the third category of potentially collusive behavior under Article 101(1), namely, the associations of undertakings notion. Revisiting the extensive interpretation given to that notion by the EU Courts (a), it will be submitted that platforms relying on a certain kind of algorithmic technology may be qualified as associations of undertakings (b), having adopted a decision as meant in Article 101 (c). To the extent that this is the case, decisions to rely on (self-learning) algorithms would more swiftly—without a

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52. See Cases C-2/01 P & C-3/01 P, *Bundesverband der Arzneimittel-Importeure eV & Commission v. Bayer*, EU:C:2004:2, para. 69.

53. For an overview of the different characteristics of the “agreement” concept as apparent from the Court’s case law, see Kelvin Kwok, *The Concept of “Agreement” under Article 101 TFEU: A Question of EU Treaty Interpretation*, 44 EUR. L. REV. 196 (2019).

54. See EU General Court, Case T-41/96, *Bayer AG v. Commission* EU:T:2000:242, para. 62. Black, *supra* note 2; Kenneth Khoo, *Regulating the Inferential Process in Alleged Art 101 TFEU Infringements*, 13 J. COMP. LAW & ECON. 45–88 (2017).

55. Cases 48/69, *Imperial Chemical Industries v. Commission*, EU:C:1972:70, para. 64; and C-40/73 etc. *Suiker Unie and Others v. Commission*, EU:C:1975:174, para. 26.

56. Cases C-40/73 etc. *Suiker Unie and Others v. Commission*, EU:C:1975:174, para. 26; C 89/85 etc. *Ahlström Osakeyhtiö and Others v. Commission (Woodpulp II)*, EU:C:1993:120, para. 63; and C-8/08, *T-Mobile Netherlands BV, KPN Mobile NV, Orange Nederland NV and Vodafone Libertel NV v. Raad van bestuur van de Nederlandse Mededingingsautoriteit*, EU:C:2009:343, para. 26.

57. *Ezrachi & Stucke, Artificial Intelligence & Collusion*, *supra* note 1, 1775, 1807.

58. On those criteria, see Van Cleynenbreugel, *supra* note 2, 1381, 1405–06.

59. Marx et al., *supra* note 47.

discussion on the existence of an agreement or concerted practice—fall within the scope of Article 101, even in the absence of a concurrence of wills or proof of contacts between two or more undertakings.

*1. The Notion of Associations of Undertakings in the Case Law.* The concept of an association of undertakings was left undefined in the original Treaty of Rome. The subsequent jurisprudence has clarified, however, that the concept is in essence an anti-circumvention measure, included in Article 101(1) in order to avoid the risk that undertakings may delegate the power to engage in anti-competitive behavior, collectively, to their trade association or other professional body.<sup>60</sup> Since the latter would often not be an undertaking in its own right, its actions would thus fall outside the purview of the competition rules; yet collective decisions of this sort might nonetheless produce the same restrictive effects as outright agreements. To avoid this risk, a reference to decisions adopted by such associations was added to the Treaty.<sup>61</sup>

According to the Court, any common structure or common body representing undertakings' interests could qualify as an association of undertakings under Article 101.<sup>62</sup> National law classifications do not matter for the qualification of a structure or body as an association within the meaning of Article 101.<sup>63</sup> Similarly, the fact that the association itself is structured as a nonprofit corporate legal person,<sup>64</sup> or does not have legal personality,<sup>65</sup> has no impact on its designation as an association of undertakings. It has also been confirmed that associations of undertakings fall within the broader concept.<sup>66</sup>

In complex cases, the case law identifies two distinguishing criteria to determine whether a body qualifies as an association of undertakings, focused on its composition and the mandate of the entity at hand.<sup>67</sup> On the one hand, a body must be composed of representatives of a particular trade or profession in order to qualify as an association. The mandate criterion, on the other, questions the extent to which the body at issue serves the public interest or instead the mere interests of the

60. See Cases T-39/92 and T-40/92, *Groupement des Cartes Bancaires "CB" and Europay International SA v. Commission of the European Communities*, EU:T:1994:20, para. 77.

61. Case C-71/74, *Frubo v. Commission*, EU:C:1975:61, para. 30. See also Cases C-209/78 etc. *Van Landewyck and Others v. Commission*, EU:C:1980:248, paras. 87-88; C-96/82 etc. *IAZ and Others v. Commission*, EU:C:1983:310, para. 19; C-123/83, *BNIC v. Clair*, EU:C:1985:33, paras. 20 & 26; C-45/85, *Verband der Sachversicherer e.V. v. Commission*, EU:C:1987:34, para. 2; C-46/86, *SC Belasco and others v. Commission*, EU:C:1989:301; C-180/98 & C-184/98, *Pavel Pavlov e.a. v Stichting Pensioenfonds Medische Specialisten*, EU:C:2000:428, para. 88; C-309/99, *J. C. J. Wouters, J. W. Savelbergh and Price Waterhouse Belastingadviseurs BV v. Algemene Raad van de Nederlandse Orde van Advocaten*, EU:C:2000:428, para. 68, referring to a professional association. For background, Alison Jones, *The Boundaries of an Undertaking in EU Competition Law*, 8 EUR. L. J. 301-331 (2012).

62. In Case C-123/83, *BNIC v. Clair*, EU:C:1985:33, para. 20, the Court highlighted that any group of traders could qualify as an association. For an overview of varied types of associations of undertakings, see Commission Decision of Dec. 19, 2007, in Case COMP/34.579—*MasterCard*, Case COMP/36.518—*EuroCommerce*, Case COMP/38.580—*Commercial Cards*, hereafter referred to as "MasterCard Commission Decision," para. 341.

63. Cases C-123/83, *BNIC v. Clair*, para. 17; and C-35/96, *Commission v. Italy*, EU:C:1998:303, para. 40.

64. See case law cited *supra* note 61.

65. Case C-309/99, *J. C. J. Wouters, J. W. Savelbergh and Price Waterhouse Belastingadviseurs BV v. Algemene Raad van de Nederlandse Orde van Advocaten*, paras. 3 and 4, illustrates this.

66. Case C-123/83, *BNIC v. Clair*, para. 19 and the Opinion of Advocate General Slynn to that case at p. 395. The General Court confirmed this in Cases T 136/94, *Eurofer v. Commission*, EU:T:1999:45, para. 9, and T-193/02, *Laurent Piau v. Commission*, EU:T:2005:22, para. 69.

67. The second criterion has been referred to as the "legal framework" criterion by Advocate General Léger in Case C-309/99, *J. C. J. Wouters, J. W. Savelbergh, & Price Waterhouse Belastingadviseurs BV v. Algemene Raad van de Nederlandse Orde van Advocaten*, para. 66; this term refers to the tasks that the presumed association was fulfilling and the scope of its actions. In that case, the public regulatory or private interest role of the Dutch Bar Association was at stake, which may explain the choice for the "legal framework" terminology. I prefer to use the term "mandate" criterion, as it more directly hints at the type of interests that the presumed association is taking into consideration.

profession itself.<sup>68</sup> A body would qualify as an association only to the extent that it represents the private interests of its members.

The *MasterCard* case illustrates a particularly ambitious application of these criteria and is thus our gateway to the application of the concept in the context of algorithmic collusion.<sup>69</sup> It involved the well-known payment card organization, which inter alia set an “interchange fee” to be paid between financial institutions when completing the transaction within the MasterCard payment card scheme. The European Commission considered that fee-setting activity to have the effect of restricting competition, insofar as those fees made transactions by payment card more expensive for merchant users within the system. The structure of the MasterCard company was an important preliminary point of interest, however, as the business was structured as a cooperative scheme between participating banks, which acted as its members.<sup>70</sup> The Court of Justice thus had to determine whether MasterCard constituted an association of undertakings; if it did not, Article 101 was inapplicable to its fee-setting activity.

As to the composition criterion, the Court made clear that enforcement authorities are not restricted to looking only at the actual composition of a body but can also consider whether its governance structures are amenable to taking undertakings’ interests into account. Even though participating banks were no longer formally shareholders of the MasterCard Corporation after its IPO in 2006, they remained as stakeholders in particular decision-making procedures and as participants in the workings of some management boards. The combination of participation alongside stakeholder interest in the outcome of MasterCard’s decision-making was considered relevant in meeting the composition prong of the association of undertakings’ definition.<sup>71</sup> As such, the actual governance structures and features, and the role played therein by the beneficiaries of certain market practices, were considered to provide more effective guidance than the actual composition or legal form of the body at hand.<sup>72</sup>

The mandate criterion was interpreted in an equally interest-focused fashion. The Court essentially confirmed, as a matter of law, that the joint interest of the undertakings concerned in the processes leading to, and the outcomes obtained in, the decisions adopted by MasterCard offered a sufficiently certain indication of its (perhaps implicit) mandate from banks to continue developing, refining, and adopting interchange fees to the benefit of those stakeholders. Accordingly, the extent of the interest of stakeholders in any decisions adopted by the putative association of undertakings, alongside the extent of their involvement in the decision-making process, is really the backbone of the Commission’s and Courts’ legal assessment.<sup>73</sup> The presence of such interests in the process and outcomes of another entity’s decision-making establishes a presumption of an implicit mandate, entrusted to that corporation to act as an “association of undertakings” in the interest of those stakeholders. Any decision or other binding recommendation adopted by that corporation would therefore logically qualify as a “decision by an association of undertakings.” The Court thus agreed that a potential alignment of interests in its process and outcomes would be sufficient to qualify a corporation such as MasterCard as an association of undertakings.<sup>74</sup>

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68. Case C-35/96, *Commission v. Italy*, para. 44; *see*, for a clear evocation in this respect, Opinion of Advocate General Léger in Case C-309/99, *J. C. J. Wouters, J. W. Savelbergh and Price Waterhouse Belastingadviseurs BV v. Algemene Raad van de Nederlandse Orde van Advocaten*, para. 70.

69. *See* the Decision as referenced *supra* note 62. *See also* Cases T-111/08, *MasterCard v. Commission*, EU:T:2012:260 and C-382/12 P, *MasterCard v. Commission*, EU:C:2014:2201.

70. *MasterCard Commission Decision*, para. 42.

71. *Id.* para. 378.

72. Case C-382/12 P, *MasterCard and Others v. European Commission*, para. 71.

73. As confirmed in the *MasterCard Commission Decision*, para. 383.

74. Case C-382/12 P, *MasterCard and Others v. European Commission*, para. 76.

It follows that the presence of a joint or common interest as a stakeholder in both the governance structures of a business unit and the processes and outcomes of its corporate decision-making suffices for that unit to be considered an “association of undertakings.”<sup>75</sup> Although it is not the exclusive criterion applied in this context, the idea of a “commonality of interest” forms the backbone analytical element in establishing the existence of a decision by an association of undertakings for these purposes. To the extent that the competition agency demonstrates a sufficient (potential) alignment of interests between the functioning of a corporation and other undertakings, the former entity might itself be considered “an association of undertakings.” Accordingly, if such an association adopts a decision aligned to the interests of its licensees and binding on the latter, that decision falls within the scope of Article 101(1).

**2. Could Algorithm-Using Digital Platforms Be Associations of Undertakings?** The liberal, almost open-ended approach relied upon by the Court of Justice in *MasterCard* thus allows for an interesting inference to be made in relation to platforms that use algorithmic technologies that result in collusive practices, namely, that those platforms, functioning as intermediaries between different undertakings and their clients, may well be characterized as associations of the undertaking.

This is seen, most obviously, in the mandate criterion as articulated by the Court. Platforms, alongside those undertakings that rely on the platform to sell their products or services, can together be said to have a joint interest in the actual processes leading to and the outcomes of any decision to rely on algorithms to generate certain results in terms of pricing and the availability of products. That is the case, moreover, both where a platform merely charges a fixed amount of compensation for using its services and where it directly set the prices (to some extent) for products being sold via the platform. In both cases, undertakings using the platform and the platform itself have a common interest when using algorithms, namely, to better tailor demand and supply and to operate in an efficient way. That in itself is not anticompetitive, but it demonstrates there is at least an alignment between the algorithm-using platform and the undertakings making use of it. As an intermediary between different economic actors, platform activities typically consist of tailoring the prices of certain products to the demand and preferences voiced by retail customers using the platform. In doing so, platforms—together with the learning algorithms that they use—can streamline and potentially differentiate the prices of different products offered by multiple businesses offered either within that same platform or on competing platforms. This may very well lead to an alignment of interests between the undertakings that use the platform to access customers and the platform’s own decision to use algorithms to deliver greater efficiencies within the platform. Undertakings that rely upon the platform for product distribution, whether exclusively or not, could be considered to have mandated the platform—at least implicitly—to rely on particular algorithms to deliver such results. A platform may thus have a mandate, within the meaning of the *MasterCard* jurisprudence, to steer the pricing or offering of products in a certain direction.

In relation to the composition criterion, it is useful to remember that *MasterCard* does not require the constituent undertakings to be shareholders or representatives within an organization in order for it to qualify as an association of undertakings. It suffices that the governance structures of the body are conducive to taking those undertakings’ interests into account. The governance features of a platform are quintessentially the algorithms that it uses to connect supply and demand for certain products or services.<sup>76</sup> Rather than having to decide, for instance, about how to balance supply and demand, or to organizing formal meetings to discuss the positioning of products or services, the platforms offer

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75. See also for this analysis in more detail, Pieter Van Cleynenbreugel, *Associations of Undertakings and their Decisions in the Wake of MasterCard*, 36 EUR. COMP. L. REV. 283 (2015).

76. See in that regard Pasquale, *supra* note 8, 59.



undertakings a means to match supply and demand appropriately, thanks to the algorithm in place. The conclusion of a contract between a series of undertakings and the platform/intermediary in which the use of the latter's algorithm is permitted (and paid for) could therefore be seen as an implicit mandate to apply algorithmic technologies in lieu of human interaction in order to determine the best sales strategy for a given product or service. If one accepts that point of view, one could argue that, by relying on algorithms, the governance structure of a platform is "composed" of instruments that safeguard the interests of those undertakings making use of the platform to sell their goods or services.<sup>77</sup> Relying upon the expansive *MasterCard* interpretation, the previous reasoning would imply that the composition criterion would also be met.

**3. Algorithm Use as a Decision by an Association of Undertakings.** The fact that a platform—or any other physical or online intermediary, for that matter—which uses artificial intelligence may qualify as an association of undertakings does not necessarily mean, however, that it automatically and always adopts decisions within the scope of Article 101. Since its early case law, the Court stated that a "decision" adopted by an association relates to any kind of activity engaged in by the association that is calculated to produce the results which it aims to suppress,<sup>78</sup> that is, any intentional measure taken on behalf of the association to ensure that the market behavior of its affiliated undertakings is streamlined. The mere adoption of a recommendation, the Court stated, can be sufficient if it applies to all members of the association or if all members feel constrained or bound by it.<sup>79</sup> In this sense, the notion of a decision differs from, and arguably augments, the "agreement" concept in the same Treaty provision. Even in cases where a direct concurrence of wills between two or more undertakings is absent, any activity nudging market behavior in a certain direction would be considered a decision if adopted by an association of undertakings. Against that background, a decision by a platform association to rely on certain algorithms, self-learning, or otherwise, in an attempt to balance supply and demand could be said to qualify as a decision by an association of undertakings. With the decision to rely on a particular algorithm, the platform association engages in a calculated measure aimed at influencing market behavior. In doing so, this behavior in principle falls within the scope of Article 101.<sup>80</sup>

It should be emphasized that this particular understanding of the use of machine learning algorithms is different from a more classical agreement concluded between an undertaking and an online or physical retailer, such as a department store, to sell one's products in accordance with a particular pricing strategy. In concluding a classical selling arrangement with a physical or online store, the undertaking agrees to allow an intermediary to resell its products, without having an interest in the technology used by that intermediary to tailor supply and demand. In that case, no decision by an association of undertakings would be in place.

At first sight, exactly the same transaction takes place when a platform relying on self-learning algorithms offers to sell a number of products to final customers. The claim being made here, however, is that the decision implicitly to consent—whether at the level of a physical retailer or that of an online platform—to the use of machine learning technology in order to streamline supply and demand and to compare different products, could be envisaged as a governance feature in its own right. Rather than facilitating or requiring direct coordination between businesses in order to determine such strategy, the undertakings concerned accept, through their individual agreements concluded with the platform, the

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77. From a more economic perspective, Michal Gal considered such elements indirectly to amount to the existence of an agreement, *see Gal (2019), supra note 1, 67, 116.*

78. Case C-71/74, *Frubo v. Commission*, EU:C:1975:61, para. 30.

79. Case C-45/85, *Verband der Sachversicherer e.V. v. Commission*, paras. 29–32. *See, for additional examples of decision varieties, RICHARD WHISH & DAVID BAILEY, COMPETITION LAW 111 (2012).*

80. One could indeed draw a parallel with the arguments made in this regard by Lee, *supra note 36. See also Calvano et al., supra note 1, confirming that such coordinated behavior falls within the scope of Article 101.*

(collective) use of algorithm-based technology. To the extent that this technology is used to align business behavior, its effect replaces the need for physical contact in the framework of a management board within the association of undertakings. Where different individual undertakings each accept to use the services of a platform/intermediary that has such technology in place, this in substance amounts to replacing the need for board meetings by technology. As a result, it is the technology that allows the interests of undertakings using the retailer/platform to be aligned in an easier way and to act as a governance feature aligning different undertakings' interests.<sup>81</sup>

While the EU Courts have not yet confirmed this interpretation in the context of algorithmic collusion, the extensive understanding of the mandate and composition criteria and of the decision notion that emerges from the *MasterCard* case open the door to such an approach. If that were indeed the case, then the acceptance of the application of algorithm-based technology by the different undertakings that each use a platform intermediary's services would fall within the notion of a decision of an association of undertakings. That does not mean, in itself, that all such uses of technology should be deemed anticompetitive. It merely implies that, in accordance with the mandate and composition criteria reflected in Article 101, any decisions taken by a platform/distributor with collective impact may face potential competition law scrutiny.

Although consistent with the existing case law, this may at first sight seem a remarkable conclusion. From a competition policy perspective, however, this should not only be perceived as a negative development. On the contrary, the expansive interpretation granted to the notion of association of undertakings may provide a helpful tool to create a culture of antitrust compliance within the digital economy. Explaining how this may arise is the final task of this article to which we now turn.

### *C. Associations of Undertakings as a Starting Point for a More Developed Compliance-Oriented Co-Regulation Framework*

It follows from the previous section that, although far-fetched, platforms that rely upon algorithms could in principle be considered as associations of undertakings having adopted a decision covered by Article 101. In practice, it would mean that the association concerned would be responsible for ensuring their compliance with that provision, even when it purchases and uses software developed by an external actor. As associations that choose to use such technology with its attendant antitrust risks, they make a decision that potentially could restrict competition while representing the interests of platform users. As such, Article 101 would be applicable. To the extent that Article 101 is applicable to such behavior, new possibilities emerge for antitrust enforcement against such entities, which may be required to take a more proactive stance to ensure competition law compliance (a.). The final section of this article outlines what steps are required to set up such a framework (b.).

*1. Co-Regulation as a Means to Oversee Platform Association's Algorithmic Decision-Making Powers.* As noted, the mere fact that a platform may choose to deploy algorithmic technology to provide intermediation services does not automatically mean that the use of such algorithms will be considered anticompetitive and thus contrary to Article 101. Instead, it simply gives the European Commission or national competition authorities a hook by which to secure jurisdiction in order to analyze the compatibility of those algorithms with underlying competition policy principles. Given this potential use of Article 101 going forward, it becomes important for both platforms and competition authorities effectively to have the tools at hand to ensure compliance. This requires, in particular, the ability to distinguish between acceptable and unacceptable instances of algorithmic collusion. In order to generate a more robust

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81. A similar argument was made by Michal Gal in relation to the generic notion of agreement, *see* Gal (2019), *supra* note 1, 67, 115–16.

compliance framework in future, this article proposes a co-regulation strategy in order to foster a competition culture among platforms that rely on algorithms. Moreover, the fact that those platforms must have in place competition-compliant algorithms may, in turn, push software developers to take such considerations into account when designing new technology. Co-regulation, it will be submitted, offers a relatively easy-to-implement way forward in this context.

In regulatory theory, co-regulation essentially refers to a regulatory framework that involves both private parties and governmental actors in the setting, implementation, or enforcement of regulatory standards.<sup>82</sup> It has been considered a valuable and effective regulatory approach, which aims at an increased compliance rate in terms of firm behavior.<sup>83</sup> In contrast with self-regulation, whereby private actors have been entrusted with overall responsibility to determine the content, applicability, and enforcement of different rules, co-regulation continues to accord a certain role to governmental actors, alongside regulated entities.

The threat of Article 101 enforcement, and the associated public fines and potential private damages claims, makes it particularly important to be able to draw a clear line between acceptable and unacceptable forms of algorithmic collusion. A constructive way forward in order to do so would consist in the establishment of a co-regulation framework. Under this framework, platforms would be responsible for setting up compliance schemes to ensure compatibility with Article 101. In doing so, they would be guided by clear red flags (unacceptable types of behavior) and green flags (acceptable algorithmic tasks) set out beforehand by the European Commission. The gray zone in between would be the subject of detailed protocols developed by the platforms, demonstrating awareness of and remedies in case of infringements of competition law. At least three key building blocks of such a co-regulation framework would need to be distinguished, two of which require Commission intervention and a third one that asks platforms to complement those initiatives.

First, the Commission could adopt a guidance document which more clearly restates and applies its red flag horizontal practices—namely, hard core cartels involving price-fixing, bid-rigging, market partitioning, or output restrictions<sup>84</sup>—in relation to algorithmic decision-making.<sup>85</sup> In the same way, the Commission can be asked to confirm that certain practices do not raise concerns from a competition law point of view.<sup>86</sup> If an algorithm permits or facilitates the exchange of commercially non-sensitive information,<sup>87</sup> for instance, this should be considered unproblematic. Setting out in a clear manner *ex ante*, both the hard core and nondangerous types of behavior will provide platforms with a clear (albeit nonexhaustive) list of “do’s” and “don’ts” in this context. As those prescriptions flow directly from the existing understanding of what constitutes a “restriction of competition” for the purposes of in Article 101, a particular guidance document focusing on that notion in the context of algorithms would be welcome.<sup>88</sup> Clearly elaborating upon the sorts of activities that algorithms cannot

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82. See, for the most basic definition, [http://ec.europa.eu/smart-regulation/better\\_regulation/documents/brochure/brochure\\_en.pdf](http://ec.europa.eu/smart-regulation/better_regulation/documents/brochure/brochure_en.pdf). See also CHRISTOPHER MARSDEN, INTERNET CO-REGULATION 46 (2011); and Michèle Finck, *Digital Co-regulation: Designing a Supranational Legal Framework for the Platform Economy*, 43 EUR. L. REV. 47 (2018).

83. For that perspective, Finck, *supra* note 82, 17. For a broader perspective, Ira Rubinstein, *Privacy and Regulatory Innovation: Moving beyond Voluntary Codes*, 6 I/S: J. L. POL’Y INFO. SOC. 357, 371 (2011).

84. See, by way of example, the existing Commission Staff Working Document Guidance on restrictions of competition “by object” for the purpose of defining which agreements may benefit from the *De Minimis Notice*, [http://ec.europa.eu/competition/antitrust/legislation/de\\_minimis\\_notice\\_annex.pdf](http://ec.europa.eu/competition/antitrust/legislation/de_minimis_notice_annex.pdf), p. 6.

85. A report on this subject matter has been filed in the context of a Commission conference on the challenges of digitalization. Prepared by Oxera economists, it may contain the basic features for later Commission documents. The study is available at [https://ec.europa.eu/competition/information/digitisation\\_2018/contributions/oxera/oxera\\_algorithmic\\_competition.pdf](https://ec.europa.eu/competition/information/digitisation_2018/contributions/oxera/oxera_algorithmic_competition.pdf).

86. By way of example, see EUROPEAN COMMISSION, *supra* note 17.

87. See, for that point outside the realm of algorithmic collusion, *Id.* paras. 75–76.

88. For Article 101 guidance communication that could serve as an inspiration, see *supra* note 14. See also PABLO IBAÑEZ COLOMO & ALFONSO LAMADRID DE PABLO, *The Notion of Restriction of Competition: Lessons and Prospects*, in THE NOTION OF

be programmed to engage in, or, in respect of self-learning technologies, imposing technological obligations to intervene and modify an algorithm or to remove part of its learning capacities for proscribed actions, would be a welcome step. So far, it seems indisputable that algorithmic price-fixing would be deemed unacceptable, yet open questions remain regarding other *prima facie* anticompetitive practices. Applying, in a prospective way, the Commission's well-known decision-making practice on hard core cartels to a series of hypotheses in the realm of algorithmic collusion could constitute the background framework against which platforms can design their individualized approach to competition compliance.

Second, even when anticompetitive behavior falls within one of the proscribed "red flag" categories, Article 101(3) theoretically still allows for its justification if and to the extent that the practice generates countervailing efficiencies. The Luxembourg Competition Authority, for example, has suggested that a pricing application for taxis could better tailor supply and demand and therefore did not infringe competition law.<sup>89</sup> Greater clarity regarding the potential application of the Article 101(3) exception rule in the context of algorithmic collusion is desirable.<sup>90</sup> Once again, formal guidance from the European Commission explaining how and when to invoke this kind of justification, and outlining its expectations when undertakings seek to do so, is necessary in order to allow platforms to act in a compliant manner.

Third, the notion of restriction of competition notion under Article 101(1), as well as the justification possibility under Article 101(3), contains many gray zones, whereby the claimed anticompetitive nature of behavior needs to be considered on a case-by-case basis and where the actual or potential effects of a putative restriction must be determined.<sup>91</sup> That assessment must be made, in the first place, by the undertakings involved in the potentially anticompetitive agreement<sup>92</sup> or, as in this case, the association of undertakings adopting the potentially anticompetitive decision. It can be submitted that each platform should therefore be required to have in place a protocol on how to avoid and address anticompetitive concerns related to the algorithms that they use. Having such a protocol does not require complete transparency about how the algorithm functions but rather provides a means of demonstrating that the undertaking or business concerned shows awareness of its status as an association of undertakings and has in place a framework to address competition law concerns. The abovementioned proposed guidance should outline the main features within which those protocols would be developed, yet platforms should remain free to design and develop those protocols in ways that best suit their individual *modus operandi*. While the Commission would maintain the final authority to investigate and oversee platforms, the existence of a detailed and well-developed protocol may help to convince the competition agency that appropriate safeguards are in place at the level of the undertaking.<sup>93</sup>

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RESTRICTION OF COMPETITION: REVISITING THE FOUNDATIONS OF ANTITRUST ENFORCEMENT IN EUROPE 333–74 (Damien Gerard et al., eds., 2017).

89. See, in that respect, Michele Gianino, "Webtaxi: The Luxembourg Competition Authority Exempts an Algorithmic Price-Fixing Arrangement on Efficiency Grounds," *Coreblog* (2018), available at <https://coreblog.lexxion.eu/webtaxi-the-luxembourg-competition-authority-exempts-an-algorithmic-price-fixing-arrangement-on-efficiency-grounds/>.

90. For a similar argument, see David Bailey, *Reinvigorating the role of Article 101(3) TFEU under Regulation 1/2003*, 111 ANTITRUST L. J. 111 (2016).

91. Case T-357/06, *Koninklijke Wegenbouw Stevin BV v. Commission*, EU:T:2012:488, paras. 122–28.

92. As confirmed by the General Court in Case T-111/08, *MasterCard, Inc. and Others v. Commission*, paras. 233–36.

93. One could draw an analogy with the Commission's approach toward stimulating businesses' compliance with the EU competition law rules. In a 2013 brochure entitled *Compliance matters* (<https://op.europa.eu/en/publication-detail/-/publication/78f46c48-e03e-4c36-bbbe-aa08c2514d7a/language-en>), the Commission outlines the importance of *ex ante* attention to ensuring no competition law violations take place. To do so, businesses are stimulated to have in place a compliance program. According to the Commission, "[i]n the interest of genuine compliance it is also important to disseminate the company's compliance strategy throughout its entire organizational structure. For the sake of internal clarity the strategy would preferably be laid down in writing, plainly worded and in all the working languages of the company, so that it is understood by everyone. It could for example take the form of a manual. Such internal guidance would ideally contain a general description of EU competition law and its purpose, explain the way it is enforced, and highlight the

In effect, acknowledging that platforms are associations of undertakings may force the entities concerned to take on a more regulatory role, by implementing protocols to address concerns of anticompetitive behavior and by self-assessing, in the light of Commission guidance, whether the market behavior triggered or facilitated by the algorithm is acceptable or otherwise.

**2. Practical Steps in Setting Up a Co-Regulation Framework.** To the extent that platforms are considered associations of undertakings, the European Commission would have significant tools at its disposal in order to force those platforms to respect Article 101.<sup>94</sup> This would present an opportunity for the European Commission to develop guidelines, according to which associations of undertakings would be considered less likely to violate the EU competition rules if they have certain protocols or codes of conduct in place. This is nothing new, as compliance considerations and past efforts are increasingly recognized as an important aspect of the overall enforcement framework.<sup>95</sup> Given the novel designation of online platforms as associations of undertakings, however, a more specific communication to this effect would be desirable, including explicit recognition of the co-regulation potential of platform intermediaries. Should the European Commission, or any other competition authority, decide to take action, three key elements should be included in such a strategy, namely, awareness, focus, and validation.

First, awareness needs to be raised about the likely future treatment of online platforms as an association of undertakings, bearing in mind that such platforms are generally also undertakings in their own right. Given that many platforms may think they are operating in a safe zone due to a lack of market dominance, it is important that their antitrust status is clarified. A formal Communication from the Commission indicating that platforms may constitute associations of undertakings would be a welcome first step, insofar as it would put such entities on notice of this status and the fact that the use of algorithmic processes may thus be considered as decisions that may restrict competition. It would be important to emphasize that not all such behavior is inherently problematic, but rather that platforms should be aware of the competition law risks that they impose on themselves by programming algorithms in a certain way. This kind of awareness should be the first step in nudging those platforms to adopt a compliance-oriented strategy, in order to convince authorities that competition problems are not an issue within their algorithms.

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potential costs of non-compliance for the company. In this way, employees will better understand the reason behind the compliance strategy and its importance” (p. 16). The Commission continues that “[i]f a company which has put a compliance program in place is nevertheless found to have committed an infringement of EU competition rules, the question of whether there is any positive impact on the level of fines frequently arises. The answer is: No. Compliance programs should not be perceived by companies as an abstract and formalistic tool for supporting the argument that any fine to be imposed should be reduced if the company is ‘caught’. The purpose of a compliance program should be to avoid an infringement in the first place” (p. 21). In the same way, the setting up of a compliance program at the platform level could contribute to serving that purpose of compliance. At the same time, that would not mean that no competition law infringements can be found or fines could be imposed.

94. We submit that doing so would legitimize the Commission’s multilayered regulatory role in this domain. See in that regard Julia Black, *Constructing and Contesting Legitimacy and Accountability in Polycentric Regulatory Regimes*, 2 REG. & GOV. 137 (2008).
95. See [http://ec.europa.eu/competition/antitrust/compliance/index\\_en.html](http://ec.europa.eu/competition/antitrust/compliance/index_en.html). See also Wouter P. J. Wils, *Antitrust Compliance Programmes and Optimal Antitrust Enforcement*, 1 J. ANTITRUST ENF. 52 (2013); Andreas Stephan, *Hear No Evil, See No Evil: Why Antitrust Compliance Programmes May Be Ineffective at Preventing Cartels* (2011), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1432340](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1432340); JOHANNES PAHA (eds.), *COMPETITION LAW COMPLIANCE PROGRAMMES: AN INTERDISCIPLINARY APPROACH* (2016); James S. Venit, *EU Competition Law-Enforcement and Compliance: An Overview*, 65 ANTITRUST L. J. 81 (1996); Christoph Knill & Andrea Lenschow, *Compliance, Competition and Communication: Different Approaches of European Governance and Their Impact on National Institutions*, 43 J. COMMON MKT. STUD. 583 (2005); and Nathalie Jalabert-Doury, *Compliance Matters—What Companies Can Do Better to Respect EU Competition Law*, 3 J. EUR. COMP. L. & PRAC. 260 (2012).

Second, raising awareness merely constitutes the first step in order for platforms *qua* associations of undertakings to be encouraged to take a more proactive stance on compliance.<sup>96</sup> Given the difficulties in penetrating the algorithmic black boxes that govern and structure how pricing and preferences decisions are made by platforms, platforms should then be encouraged or incentivized to take preventive measures to ensure that their algorithms do not enable or cause horizontal collusion.<sup>97</sup> To that end, it has been suggested that algorithmic outcomes ought to be validated by a programmer and a lawyer in order to ensure that they do not contribute to anticompetitive outcomes.<sup>98</sup> While that strategy has much to recommend it, care should be taken to ensure that such a process does not inhibit innovation or improved algorithm design. For instance, the Commission in its awareness Communication would ideally describe the procedural steps that a platform should have in place to persuade enforcement authorities that it takes the responsibilities and risks attached to its status as an association of undertakings seriously. The Commission might even go as far as to require the platform to draw up a code of conduct, including procedures to be followed when anticompetitive outcomes emerge from algorithm decisions.<sup>99</sup> As part of that procedure, the platform should be required to correct the anticompetitive outcome by inputting certain elements in the algorithmic reasoning. A reasonable time, to be determined in light of the specificities and complexity of the algorithm, should be allowed to do so. Given the very different algorithms utilized by platforms and the secrecy that typically underlies such proprietary technology, it may be necessary to allow the platform concerned to have some input in determining what is a reasonable time in the circumstances. It would not be unreasonable, moreover, to ask platforms to publicize their code of conduct and remedial procedures in order to demonstrate that they take the risks of anticompetitive behavior seriously.<sup>100</sup>

Third, the fact of having in place procedures that allow a platform to take action in case of anticompetitive risks aligns with the self-assessment exercise that is required of undertakings *and* association of undertakings under Regulation 1/2003.<sup>101</sup> Nevertheless, the presence of such a code of conduct aimed at preventing algorithmic collusion also serves as a proof of competition law awareness

96. As confirmed by the Commission's 2013 *Compliance matters* brochure, *supra* note 93.

97. For an analysis of the possibilities and limits should the EU want to take that argument further, *see* Van Cleynenbreugel, *supra* note 40 and the references in that chapter.

98. Giovanna Massarotto, *From Digital to Blockchain Markets: What Role for Antitrust and Regulation?* (2019), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3323420](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3323420).

99. That is all the more the case since the European Commission appears to call for more transparency from online platforms in relation to their professional users. To that extent, *see also* REGULATION 2019/1150 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 20 JUNE 2019 ON PROMOTING FAIRNESS AND TRANSPARENCY FOR BUSINESS USERS OF ONLINE INTERMEDIATION SERVICES [2019] O.J. L186/57. According to Recital 7 of that Regulation, a targeted set of mandatory rules should be established at Union level to ensure a fair, predictable, sustainable, and trusted online business environment within the internal market. In particular, business users of online intermediation services should be afforded appropriate transparency, as well as effective redress possibilities, throughout the Union in order to facilitate cross-border business within the Union and thereby improve the proper functioning of the internal market and to address possible emerging fragmentation in the specific areas covered by this Regulation. Transparency is the key value in that regard. It is not entirely impossible, therefore, that a similar transparency-focused competition law compliance framework could be set up.

100. In many other fields, most notably in financial market regulation, transparency has become the key principle to attract and ensure compliance with EU legal norms. *See*, for analyses of the scope of transparency requirements as regulatory tools in that field, Iris Y.-H. Chiu, *Transparency Regulation in Financial Markets—Moving into the Surveillance Age?*, 2 *EUR. J. RISK REG.* 305 (2011); NIAMH MOLONEY, *EU SECURITIES AND FINANCIAL MARKETS REGULATION* (2014); and NIAMH MOLONEY, *EU Financial Governance and the Trading Transparency Regulation: A Test for the Effectiveness of Post-Crisis Administrative Governance*, in *REGULATION OF THE EU FINANCIAL MARKETS: MiFID II AND MiFIR 315* (Danny Busch & Guido Ferrarini eds., 2017). Consumer protection law employs the same standard, *see* to that extent, the Commission's new proposals in the area of consumer law, [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_19\\_1755](https://ec.europa.eu/commission/presscorner/detail/en/IP_19_1755). For a more general perspective in this regard, *see* ANGELA DALY, *PRIVATE POWER, ONLINE INFORMATION FLOWS AND EU LAW: MIND THE GAP* (2018).

101. *See* Article 2 of COUNCIL REGULATION 1/2003 OF 16 DECEMBER 2002 ON THE IMPLEMENTATION OF THE RULES ON COMPETITION LAID DOWN IN ARTICLES 81 AND 82 OF THE TREATY (OJ L 1/1, 4.1.2003).



and should therefore signal a need for reduced attention from competition authorities. In that regard, it may be useful to have some form of validation or certification mechanism in place. To make a comparison with another field of law that has recently been upgraded in the light of digitalization, the new General Data Protection Regulation provides for a certification mechanism that can be awarded to data processors respecting the principles of data protection by design and by default.<sup>102</sup> An analogous certification scheme can be envisaged for online platforms that incorporate respect for the EU competition rules within the fabric of their technology in order to avoid algorithmic collusion. One could imagine either that the European Commission would provide such certification or that an independent private certification organization may accomplish the task. Given that the Commission abolished its notification and exemption system in 2004,<sup>103</sup> it may be reluctant to reintroduce it in this field, so entrusting a private actor would appear a more useful way forward. At its most ambitious, holding such a certificate might even function to establish a rebuttable presumption that the platform concerned does not adopt anticompetitive decisions captured by Article 101 and would thus create a presumption of compliance with the cartel prohibition.

The steps proposed here could, accordingly, be the basis for a compliance framework within which online platforms that use algorithmic tools may prove their willingness to avoid algorithmic collusion. Stimulating co-regulatory initiatives in order to draw a line between acceptable and nonacceptable behavior would, moreover, leave incentives of firms to innovate, and their ability to redevelop and refine such algorithms, largely intact. The question that remains is what form the development of such a scheme should take. A legislative instrument imposing those obligations on platforms is the strongest way forward. Yet a mere soft law instrument by the Commission, which outlines the parameters of the set of procedures necessary to create a presumption against enforcement under Article 101, would nonetheless be a step in the right direction. In the latter case, however, the fact that national competition authorities are not generally bound by soft law instruments may require additional steps to ensure that the same guarantees can be offered at Member State level in the presence of sufficient compliance-oriented procedures within the platform.

In principle, nothing would seem to impede the establishment of a generally applicable compliance framework, in an attempt to nudge all associations of undertakings into monitoring their behavior and to promote co-regulation aimed at avoiding anticompetitive behavior. At present, however, any compliance steps being taken at the EU level remain in their infancy. Placing such measures on a firmer footing, however, would help to ensure that responsibility of online platforms, in the guise of associations of undertakings, to ensure effective competition across their platforms is recognized explicitly.<sup>104</sup>

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102. Article 25 of REGULATION 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 27 APRIL 2016 ON THE PROTECTION OF NATURAL PERSONS WITH REGARD TO THE PROCESSING OF PERSONAL DATA AND ON THE FREE MOVEMENT OF SUCH DATA, AND REPEALING DIRECTIVE 95/46/EC (GENERAL DATA PROTECTION REGULATION) [2016] O.J. L119/1. See also the speech by Commissioner Vestager on Mar. 16, 2017, *supra* note 4, advocating compliance by design.

103. See on that change, Alexander Türk, *Modernisation of EC Antitrust Enforcement*, in EU ADMINISTRATIVE GOVERNANCE 215–43 (Herwig Hofmann & Alexander Türk eds., 2006); David Gerber & Paolo Cassinis, *The “Modernization” of European Community Competition Law: Achieving Consistency in Enforcement*, 27 EUR. COMP. L. REV. 10-18 and 51-57 (2006); Hans Gilliams, *Modernisation: From Policy to Practice*, 28 EUR. L. REV. 451 (2003); Koen Lenaerts & Damien Gerard, *Decentralisation of EC Competition Law Enforcement: Judges in the Frontline*, 27 WORLD COMP. 313 (2004); Katarina Pijetlovic, *Reform of EC Antitrust Enforcement: Criticism of the New System is Highly Exaggerated*, 25 EUR. COMP. L. REV. 356 (2004); Alan Riley, *EC Antitrust Modernisation: the Commission Does Very Nicely—Thank You! Part 1: Regulation 1 and the Notification Burden*, 24 EUR. COMP. L. REV. 604 (2003); Alan Riley, *EC Antitrust Modernisation: The Commission Does Very Nicely—Thank You! Part 2: Between the Idea and the Reality: Decentralisation Under Regulation 1*, 24 EUR. COMP. L. REV. 657 (2003); and James Venit, *Brave New World: The Modernization and Decentralization of Enforcement under Articles 81 and 82 of the EC Treaty*, 40 COMMON MKT. L. REV. 545 (2003).

104. That approach essentially resembles the proposals advanced by the Special Advisors to the European Commission in their 2019 report on COMPETITION POLICY FOR THE DIGITAL ERA, <https://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf>. In the Report, the experts consider platforms to act as regulators of their own ecosystems. As a result, the

Under Regulation 1/2003, those associations already bear such responsibilities, so nothing prevents the Commission from clarifying and developing their compliance obligations.

In practice, however, it is perhaps unlikely that a more general compliance initiative on a more general scale will be undertaken in the short term. Given that the proposed approach to algorithmic collusion relates to a very specific identified problem, which involves the need to ensure competition compliance in a new domain, the development of a more generally applicable compliance framework may not be considered a priority at this stage. That does not mean, however, that further reflection should not be devoted to tailoring a specific compliance system for algorithm-using digital platforms in their capacity as associations of undertakings. Viewed from this perspective, and despite many skeptical voices, arguably Article 101 *already* provides a means by which effectively to regulate unacceptable algorithmically induced collusion that may emerge in the years to come. It is thus hoped that the European Commission is willing to consider the provision and the possibilities that it offers to play a steering role in the necessary compliance framework.

#### IV. Conclusion

The development of (self-learning) algorithms has raised important questions about the extent to which the existing competition laws can address collusive behavior in that context. The larger background question is whether contemporary competition law provides a clear dividing line between acceptable and unacceptable forms of collusion, with various calls to modify the regulatory framework. The purpose of this article, however, was to question whether the *existing* legal rules could be mobilized to draw that dividing line more clearly. Confirming the limited use of notions such as agreement or concerted practice covered by Article 101 in the context of self-learning algorithms, this article nonetheless suggested that the notion of association of undertakings may play a more fruitful role. Working from the basis that the choice to rely upon algorithms could, in the current state of EU law, arguably be considered a decision by an association of undertakings, this article analyzed the implications for the development of a regulatory framework to facilitate greater competition compliance. In so doing, it called upon the Commission to seize the opportunity to develop a refined compliance-focused guidance program. That program, structured in a co-regulation spirit, would more effectively facilitate the regulation of algorithmic collusion *ex ante* and could play a pivotal role in informing future discussions of “acceptable” cartel behavior in the rapidly developing digital economy.

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Report proposes that, because of their function as regulators, dominant platforms have a responsibility to ensure that their rules do not impede free, undistorted, and vigorous competition without objective justification. A dominant platform that establishes a marketplace must ensure a level playing field within this marketplace and must not use its rule-setting power to determine the outcome of the competition (p. 11).