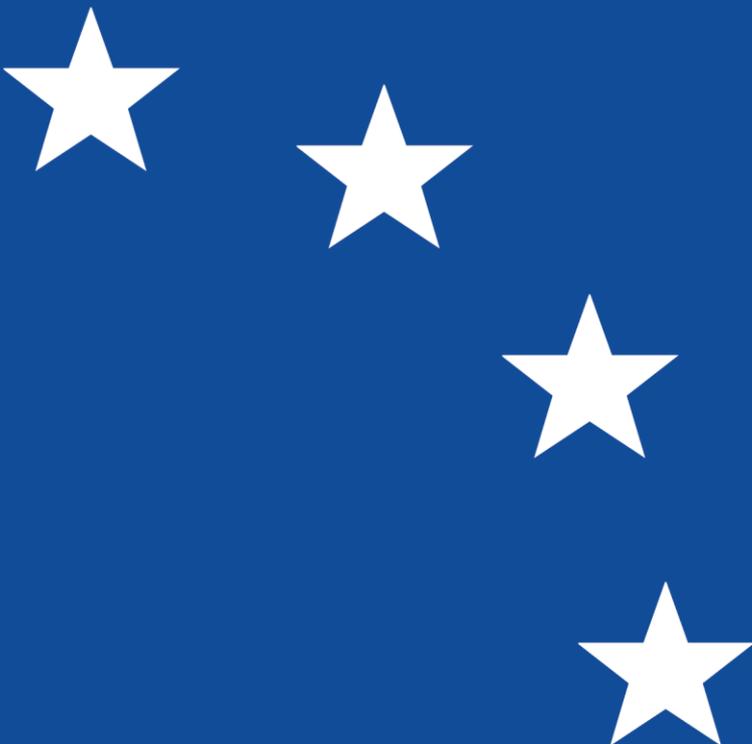# Algorithms: Teenage Troublemakers of EU Competition Law

A Closer Look at Algorithms as the New Price-Fixing Tool in EU Competition Law

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Executive Summary

With the evolution of technology, transparency and access to information have reached new heights previously unthought of by people. Through these, an environment is taking shape in which algorithms can thrive. This paper looks at algorithms being used as price-fixing instruments and how such behaviour can be qualified under EU Competition Law. Establishing different situations, three issues are covered. First, people's tendency to hide behind the decision-making power of their programs is examined, to establish that algorithms remain tools that are used by people with their own decision-making powers. Following this, the EU *Eturas* case is discussed, concerning platform collusion by a group of competitors, wherein the platform is supported by an algorithm. Here, issues such as the burden of proof in a digital environment as well as the presumption of innocence bring some changes in EU law to light. Finally, the continuing reluctance of EU bodies to qualify the phenomenon of tacit collusion as an infringement of EU law is discussed, showing that this reluctance has not always been the standard for approaching these situations. To deal with algorithms, changes will become necessary and they need to come from both sides in these disputes. Enforcement agencies will have to take a closer look at the tools available to them and consider whether provisions such as Article 101 and 102 TFEU, provisions which have barely changed since their first emergence on the competition law scene, will nevertheless be suitable and capable of tackling technology which has evolved more than this legislation. Algorithm developers and users will simultaneously have to ensure that their algorithms will comply by design. Algorithms have such great problem-solving capabilities that writing them to comply with legislation will be the next hurdle to overcome.

List of Abbreviations

CJEU	Court of Justice of the European Union
CML Rev	Common Market Law Review
ECLR	European Competiton Law Review
EU	European Union
JECL & Pract	Journal of European Competition Law & Practice
Minn L Rev	Minnesota Law Review
OECD	Organisation for Economic Co-operation and Development
SACL	Lithuanian Supreme Administrative Court
TFEU	Treaty on the Functioning of the European Union

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1. Introduction: Algorithms are Ancient

Algorithms are not a new invention. Rather, they have been around for thousands of years, with ancient algorithms named and attributed to Greek mathematicians such as the Sieve of Eratosthenes and Euclid's algorithm.[1] However, the use of algorithms is not limited to the field of mathematics. On the contrary, it can be used in as many ways as can be imagined.

> *Where there is a problem, there is an algorithm not far behind.[2]*

Algorithms can also be used for encrypting and decrypting messages, for providing search results on the Internet, for finding matches on dating sites and for plenty more.[3] It is therefore not unimaginable that algorithms can also be used to set prices for products being sold.

The most well-known anecdote on this issue is when two algorithms entered into what can only be described as a price war over a second-hand copy of *The Making of a Fly* being sold on Amazon. Two sellers were selling their copies, each using an algorithm to establish the price:

The first book's price at $x = 1.27059 * y$
The second book's price at $y = 0.9983 * x$ [4]

As a consequence, the algorithms interacted with each other. Every time one of them adjusted the price, the other followed suit. The end result? After 10 days of this bizarre game of table tennis, the price peaked at \$23,698,655.96. While extreme, this situation illustrates perfectly how algorithms left to their own devices can behave and let a simple pricing decision get completely out of hand. This example was an unfortunate, even amusing, coincidence, yet it poses an important question: what dangers can algorithms facilitate when they are left unchecked, or worse: used to actively distort competition in the market?

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[1] These are methods to search for prime numbers and to determine the greatest common divisor respectively.

[2] Professor of Mathematics Marcus du Sautoy at the University of Oxford in the BBC Documentary 'The Secret Rules of Modern Living: Algorithms', first aired in September 2015.

[3] For keeping track of the stock market; for matching students to prospective universities, etc. Salil Mehra, 'Antitrust and the Robo-Seller: Competition in the Time of Algorithms' [2016] *Minnesota Law Review* 100, p 1323–1375 (Mehra *Minn L Rev* 2016) p 1333.

[4] John Sutter 'Amazon Seller Lists Book at \$23,698,655.93 – Plus Shipping' CNN (April 25 2011) <http://edition.cnn.com/2011/TECH/web/04/25/amazon.price.algorithm/index.html > (last accessed 30-04-2018).

2. Encountering Algorithms Under EU Competition Law

This paper will focus on the use of algorithms as price-fixing tools, how these can lead to issues under EU competition law rules and how they can be dealt with. It is possible to distinguish between three different situations: implementing algorithms, in which the algorithm is used to implement an already made agreement between colluding parties; administrator algorithms, in which companies offer their products on the same platform regulated by an algorithm; and independent algorithms, where unrelated companies in the same market use an algorithm to determine their prices.[5] While competition authorities have found infringements in the first two situations,[6] the third leads to tacit collusion which for some years now has not been qualified as an infringement of Article 101 TFEU. Even where infringements have been found, the involvement of algorithms can lead to certain issues which will be discussed in the following chapter.

3. Algorithms in Action

3.1. The Implementing Algorithm: Liability of the Algorithm

We are not setting the price. The market is setting the price. We have algorithms to determine what that market is.[7]

One of the founders of Uber argued that the severe price increase one of their customers encountered for a fare one day was not because of decisions made by its employees, but by decisions made by an algorithm. This may lead to a worrying trend in the future: companies attempting to hide behind their algorithms to claim that they are not responsible for pricing decisions. While an algorithm used to implement an already existing anti-competitive agreement could qualify as an infringement of EU competition law provisions, where algorithms start making decisions without any human input whatsoever, this behaviour cannot

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[5] In their book *Virtual Competition: The promise and perils of the algorithm-driven economy* the authors Ezrachi and Stucke call these the Messenger scenario, the Hub and Spoke scenario, and the Predictable Agent scenario respectively. Ariel Ezrachi and Maurice Stucke, *Virtual Competition: The promise and perils of the algorithm-driven economy* (Harvard University Press 2016) (Ezrachi and Stucke 2016).

[6] The implementing algorithm infringing in the United States in *United States v David* Topkins (Plea Agreement) No CR 15-00201 WHO and the administrator algorithm in the European Union in Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42.

[7] Travis Kalanick, founder of Uber, in reaction to a severe price increase on what should have been a normal Uber fare, found in Jill Priluck 'When Bots Collude' *The New Yorker* (New York 25 April 2015) <https://www.newyorker.com/business/currency/when-bots-collude> (last accessed 24-04-2018).

be qualified as such.[8] How then to assign responsibility? According to Mehra, there are three possible ways where algorithms are involved: to the algorithm itself, to the humans employing it, or to no one.[9] However, the final option is in reality no option at all since it would leave the behaviour unchecked. Nor is it possible to punish an algorithm, since it cannot legally qualify as an undertaking under the *Höfner* criteria, necessary to infringe on Article 101 TFEU,[10] in addition to the fact that the deterring nature of fines and imprisonment would have no effect on an algorithm whatsoever, as it lacks all the human psychology to understand fear or the Prisoner's Dilemma in cartel cases.[11] The remaining option is that responsibility over the algorithm lies with the humans using it. Arguments such as 'the algorithm made me do it' should not be accepted as a valid excuse. Algorithms are, and will remain, tools and they will always work on behalf of someone else.[12] No matter how intelligent they become or how independently they can make decisions, the companies employing them as tools should be responsible for the consequences of that behaviour just as it would be for any other tools or methods used.[13]

3.2. The Administrator Algorithm: Ignorance of an Algorithm's Behaviour

The first EU case concerning algorithms was *Eturas*, concerning the E-Turas platform on which Lithuanian travel agencies sold their products.[14] The algorithm being applied capped all discounts offered at 3%, following a request to the participating travel agencies of their position on changing the discount percentages.[15] The main issue here was the burden of proof: only

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[8] Mandrescu Daniel, 'Applying EU Competition Law to online platforms: the road ahead – Part 1' [2017] *European Competition Law Review* 38(8) p 357 (Mandrescu *ECLR* 2017).

[9] Mehra *Minn L Rev* 2016 p 1366 [n3].

[10] Case C-41/90 *Höfner and Elser v Macroton GmbH* [1991] ECR I-1979 para 21. Also Craig & De Búrca 2011 p 961.

[11] As explained in Mehra *Minn LRev* 2016 p 1657 [n3]. The problem with which cartel members are confronted is the unenforceability of their agreements. It means they need to find ways to trust their co-conspirators to not defect from the agreement. If all parties involved work together and remain silent, they will collectively benefit from this behaviour. If parties were to defect for their own benefit, the collective advantages will disappear.

[12] Nicolas Petit, 'Antitrust and Artificial Intelligence: A Research Agenda.' [2017] *Journal of European Competition Law & Practice* 8(6) p 360 (Petit *JECL & Pract* 2017).

[13] OECD Roundtable Contribution by EU 'Algorithms and Collusion – Note from the European Union' DAF/COMP/WD(2017)12, para 28.

[14] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42.

[15] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42 para 8-10 and further.

those agencies who had knowledge of the algorithm's actions could be found to have infringed Article 101 TFEU. There needed to be some evidence on the basis of which it found that '*[the parties] tacitly assented to an anti-competitive action*,'[16] and without knowledge, there can be no infringement. The platform included its own messaging system through which the agencies were notified of pricing decisions, but following the reasoning of the Court of Justice the mere receiving of such a message does not constitute knowledge of the actions. The Court then lists a number of ways in which the agencies involved could argue for distance between themselves and the actions undertaken.[17]

The principle of public distancing is one which arises in cartel cases and can be used by a company to rebut what has become known as the *Anic* presumption.[18] Companies involved in an anti-competitive meeting cannot wilfully ignore knowledge obtained at such a meeting and it is presumed that their subsequent conduct on the market is influenced by this knowledge. Once something is known, it cannot be unknown.

While it follows from competition law that the burden of proof lies with the enforcement agency arguing that there has been an infringement, the presumption of innocence precludes the competition authorities from basing their arguments solely on such circumstantial evidence, such as receiving messages.[19] Nevertheless, supported by additional evidence, this is allowed to serve as a basis for the presumption of knowledge of the anti-competitive conduct by the undertakings.[20] The only way to escape this presumption is by rebutting it.[21] This can be done

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[16] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42 para 45.

[17] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42 paras 34, 41 and 46-47.

[18] Marc Abenhaïm, 'Public Distancing and Liability in Cartel Cases Does Distance lend Enchantment' [2016] *World Competition* 39(3) p 415-417 (Abenhaïm *World Competition*2016) 'For one thing, subject to proof to the contrary, which it is for the economic operators concerned to adduce, there must be a presumption that *the undertakings participating in concerting arrangements and remaining active on the market take account of the information exchanged with their competitors when determining their conduct on that market*, particularly when they concert together on a regular basis over a long period, as was the case here, according to the findings of the Court of First Instance.' In Case C-49/92 P *Commission v Anic Partciapazioni* [1992] ECR I-4162 para 121 (emphasis added).

[19] Ioannis Apostolakis, 'Antitrust liability in cases of indirect contacts between competitors: VM Remonts' [2017] *Common Market Law Review* 54(2) p 621 (Apostolakis *CMLR* 2017).

[20] Emiliano Marchisio, 'CJEU: anti-competitive agreements – Article 101 TFEU' [2016] *European Competition Law Review* 37(5) N61-65 (Marchisio *ECLR* 2016).

[21] The conflict between the *Anic* presumption and the presumption of innocence is an interesting issue but not the main topic of this thesis. See the articles by Abenhaïm *World Competition* 2016 and Apostolakis *CML Rev* 2017 for more on this issue.

in different ways: among others if a company would show that they had no anti-competitive intentions in attending a meeting *and* that this different mindset had been made clear to the other participants.[22] There are, however, issues in simply getting courts to accept the rebuttal of the *Anic* Presumption.[23] With the *Eturas* case, things may be changing. Not only can the public distancing requirement be applied in a digital environment, it means that it can be applied in a situation where there was no anti-competitive meeting at all.[24] This would make it very fitting in the algorithm-based environment, if not for the difficulty of having it accepted. However, in the *Eturas* case, it appears that the Court stepped away from the more subjective aspect of the requirement: as it is not possible for parties involved to know who its co-conspirators are in a platform collusion, it is impossible to ask of a company to have made it sufficiently clear to the 'other participants' that is has no anti-competitive intentions.[25] This makes the public distancing requirement rather more objective. The Court lists a number of ways in which distancing can nevertheless be achieved in these circumstances: by submitting a clear and express objection to the platform administrator; by repeatedly attempting to offer a discount exceeding the capped amount of 3%; by proving that the message was not received; or by showing that the party involved only became aware of the content of the message after some time had passed.[26] While an express objection to the platform administrator will clearly reach the intended goal, one may doubt the effectiveness of the second option. After all, it concerns a unilateral act which has, under these circumstances, no consequences whatsoever and appears to stem from an *a contrario* reasoning. The assumption appears to be that a company aware of the capped discounts, would lower its offered discounts to fit this cap while an unaware company would not. This assumption does not take into account that, especially after having been made aware of it by this ruling, this method can also be used by those companies who *are* aware of the cap to escape liability which could then still reap the benefits of the anti-competitive behaviour without having to fear consequences, since they can argue for

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[22] For example in Case T-303/02 *Westfalen Gassen Nederland BV v Commission* (T-303/02) [2006] ECR II-4574 para 76, see also Alison Jones and Brenda Sufrin, *EU Competition Law Text, Cases and Materials* (6th edition, Oxford University Press 2016) p 145 and case law mentioned there and Abenhaïm *World Competition* 2016, p 417 and case law mentioned there.

[23] Abenhaïm *World Competition* 2016 p 414 [n 17] and Annex. According to Abenhaïm, as of May 2016 the public distancing requirement has yet to be accepted as a valid defence in a case.

[24] Abenhaïm *World Competition* 2016 p 421 [n17].

[25] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42 para 45.

[26] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42 para 41 and 48-49. See also Marchisio *ECLR* 2016.

the rebuttal of the presumption of participation.[27] However, there remains another way in which companies could apply larger discounts, with consequences which would have an actual effect. In the *Eturas* case, the travel agencies would have been required to take additional, technical steps to actually circumvent the cap and subsequently to offer a higher discount.[28] That way, it would be possible for companies to rebut the presumption of their participation in the concerted practices since, with the extra effort made, they were successful in applying a discount exceeding the cap.

The question remaining is the manner in which the Lithuanian Supreme Administrative Court ('SACL') assessed the systematic application of a discount exceeding the cap.[29] Some travel agencies offered additional discounts through loyalty rebates, which the SACL considered to be insufficient to rebut the presumption since it required consumers to take additional steps to obtain the discount.[30] The additional effort made to be able to rebut the presumption, either by express opposition or by applying a higher discount, should be made by the companies, not consumers.

3.3.   The Independent Algorithm: Prohibition of Tacit Collusion

Finally, the increasing use of algorithms may lead to an increase in occurrence of what is called 'tacit collusion.' This is a situation in which competitors do not explicitly collude with each other, but engage in such behaviour that the result is as if they had colluded. Economically, the result is the same, but legally they can be qualified differently.[31]

Already, it is becoming more and more the norm for companies to track their competitors' prices online by the use of algorithms.[32] With information being more and more easily available, it has become incredibly easy to track those prices and, when changes are

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[27] This of course in the absence of any other evidence that could prove awareness on the infringing companies part.

[28] Case C-74/14 *Eturas and other v Lietuvos Respublikos konkurencijos taryba* [2016] OJ C 98/3 ECLI:EU:C:2016:42 para 12.

[29] *UAB "Eturas" and others v Competition Council*, Judgment of 2 May 2016 of the Supreme Administrative Court of Lithuania, case No A-97-858/2016.

[30] *UAB "Eturas" and others v Competition Council*, Judgment of 2 May 2016 of the Supreme Administrative Court of Lithuania, case No A-97-858/2016, para 379.

[31] Report 'The Economics of Tacit Collusion' 2003 p 4.

[32] 53% of the respondents has admitted to tracking their competitors' prices online. 67% of these uses algorithms to do so. Commission Staff Working Document accompanying the Final Report on the E-commerce Sector Inquiry SWD(2017) 154 final para 149.

made, to immediately adjust your own prices accordingly, faster than any human could ever have done.[33] The damaging influence tacit collusion could have on a market is that it becomes less attractive for competitors to lower their prices and engage in price wars. In order for such decisions to attract customers, time is needed. Algorithms, by making decisions in less than a second, essentially take away this element, leading to prices being kept high artificially and resulting in distorted market conditions.[34]

While this situation is yet to arise, action may become necessary as algorithms will be used more and more in the future. At this moment, tacit collusion falls outside of the scope of Article 101 TFEU. It does not qualify as an 'agreement' since there is no concurrence of wills between the parties.[35] In other cases,[36] arguments were raised to qualify tacit collusion as 'concerted practices', but these were eventually quashed by the oligopoly defence.[37] Parallel pricing behaviour on itself was not enough to conclude collusion and, in an oligopoly, was deemed to be the result of rational behaviour in this very specific setting. However, arguments can be made that rationality should not be a valid defence for any type of behaviour.[38]

Failing Article 101 TFEU, attempts were made to categorise this under Article 102 TFEU. The provision contains the following wording:

[…] any abuse <u>by one or more</u> undertakings of a dominant position […].[39]

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[33] To illustrate this, the example of a number of gas stations located close to each other is used. See Ezrachi and Stucke 2016 in Chapter 7 of their book, but also mentioned by the Acting Chairman of the US Federal Trade Commission Maureen Ohlhausen in Speech by Maureen Ohlhausen 'Should We Fear The Things That Go Beep In The Night? Some Initial Thoughts on The Intersection of Antitrust Law and Algorithmic Pricing' (Concurrences Antitrust in the Financial Sector Conference, New York, 23 May 2017) <https://www.ftc.gov/system/files/documents/public_statements/1220893/ohlhausen_-_concurrences_5-23-17.pdf> (last accessed 24-04-2018). It is based on *William White et al v RM Packer Co Inc et al*, No 10-1130 (1st Circuit, 2011).

[34] Ezrachi and Stucke 2016 p 62-64.

[35] As required under Case T-41/96 *Bayer AG v Commission* [1996] ECR II-3378 para 67 and 176.

[36] Nicolas Petit, 'The Oligopoly Problem in EU Competition Law', p 1-80, also published in *Research Handbook in EU Competition Law*, Ioannis Liannos and Damien Geradin (eds) (Edward Elgar Publishing 2013) p 27 (Petit 2013). The first case of relevance here is Case C-54/69 *SA Française des Matières Colorantes (Francolor) v Commission* Judgment of 14 July 1972 [1972] ECR 851, which, while the Commission in the end did find evidence of meetings between the undertakings, also included parallel pricing as evidence used by the Commission.

[37] The logic for this defence can be found in Case C-48/69 *ICI v Commission* Judgment of 14 July 1972 [1972] ECR 619 p 655 para 66.

[38] Petit calls this argumentation 'nonsensical' in Petit 2013 p 19. The simple reasons that it is the rational and logical decision to break the law, should not be allowed to be an acceptable defence. Would it not similarly be a logical business decision for competitors to form a cartel and reap the fruits of their behaviour, which we now consider an infringement of Article 101 TFEU?

[39] Article 102 TFEU on the Abuse of a Dominant Position (Emphasis added).

Approaching this group behaviour from Article 102 TFEU would not be novel. The Commission has shown its interest for this in the past and the Court has even ruled that it was possible for independent companies to have together, in the relevant market, a dominant position which they could abuse.[40] This conclusion also required some economic link or interdependence between the participants. However, the Commission has since lost its interest in such an approach, meaning that there is, as of yet, no conclusion for such an approach. It is, however, not unthinkable for the Commission to take the baton up once again when algorithms become more and more influential.

4. Conclusion: What Comes Next?

Algorithms are on the rise, much in the same way as all technology has been for the last few decades. In the area of competition law, they might soon start making real trouble. First of all, it should nevertheless be remembered that not every use of algorithms will automatically lead to an infringement of competition law rules. It remains the anti-competitive nature of the behaviour, not the tool, which is decisive. Simultaneously, the different ways in which algorithms can be used in a competition law frame should be kept in mind, such as the scenarios discussed in the previous chapters and the possible ways of dealing with them.

Already, EU and US competition bodies have shown their interest in this future; all of whom search for a solution.[41] In addition to the qualification problems discussed in this paper, agencies will be confronted with issues in discovery and enforcement. Before it is possible to tackle algorithms legally, their use needs to be discovered, which may prove difficult.

However, scenarios might occur more often in the future and would need attention to prevent them from severely contorting market conditions. Additionally, the future may make

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[40] Case T-68/89 *Società Italiana Vetro SpA, Fabbrica Pisana SpA and PPG Vernante Pennitalia SpA v Commission* (Joined Cases 68, 77-79/89) [1992] ECR II-1405 p II-1547 para 357 and further.

[41] Speech by Margrethe Verstager 'Algorithm and Competition' (Bundeskartellamt 18th Conference on Competition, Berlin, 16 March 2017) <https://ec.europa.eu/commission/commissioners/2014-2019/vestager/announcements/bundeskartellamt-18th-conference-competition-berlin-16-march-2017_en> (last accessed 24-04-2018), Speech by Maureen Ohlhausen 'Should We Fear The Things That Go Beep In The Night? Some Initial Thoughts on The Intersection of Antitrust Law and Algorithmic Pricing' [n32] and Speech by Terrell McSweeny 'Algorithms and Coordinated Effects' (Remarks at University of Oxford Center for Competition Law and Policy , Oxford, 22 May 2017) <https://www.ftc.gov/system/files/documents/public_statements/1220673/mcsweeny_-_oxford_cclp_remarks_-_algorithms_and_coordinated_effects_5-22-17.pdf> (last accessed 24-04-2018).

room for a fourth scenario: where algorithms evolve into artificial intelligence.[42] Tacit collusion may start occurring in scenarios previously unthought of, and algorithms may start processing big data, analysing vast and complex situations and learning from those instances. One day, algorithms may become so advanced that they can influence markets in such a way that humans are not even aware of it anymore.[43]

Tackling this issue would benefit from a two-pronged approach: the EU legislation would need an update to deal with this situation, whilst algorithm developers would have to engage in 'compliance by design.'[44] If algorithms are there to tackle any problem, this is just the next challenge for them. In the words of the EU Commissioner on competition law: 'I think some of these algorithms, they all have to go to law school before they are let out.'[45] Now would be the right time to educate these teenagers before they grow into adults with bad habits.

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[42] Also called the Digital Eye scenario by Ezrachi and Stucke in Ezrachi and Stucke 2016 Chapter 8.

[43] Ezrachi and Stucke 2016 chapter 8 p 74-79.

[44] As discussed in Speech by Margrethe Verstager 'Algorithm and Competition' [n40].

[45] Podcast with Margrethe Verstager 'Recode Decode' (December 2017) transcript and recording available at <https://www.recode.net/2017/12/9/16752750/european-union-eu-competition-commissioner-margrethe-vestager-recode-decode-lisbon-web-summit> (last accessed 24-04-2018).

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