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Artificial intelligence and competition law

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INSTITUT de droit de la concurrence

+ On-Topic

Artificial intelligence and competition law

ABSTRACTS

This special issue offers the antitrust community the opportunity to reflect on how AI is de facto affecting all markets—thus competition law. It shows what competition law can learn from AI and viceversa. The issues discussed in these articles include the adoption of algorithms and computational tools in the antitrust domain, the challenges of detecting anticompetitive behavior performed by AI algorithms (e.g. reinforcement learning algorithms), and competition law and the IoT. The authors are scholars, antitrust enforcers, and practitioners who provide us with three different perspectives on the matter of AI and competition law.

Ce dossier offre à la communauté antitrust l'occasion de réfléchir à la manière dont l'AI affecte de facto tous les marchés - et donc le droit de la concurrence. Il montre ce que le droit de la concurrence peut apprendre de l'IA et vice versa. Les questions abordées dans ces articles comprennent l'adoption d'algorithmes et d'outils informatiques dans le domaine de la concurrence, les défis de la détection des comportements anticoncurrentiels réalisés par des algorithmes d'IA (par exemple, les algorithmes d'apprentissage par renforcement), et le droit de la concurrence et l'IoT. Les auteurs sont des universitaires, des responsables de l'application des lois antitrust et des praticiens qui nous offrent trois perspectives différentes sur la question de l'IA et du droit de la concurrence.

Why AI and competition law matter?

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Algorithms: helping competition authorities be cognisant of the harms, build their capabilities and act

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A computational analysis of the DMA and DSA

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How algorithms work and play together

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Artificial intelligence: algorithms and competition

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Antitrust and the Internet of Things: Addressing the market tipping fallacy

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Artificial intelligence and competition law

Why AI and competition law matter?

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1. Most of our activities rely on a computer. A smartphone is a phone with a computer inside; most of our financial activities can be performed without going to a bank thanks to a computer (e.g., an ATM). These "smart devices" are everywhere and connected through the Internet—Internet of Things (IoT).[1] But computers (rather the hardware) are not smart in themselves. A computer is as a paperweight, Professor Noam Chomsky observed—it does nothing.[2] It is the software/computer program that tells the computer what to do and how to perform a specific task by means of algorithms.

2. Algorithms have become increasingly sophisticated. They can not only instruct a computer how to perform a task but also learn from large amount of data:

– how to perform a specific task (supervised machine learning);

– to operate on its own (unsupervised machine learning);

– which actions to take in a specific environment to maximize a cumulative reward (reinforcement learning).

3. Supervised, unsupervised and reinforcement learning are the three main machine learning (ML) approaches, which computers can adopt to learn from experience (past data) and these approaches are also referred to as "weak AI." Different from artificial general intelligence (AGI) or "strong AI" machines, which are able to perform a plethora of different tasks, "weak AI" systems perform very narrow, domain-specific tasks very well, such as recognizing images or playing a game (e.g., chess or Go). These AI systems are becoming increasingly good at performing a variety of narrow tasks given the large amount of data that is now available thanks to increasingly high-speed connectivity. Therefore, today AI represents an integral part of most businesses and situations.[3]

4. On the other hand, AI is posing new challenges for antitrust agencies and lawmakers. In the context of antitrust, the primary question is how antitrust enforcers can tackle AI algorithms that could learn very well how to engage in anticompetitive conduct (e.g., algorithmic collusion or self-preferencing).[4] Again, these AI techniques rely on data, a resource that today is mainly controlled by digital platforms—also called Big Tech or gatekeepers—raising other critical antitrust issues linked to the Internet and data centralization.[5]

1 *See* A. Portuese, Antitrust and the Internet of Things: Addressing the market tipping fallacy.

2 N. Chomsky, Can Machines Think? YouTube (Feb. 17, 2017) https://www.youtube.com/watch?v=Ex9GbzX6tMo.

3 *See* K. Brand, S. Hunt & H. Quinn, Algorithms: Helping competition authorities be cognisant of the harms, build their capabilities and act. "*The use of algorithms brings significant benefits to consumers (e.g., personalised recommendations); enables markets that could not have existed otherwise (e.g., search); and drives efficiency and effectiveness for businesses.*" Ibid.

4 Ibid. *See also*, M. Siragusa, AI anthology: Legal, economic and social aspects.

5 Portuese, *supra* note 1; F. Di Porto, T. Grote, R. Invernizzi & G. Volpi, A computational analysis of the DMA and DSA. "*While the details of legislative proposals might differ, their goals are very similar: to tackle big tech firms.*"

5. This special issue offers the antitrust community the opportunity to reflect on how AI is de facto affecting all markets—thus competition law. It shows what competition law can learn from AI and vice versa. The issues discussed in these articles include the adoption of algorithms and computational tools in the antitrust domain, the challenges of detecting anticompetitive behavior performed by AI algorithms (e.g., reinforcement learning algorithms), and competition law and the IoT. The authors are scholars, antitrust enforcers, and practitioners who provide us with three different perspectives on the matter of AI and competition law.

6. From the UK Competition and Markets Authority (CMA), we have Dr. Stefan Hunt, Chief Data and Technology Insights Officer; Kate Brand, Director of Data Science; and Helena Quinn, Senior Data and Technology Insight Adviser. They are all part of the Data, Technology and Analytics (DaTA) unit at CMA. DaTA, which is described in their article, shows the necessity to integrate data experts/technologists into the antitrust analysis of today's fast-moving technological markets and the adoption of ML techniques in the antitrust domain. A first proof of concept of AI system for assisting antitrust agencies in enforcing antitrust principles by means of ML was developed and described in Gleaning Insight from Antitrust Cases Using Machine Learning, *Stanford Computational Antitrust* (2021) by Ashwin Ittoo and me. We ran our AI system using data related to FTC no-merger proceedings and adopted unsupervised learning techniques, because we thought it would be more interesting to see what the algorithm could learn on its own rather than asking an algorithm to learn a specific task (supervised learning). I am an antitrust scholar, while Prof. Ashwin Ittoo has a computer science background: the combination of our skill sets was critical in the development of our AI antitrust system.

7. The idea to construct an ML algorithm to assist antitrust agencies in enforcing antitrust principles in fast-moving markets stemmed from my book *Antitrust Settlements: How a Simple Agreement Can Drive the Economy* (Wolters Kluwer, 2019). After performing a multi-regression analysis to predict Google's break-up and collecting data related to a large number of antitrust proceedings, I envisaged the adoption of AI techniques to exploit such data and perform more sophisticated predictions. Multi-regression is a supervised learning method for prediction; regression analysis in general is a primary tool in the context of empirical research.[6] At least in the U.S., "*the greater judicial willingness to evaluate evidence about the economic effects of mergers and the effect of alleged anticompetitive practices*," enables empirical methods to be widely used in the antitrust domain.[7] Empirical research can greatly benefit from the adoption of AI techniques (e.g., supervised and unsupervised ML algorithms); thus, AI systems will become increasingly important in the field of antitrust.

8. ML techniques are interesting because they represent cutting-edge technologies while relying on past data. They are not intelligent by themselves, and their results largely depend on the quality of data and the relevance of the adopted variables. This is why combining data analysts/technologists with antitrust lawyers and economists like at the CMA seems to be the right way forward.

9. In their article, Prof. Fabiana Di Porto, Tatjana Grote, Gabriele Volpi and Riccardo Invernizzi emphasize the potential of computational tools, which include AI algorithms, in the field of antitrust. They performed a computational analysis by using natural language processing (NLP) algorithms to explore the consensus among all stakeholders about the meaning and use of relevant concepts and terms present in the Digital Services Act (DSA) and Digital Markets Act (DMA). NLP techniques aim to assist computers in understanding language as people do, and can be used to read and analyze documents much faster than humans by detecting recurring patterns.[8] In other words, the authors adopted NLP to read and understand the semantic content of DMA and DSA noticing that there are "*significant differences in understanding for many central terms of the DSA and DMA*,"[9] which can lead to different implementations of the related provisions.

10. In summary, computational tools can be very useful in the context of antitrust, especially "*when it comes to proposals as complex as the DMA and DSA*,"[10] where a common understanding of relevant terms appears to be critical.

11. On the other hand, like any tool, AI algorithms have the capacity to harm if misused. Yet, in the context of antitrust, one of the main concerns is related to the use of these algorithms to engage in anticompetitive conduct. This issue is well captured in the article of Prof. Thomas Fetzer, Prof. Heiko Paulheim, Damaris Kosack and Michael Schlechtinger, who engaged in an interesting study concerning price decisions made by algorithms with a focus on reinforcement learning algorithms. They built a simplified algorithm environment by using "*a modified version of a prisoner's dilemma*" in which "*three agents play the game of rock-paper-scissors*."[11] The authors observed that in multiple game rounds the three agents eventually achieved "*a stable state of the highest possible long-term* [maximum] *reward rate*."[12] But it is unclear if this result stems from an independent or joint behavior—tacit or explicit collusion—and the adoption of these algorithms should be prohibited or limited in the light of competition law provisions. In other words, the application of competition law provisions in the context of AI algorithms is far from being straightforward, and the authors urge legislators and antitrust enforcers for clarity.

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6 W. H. Greene, *Econometric Analysis* 7 (5th ed., Prentice Hall, 2003).

7 J. B. Baker & D. L. Rubinfeld, Empirical Methods in Antitrust Litigation: Review and Critique, 2 *American L. & Econ. Rev*. 386, 387 (1999).

8 Di Porto, Grote, Invernizzi & Volpi, *supra* note 5.

9 Ibid.

10 Ibid.

11 T. Fetzer, D. Kosack, H. Paulheim & M. Schlechtinger, How algorithms work and play together.

12 Ibid.

12. This issue is also raised by Mario Siragusa,[13] who questions in his article the effectiveness of competition law in dealing with the increase in the adoption of AI tools, which pose new challenges for antitrust enforcers. Siragusa observes that the introduction of new antitrust tools or the rethinking of fundamental competition law concepts needs to consider how in the past competition law principles have been applied and adapted in different situations. In other words, can competition law be successfully adapted in the context of AI?

13. Since algorithms are increasingly present in any business situations, the IoT is accelerating the use of algorithms and the exploitation of data, along with the need for antitrust agencies to understand how to enforce antitrust principles in data-driven markets. Aurelien Portuese, in his article,[14] offers another point by considering the current fear that IoT could have contributed to creating the so-called "gatekeepers" or Big Tech corporations. As outlined above, AI algorithms run on large amount of data collected thanks to the Internet, which today appears to be centralized by large online platforms (known as gatekeepers). The European Commission launched a specific sector inquiry on the IoT warning that "gatekeepers" could emerge in this sector by reinforcing their market power. With that in mind, Portuese invites antitrust agencies to "*refrain from engaging in precautionary interventions (in Europe) or resorting to incipiency doctrine (in the U.S.)*"[15] to preserve companies' incentives to innovate.

14. In summary, AI is everywhere, from voice assistants to self-driving cars. How to enforce antitrust principles in the context of AI and data-driven markets is particularly challenging and requires adaptation and creative thinking, which competition law has demonstrated possible in the past. The use of computational tools, such as machine learning or NLP techniques, might be the result of these creative processes, which would require a DaTA unit in any antitrust agency—not only at the CMA. The integration of data analysts and computer scientists with antitrust lawyers and economists seems to be an appropriate and necessary way forward.

15. We are using "weak AI," which focuses on the exploitation of large amount of data rather than on the interpretability and explicability of results. As the articles at hand reveal, we understand very little about the results of computational tools, such as reinforcement learning and NLP, also in the field of antitrust. The pages you are about to read offer some thought-provoking information. Exploring the concepts presented and deepening your understanding of this important shift underway would help you remain competitive and capable of enhancing the discussion as well. ■

13 Siragusa, *supra* note 4.

14 Portuese, *supra* note 1.

15 Ibid.

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