

Unclassified

English - Or. French

6 June 2023

**DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS  
COMPETITION COMMITTEE**

**Algorithmic competition – Note by France**

14 June 2023

This document reproduces a written contribution from France submitted for Item 5 of the 140th OECD Competition Committee meeting on 14-16 June 2023.

More documents related to this discussion can be found at  
<https://www.oecd.org/competition/algorithmic-competition.htm>

Antonio CAPOBIANCO  
Antonio.Capobianco@oecd.org, +(33-1) 45 24 98 08

**JT03520862**

## *France*

### Introduction

1. Algorithms are among the most important technological levers in the current digitisation process, enabling companies to be more innovative and efficient.
2. A debate has emerged in recent years about whether and to what extent algorithms could also have adverse effects on the competitive functioning of the markets.
3. In this context, the *Autorité de la concurrence* (hereinafter the "*Autorité*") will start by referring to the joint study conducted in 2019 with the Bundeskartellamt on algorithms and their challenges for the application of competition law (1). It will then look at the new conversational language models and the competitive risks they may raise (2). Lastly, it will examine the possible contributions of algorithms for competition authorities (3).

### 1. The joint study conducted by the *Autorité de la concurrence* and the Bundeskartellamt in 2019

4. As a reminder, in 2019, the *Autorité de la concurrence* and the Bundeskartellamt investigated the potential competitive risks that may be associated with algorithms. They conducted an in-depth study of the concept of algorithms and the different types and areas of application.
5. In their joint study<sup>1</sup>, the two authorities focused on pricing algorithms and the risks of collusion, but also considered the interdependencies that may exist between algorithms and the market power of the companies that use them, as well as the practical difficulties encountered when investigating algorithms.
6. In particular, the study analysed three different scenarios depending on whether the algorithms are used to support or facilitate "classic" anticompetitive practices, whether the collusion is based on an algorithm between competitors involving a third party, or caused by the parallel use of individual algorithms.
7. While algorithmic agreements are among the first risks identified, algorithms can also be the support or vector for potential abuses of a dominant position and the new generations of algorithms in artificial intelligence raise some questions on this subject.

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<sup>1</sup> [https://www.autoritedelaconcurrence.fr/sites/default/files/Algorithms-and-competition\\_FR.pdf](https://www.autoritedelaconcurrence.fr/sites/default/files/Algorithms-and-competition_FR.pdf) (French version) [https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Berichte/Algorithms\\_and\\_Compensation\\_Working-Paper.pdf?\\_\\_blob=publicationFile&v=5](https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Berichte/Algorithms_and_Compensation_Working-Paper.pdf?__blob=publicationFile&v=5) or [https://www.autoritedelaconcurrence.fr/sites/default/files/Algorithms\\_and\\_Compensation\\_Working-Paper.pdf](https://www.autoritedelaconcurrence.fr/sites/default/files/Algorithms_and_Compensation_Working-Paper.pdf) (English version)

## 2. Conversational language models

### 2.1. Presentation

8. Since ChatGPT was made available to the public in November 2022, conversational Large Language Models (*LLMs*) have become very prominent in public debate and space. Any Internet user can now have a "realistic" conversation with these conversational agents, and obtain answers to all their questions.

9. In addition to OpenAI (creator of ChatGPT, and GPT 3, 3.5 and 4), many players have developed their own LLM technologies, such as Google (LaMDA, Bard) and Meta (BlenderBot3, LLaMA).

10. The promise of these models is leading some stakeholders to be more circumspect and call for these technologies to be regulated<sup>2</sup>, while others want them banned such as the Italian data protection agency which decided to block ChatGPT in Italy<sup>3</sup>.

11. Language models such as ChatGPT are a combination of several technological advances in the field of Natural Language Processing (*NLP*). They combine the power of neural networks (generative and classification) with that of "Transformers" architectures<sup>4</sup>. The French Center of Expertise for digital platform regulation<sup>5</sup> (PEReN) published a note in April 2023 describing precisely how these algorithms work<sup>6</sup>.

12. These models are first trained on training databases, which allow them to optimise their "hyperparameters" (the importance given to each piece of information identified during the training phase). They can then make inferences, i.e. produce predictions from new data, on which they have not been trained.

13. Training these conversational language models requires a large amount of textual data, which can come from two types of source: open or private. The main open data sources used by these models are the Common Crawl<sup>7</sup>, the corpus of Wikipedia pages, Reddit threads, etc. These models can also be trained on proprietary data (or a combination of open and proprietary data), and are then dependent on the company developing them.

14. This phase of training conversational language models is very costly and requires a highly developed computing infrastructure. The LLaMA<sup>8</sup> algorithm developed by Meta,

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<sup>2</sup> <https://www.lesechos.fr/tech-medias/hightech/ia-elon-musk-et-des-experts-appellent-a-une-pause-evoquant-des-risques-majeurs-pour-lhumanite-1920243>

<sup>3</sup> [https://www.liberation.fr/economie/economie-numerique/litalie-bloque-le-robot-conversationnel-chatgpt-20230331\\_4CERH7Q7EVC2PH5PWMAIBK3S7E/](https://www.liberation.fr/economie/economie-numerique/litalie-bloque-le-robot-conversationnel-chatgpt-20230331_4CERH7Q7EVC2PH5PWMAIBK3S7E/)

<sup>4</sup> Transformers neural networks are based on an "attention" mechanism that allows them to give a different level of importance to the various "tokens" that make up a sentence.

<sup>5</sup> PEReN is a national service that provides expertise and technical assistance in data processing, data sciences and algorithmic processes to government departments and administrative authorities involved in the regulation of digital platforms. It is also involved in exploratory and scientific data science research projects.

<sup>6</sup> [https://www.peren.gouv.fr/rapports/2023-04-06\\_Eclairage%20sur\\_CHATGPT\\_FR.pdf](https://www.peren.gouv.fr/rapports/2023-04-06_Eclairage%20sur_CHATGPT_FR.pdf)

<sup>7</sup> Common Crawl is an open web archiving initiative. It makes a large set of web pages collected since 2011 available free of charge.

<sup>8</sup> <https://ai.facebook.com/blog/large-language-model-llama-meta-ai/>

for example, required the use of more than 2,000 graphics processing units (GPUs) for over 20 days. This may make it more difficult for newcomers to enter the market.

15. The table below shows the main models on the market:

Figure 1: Main language models developed Source: PEReN ([link](#))

	Year	Maximum No. of parameters (in bn)	Public architecture	Open trained model	Open data	Conversational (RLHF)	Accessible to users (UI or API)
BigScience BLOOM	2022	175	✓	✓	✓	✗	✓
Google GLaM/PaLM	2021 / 2022	1200 / 540	✓	✗	✗	✗	✓ (paid API)
Google LaMDA/Bard	2022	137/?	✓ / ✗	✗	✗	✓	✓ (UK/US)
Meta OPT	2022	175	✓	✓	✓	✗	✗
Meta BlenderBot3	2022	175	✓	✓	✓	✓	✓ (US)
Meta LLaMA	2023	65	✓	✓	✓	✗	✗
OpenAI GPT-3	2020	175	✓	✗	✓ (1st version only)	✗	✓ (paid option)
OpenAI GPT-3.5 (InstructGPT /ChatGPT)	2022	175 / ?	✓ / ✗	✗	✗	✓	✓ (paid option)
OpenAI GPT-4	2023	?	✗	✗	✗	✓	✓ (paid API and UI)

## 2.2. Potential competitive risks

16. Here, the *Autorité* presents some preliminary thoughts on the potential competitive risks that these new types of algorithms could raise.

17. First, the market currently covers a small number of companies, most of which enjoy a preferential or dominant position in other digital markets. Particular attention should therefore be paid to practices that may result in the impoverishment of competition.

18. Barriers to entry could be another angle for analysis, since the investments required to enter this market are significant (IT architecture upon which computing power depends, access to training data, etc.) and may tend to rise over time, due to the increase in the size of the training data sets. Therefore, cloud computing is generally the preferred

infrastructure for driving these models<sup>9</sup>. In France, however, a few players concentrate the bulk of the market in terms of volume and growth<sup>10</sup>.

19. The data on which these models are trained also raises a number of issues. Some of the training data comes from open sources but may raise issues of personal data or related rights in the context of news articles. The *Autorité* has already addressed this issue of related rights.<sup>11</sup>

20. Secondly, some models may rely on private data, collected in another capacity (e.g. proprietary data of operators running online platforms), which may give these companies a competitive advantage over their potential competitors.

21. In addition, these conversational language models can use reinforcement learning to continuously improve based on feedback received during exchanges with users. This user feedback can be used to improve future algorithms. A loop of positive interactions is therefore created, in which the more a conversational language algorithm is used, the more it will be able to reach high performance levels by training using its own data. The first entrants are therefore likely to have a competitive advantage as a result of the data they are able to collect.

22. These algorithms may raise questions about self-preferencing and ranking. It is easy to imagine that a company developing a conversational language model could decide, in a deterministic way, to use its conversational AI to promote its own products to the detriment of other products from its competitors. Moreover, the fact that conversational agents generally offer just one answer makes this problem even more prevalent, as places beyond the first are devoid of interest, which could accentuate the effects of such practices.

23. Generally speaking, the possible integration of conversational language models into search engines could have an impact on their operation and use. It is important for the competition authorities to anticipate and understand these developments in order to assess the consequences for the activities of dominant platforms (particularly in view of the implementation of the Digital Markets Act<sup>12</sup>) and for the economics of search-related online advertising, which has been the subject of recent decisions by the *Autorité*, both directly (Meta<sup>13</sup> and Adloox<sup>14</sup> decisions) and indirectly (Google "related" decision<sup>15</sup>).

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<sup>9</sup> For example, OpenAI and ChatGPT use the Microsoft Azure infrastructure (Source: <https://openai.com/blog/openai-and-microsoft>)

<sup>10</sup> <https://www.autoritedelaconcurrence.fr/fr/communiqués-de-presse/autorite-de-la-concurrence-ouvre-jusquau-19-septembre-2022-une-consultation> (French version) or <https://www.autoritedelaconcurrence.fr/en/communiqués-de-presse/autorite-de-la-concurrence-opens-public-consultation-until-19-september-2022> (English version)

<sup>11</sup> See in particular Decision 22-D-13 of 21 June 2022 regarding practices implemented in the press sector ([link](#))

<sup>12</sup> Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act)) ([link](#))

<sup>13</sup> Decision 22-D-12 of June 16, 2022 regarding practices implemented in the online advertising sector ([link](#))

<sup>14</sup> Decision 23-MC-01 of May 4 2023 regarding a request for interim measures from Adloox ([link](#))

<sup>15</sup> Decision 22-D-13 of June 21, 2022 regarding practices implemented in the press sector ([link](#))

### 3. Benefits of algorithms for competition authorities

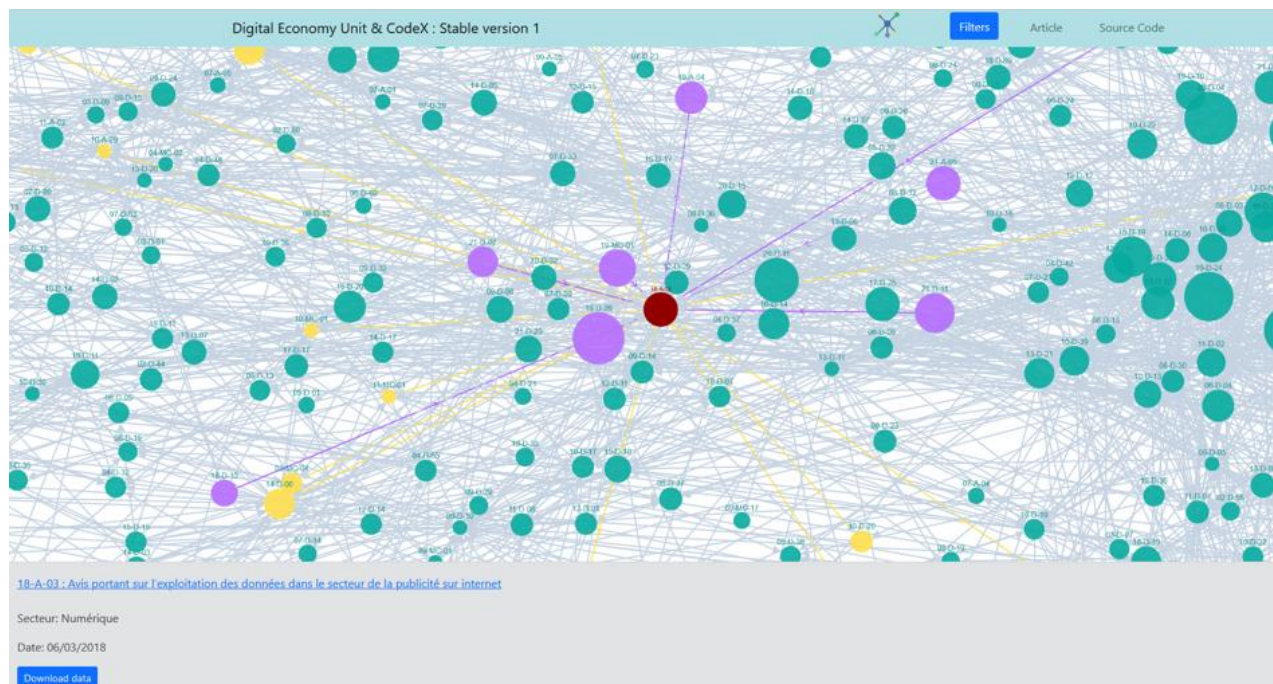
24. Lastly, while current thinking tends to focus on the competitive risks associated with algorithms, they can also make beneficial contributions, particularly for competition authorities, in helping them with their missions.

25. To illustrate this beneficial contribution, we can cite the fact that the *Autorité* has introduced, in "open source" mode, the first tool<sup>16</sup> that allows the visualisation of the interactions between its publications.

26. Developed by the *Autorité's* Digital Economy Unit, in partnership with CodeX's Computational Antitrust, this tool, intended for competition law stakeholders (rapporteurs, researchers, lawyers, etc.), is in the form of a network graph in which the *Autorité's* publications are represented and linked by the citations they contain. It therefore makes it possible to identify the interconnections between the various publications at a glance and gives the user an overview of the *Autorité's* decision-making practice.

27. In an article<sup>17</sup>, the *Autorité* explains the method and algorithms used, so that this tool can be implemented by other competition authorities.

Figure 2: Illustration of the network created by the *Autorité's* publications



<sup>16</sup> <https://www.autoritedelaconurrence.fr/fr/article/lautorite-de-la-concurrence-met-disposition-le-premier-outil-de-visualisation-de-ses> or <https://www.autoritedelaconurrence.fr/en/article/autorite-de-la-concurrence-introduces-first-network-visualization-tool-explore-its>

<sup>17</sup> <https://www.autoritedelaconurrence.fr/sites/default/files/2023-01/Stanford-Computational-Antitrust-en.pdf> (French version) or <https://www.autoritedelaconurrence.fr/sites/default/files/2023-01/Stanford-Computational-Antitrust-fr.pdf> (English version)