ARTIFICIAL INTELLIGENCE AND COMPETITION

Prepared jointly by the National Commission on Markets and Competition (CNMC) and the Catalan Competition Authority (ACCO), this report considers the need for changes in the tools available to competition authorities in view of the challenges posed by the proliferation in the use of artificial intelligence (and of an increasingly digital economy). In particular, it is suggested that the rules be adapted so that competition authorities can also make use of artificial intelligence and that these public bodies can be more receptive to existing knowledge in this field.

1. Preface

The European Commission White Paper on Artificial Intelligence (AI),[1] released on 19th February 2020, sets out a series of initiatives and proposals in two broad categories on which the public consultation is focused:

- Building an ecosystem of excellence for the development of AI in the European Union.
- Regulatory options in the sphere of artificial intelligence.

The level of specificity of the proposed actions is quite limited in most cases, and any reference to the perspective of protecting competition in the markets is omitted. This is the reason for this position paper proposed jointly by the National Commission on Markets and Competition and the Catalan Competition Authority, which outlines the impact that AI may have on competition in markets and proposes specific measures to address the challenges that AI creates for competition authorities.

It is also important to point out that a number of initiatives contained in the White Paper must be developed taking into account the need to avoid distorting competition. In particular, the allocation of public funding, initiatives to promote inter-firm cooperation, the creation of public–private partnerships and other similar measures that could lead to an unlevelled playing field or become barriers to entry for smaller undertakings.

2. Main challenges to competition posed by artificial intelligence (digital economy)

The digital economy and what is probably its greatest exponent, artificial intelligence, bring about radical changes in the way economic markets operate. These changes pose a number of challenges for competition enforcement. Although these have already been identified[2],, we feel it appropriate to include a brief summary below.

[1] https://op.europa.eu/es/publication-detail/-/publication/aace9398-594d-11ea-8b81-01aa75ed71a1

[2] For example, by the Catalan Competition Authority itself in 'The Data-Driven Economy. Challenges for competition' from November 2016 (http://acco.gencat.cat/web/.content/80_acco/documents/arxius/actuacions/Eco-Dades-i-Competencia-ACCO-angles.pdf) and by the National Commission on Markets and Competition in various contributions to the OECD, studies and articles.

- The **proliferation of zero-pricing business models in the digital economy** means that **competition shifts from price and quantity variables to qualitative variables** related to service quality. This poses a **challenge in terms of measuring qualitative aspects**, as at least some aspects of this concept are far less observable than price, which makes them difficult to quantify.[3]

  Although quality (and variety) are already aspects analysed by competition authorities,[4] the price factor is more often the core element of analysis.

  However, as pointed out, in the digital economy, it is not expected that any abuses of a dominant position will entail, at least in the short or medium term, a loss of well-being consisting of a reduction in supply and increase in price, so the assessment developed by competition authorities cannot focus on price. For example, possible abusive behaviour by large digital platforms could consist of a hidden reduction in quality in terms of user privacy or the quality of information provided (rather than an increase in price).[5]

- One of the **aspects that characterises the digital environment is** undoubtedly **speed** (how fast a user can subscribe to a service, information processing, material provision of services, etc.). This circumstance becomes even more important as undertakings make use of artificial intelligence to accelerate the already particularly fast network effects experienced by digital platforms. This therefore presents competition authorities with the **challenge of reacting quickly**.

  The fact is that if a digital undertaking of considerable size engages in conduct that infringes competition law, it is likely that it will harm competition in the market in a way that is hard to reverse if swift action is not taken. Faced with this problem, some competition authorities are imposing interim measures more frequently, as was the case with the French competition authority in the case of Google.[6]

- **What are known as data mergers or mergers between undertakings with a significant volume of data can be comparatively more complex to assess, as the data supports different uses**. Thus, unlike brick and mortar mergers where the relevant market is relatively obvious, when the merger can be explained by an interest in obtaining data, it is more difficult to anticipate it or to

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[3] The challenges associated with quality measurement in zero-price markets are identified in the CNMC's contribution to the OECD debate on this issue in November 2018 (https://www.oecd.org/competition/quality-considerations-in-the-zero-price-economy.htm#:~:text=Over%20the%20course%20of%20a,of%20products%20are%20not%20new).

[4] As detailed in the article 'Novedades en la aplicación de la política de competencia en la Unión Europea en 2018', prepared by Beatriz de Guindos, Jordi Fornells and Francisco de Paula Roig (http://www.revistasice.com/index.php/ICE/article/view/6659).

[5] The founders of Google themselves warned of the risks associated with a private search engine in the early days of the search engine. In particular, they stated that if an information search engine receives remuneration from advertisers, it will be tempted to omit or hide certain negative information about such advertisers and that such behaviour would be particularly harmful because of the impossibility of even being perceived by users of the search engine (http://infolab.stanford.edu/~backrub/google.html)

[6] https://globalcompetitionreview.com/article/1225364/french-interim-measures-force-google-to-pay-publishers#:~:text=France's%20Competition%20Authority%20has%20given,content%20in%20its%20search%20results.

identify the many markets that may be affected. For example, when Google acquired thermostat manufacturer Nest Labs in 2014, it was not obvious whether it did so to obtain data on electricity consumption, and therefore that would be the relevant market, or if the relevant market instead continued to be online advertising – and it will use that information to better personalise ads, as it will know whether or not we are at home – or whether it will use the information on consumption to know whether or not we have an electric vehicle/scooter and therefore enter the mobility device market.

This new challenge has led a growing number of experts to suggest the need to shift the burden of proof so that it is the parties involved in the merger that must demonstrate that the transaction is not harmful to competition, and in particular, that they themselves specify the market affected. This way, the competition analysis can be carried out in relation to the target market. And if in the future the data obtained through that transaction is used in relation to another undeclared market, the competition authorities may intervene[7].

Using artificial intelligence makes it possible to get a greater return on information. Therefore, it may be expected that there is a positive correlation between the use of artificial intelligence and the number of data mergers that occur, allowing us to assert that artificial intelligence intensifies the challenge described here.

- **In an increasingly data-driven, more transparent economy, where the use of pricing algorithms is increasingly widespread, the possibility of algorithmic collusion is growing**[8]**.** Using algorithms to refine pricing models or customise services can generate efficiencies that benefit both businesses and consumers in terms of new, better and individualised goods and services. However, the increasingly widespread use of algorithms can also lead to anti-competitive behaviour by encouraging companies to coordinate their conduct without the need for a formal agreement or even concerted practice or without the need for human interaction.

  Algorithms can facilitate collusion in different ways. First, they can be used to monitor and enforce an already established coordinated strategy. This makes agreements more stable and prolonged over time, as any deviation from the agreement is quickly detected. This case requires explicit communication between companies in order to establish and implement the cartel and subsequently, the use of an algorithm to monitor the agreement reached. Therefore, it could be detected using the traditional tools of competition authorities, since the algorithm is used as a facilitating and disciplinary tool of the agreement.

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[7] As mentioned in the document 'Competition Policy for the Digital Era' (2019), prepared by Jacques Crémer, Yves-Alexandre de Montjoye and Heike Schweitzer. In addition, the Commissioner for Competition herself, Mrs Vestager, may be considering this possibility, and figures such as the former Chief Economist of Directorate-General for Competition, Massimo Motta, may be openly in favour of it, as shown in the paper 'Challenges for EU Merger Control' (https://econpapers.repec.org/paper/bonboncrc/crctr224_5f2019_5f077.htm)

[8] This challenge is already identified, in the area of fintechs, in the CNMC study on the impact of new technologies on competition in the financial sector, from 2018 (https://www.cnmc.es/expedientes/ecnmc00118).

This is not the case when the use of pricing algorithms results in tacit coordination without the need for communication or interaction between competitors.

It may so happen that multiple companies hire the same software company to design their pricing algorithm. This could create a hub-and-spoke scenario in which competitors use the same hub to develop their algorithms, resulting in the use of the same algorithm or very similar versions for pricing, facilitating coordinated behaviour by companies that are setting their pricing strategy using the same 'brain'.[9] It should be noted that this effect is intensified when companies also use the same data set to feed their algorithm, because this allows the cartel price reached by the algorithm to be more profitable for the companies that use it.[10]

Another possibility is to behave like a predictable agent, that is, each company establishes its mechanism for setting prices, but reacts predictably to external factors. This behaviour can be detected and monitored by other agents, thus sending out an invitation to collude.

Finally, companies could choose to implement deep learning algorithms to make pricing decisions. In this case, competitors would unilaterally design their pricing algorithms by selecting a specific goal, such as maximising profit. If the algorithm is sufficiently complex, it learns, similarly to how the human brain would, and it determines the optimal pricing strategy on its own, possibly concluding that the best strategy is to collude. The main problem for competition authorities in these cases is that the algorithm makes decisions without revealing information about the process followed, so they would be faced with a black box that must be analysed in order to determine if there is a case of virtual collusion.

- **New barriers to entry related to artificial intelligence may arise, including access to data[11].** From this perspective, data is an essential input since it feeds AI algorithms. The ability of algorithms to detect patterns of behaviour and relationships depends on the quality, quantity and variety of the data used. Providing little or inadequate data when training the algorithm results in poor performance of the algorithm and the possibility of drawing erroneous conclusions from the results generated. Therefore, exclusionary or predatory practices by some companies to limit their competitors' access to data may result in barriers to entry.

[9] 'Artificial Intelligence & collusion: when computers inhibit competition' (2017), authored by Ariel Ezrachi and Maurice E. Stucke (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2591874).

[10] 'Algorithms and Collusion: Competition Policy in the Digital Age', OECD (2017) (www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm).

[11] As identified in the CNMC's contribution to the conference organised by the European Commission on 'Shaping competition policy in the era of digitisation' in January 2019 (https://ec.europa.eu/competition/scp19/media_en.html#Contributions)

It is true that data is not an easily monopolisable asset, in the sense that the same individual can give multiple companies access to its data. However, it may also happen that certain relevant information is only owned or acquired by one company, through exclusive contracts with external data providers, and that this company excludes or attempts to exclude its competitors from its data warehouse[12]. In the case of data, we already have a structure in which competition is highly weakened, given that the value and usefulness of the data is growing exponentially with the volume of data processed, thus giving a considerable advantage to the large established undertakings and suggesting a trend towards market concentration. It would be important, in order to ensure an adequate level of competition in AI, for competition authorities to have tools to ensure that potential new undertakings offering AI-based services can access the same volume of data as incumbents, for example, by the user having the option to transfer the historical data they have generated from the current service provider to the new service provider of their choice[13].

- Artificial intelligence makes it possible to offer particularly personalised services. Consider, for example, voice assistants that, instead of offering a list of possible results, offer a single answer straightaway. Thus, **the trend towards hyper personalisation – reinforced by AI – entails an additional risk in terms of competition,** insofar as when a user searches for a particular product, it may lead them to a single supplier. The other competitors are not even mentioned.

  This therefore significantly increases the existing risk that whoever controls the device (voice assistant, to continue with the example) will use their 'gatekeeper' position to benefit themself (in the event they also produce or offer the required product or service) or help an undertaking with which they have been able to reach some kind of agreement.

  Given the situation described above, competition authorities are likely to find themselves needing to tackle possible competitive imbalances arising from this behaviour. This would require mechanisms that would force the undertaking to behave in a neutral manner. Additionally, the requirement of neutrality in respect of the service concerned should be reasonably structured in order to maintain its personalisation and efficiency functionalities.

[12] As detailed in the CNMC's contribution to the OECD round table discussion on 'Consumer Data Rights and Competition' in June 2020 (http://www.oecd.org/daf/competition/consumer-data-rights-and-competition.htm).

[13] An initial step to be able to carry out such information transfer by users involves them knowing which service provider has their data and what data they hold. In this regard, 'personal information management systems' (PIMS), already recommended by the European Data Protection Supervisor in Opinion 9/2016, are particularly attractive. 'EDPS Opinion on Personal Information Management Systems. Towards more user empowerment in managing and processing personal data'. Examples of PIMS are the websites reclamadatos.es or saymine.com.

3. Adaptation of the competition authorities' toolkit to oversee the use of AI by undertakings

The competition authorities' toolkit is powerful and flexible. However, it must be adapted to digital reality to address the new challenges posed by AI and the data economy.

Although the possibility of algorithmic collusion is a reality, theoretically and empirically demonstrated, competition authorities are detecting hardly any cases. At the European level, mention should be made of three cases in which sanctions have already been imposed[14]. And the Spanish competition authority is currently investigating a possible case of algorithmic collusion in the property brokerage market.[15].

In these past cases, the algorithms were used only as facilitators of an explicit agreement between competitors, so it was possible to detect them using the traditional tools of competition authorities. However, it is noteworthy that given how frequently pricing algorithms are used (according to a 2017 European Commission report on online commerce, two-thirds of online distributors use automatic software to adjust their own prices to the monitored prices of their competitors), there are not more cases and, in particular, no situations identified so far of tacit coordination as described in the second subparagraph of the document[16].

Among the possible reasons for this relatively low rate of detection of algorithmic collusion is the lack of specialised profiles in the field of artificial intelligence and a lack of specific training on these issues for Competition authorities' officials. In this respect, the challenges faced by competition authorities include understanding the specific

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[14] In 2016, the British Competition Authority, the Competition and Markets Authority (CMA), sanctioned an online poster cartel in which the parties had agreed not to lower the prices of posters sold on the Amazon website in the UK. Price adjustment software was used to implement the agreement.

In 2018, the European Commission sanctioned four electronics manufacturers for imposing resale prices on their online distributors. The Commission emphasised that the companies had used sophisticated algorithms to monitor the price set by distributors, allowing them to take quick action in the event of a price reduction.

In 2019, UK energy market regulator OFGEM fined two energy companies for agreeing not to take each other's customers by using software that blocked registration of the other company's customers. In this case, the two companies had an agreement to divide up markets and assign customers, and the algorithm was used to make the process of checking the customer list easier and more efficient and to verify that both companies were fulfilling the established agreement.

In addition, there would be hub-and-spoke cases, which without being directly affected by algorithmic collusion, could be brought into the digital world. Among others, the Eturas case should be highlighted, in which the online booking system used by travel agencies limited the maximum amount of the discount (http://competitionlawblog.kluwercompetitionlaw.com/2017/01/19/eturas-conclusions-platform-collusion/?doing_wp_cron=1591203312.7948870658874511718750).

[15] In this case, in which currently investigation is still ongoing, coordination would have been implemented, among other means, through the use of software and computer platforms and would have been facilitated by companies specialising in computer solutions through the design of the property management software and its algorithms (https://www.cnmc.es/sites/default/files/editor_contenidos/2020219%20NP%20Intermediation%20Market%20EN_.pdf)

[16] Final report on the E-commerce Sector Inquiry. Report from the Commission to the Council and the European Parliament.

functioning of these algorithms, how they can facilitate collusion and how to detect possible violations arising from their use.

Another reason may be that the tools available to competition authorities need to be adapted to the digital reality in order to be able to identify this type of anti-competitive practices more widely.

1. In order to be able to deal effectively with the new challenges posed by the data economy and artificial intelligence, it would be advisable for competition authorities to have the following options to exercise effective control over this new reality:

1.1. **Access to the necessary information that would also make it possible to use AI tools to effectively control the behaviour of companies and to be able to detect anti-competitive behaviour ex officio**.

In other words, competition authorities' control mechanisms should also be able to make use of AI, and to this end, it is essential to be able to access all relevant information. This would include information held by the public administrations, including information from public procurement, an area particularly affected by collusive conduct, but also information related to companies, which makes it possible to monitor their behaviour, particularly in terms of prices (such as data collected through cookies), and even information about users (so as to be able to determine, for example, whether they are being discriminated)[17].

This need contrasts with the current situation in which, for example, some websites detect and block their users when they engage in web scraping, so that obtaining the information itself may not be feasible for control bodies. As a remedy to this situation, it is suggested that mechanisms be set up that allow competition authorities to have effective access to data relevant to their investigations.

1.2. In the framework of an investigation, **being able to monitor the code of the algorithm used and to access the information available on computer or electronic media, databases, applications, IT services, digital platforms and application programming interfaces**. Furthermore, it should be possible to access the data entered in algorithms and used by companies, in particular it should be possible to **track the data** in order to detect exchanges of sensitive information between companies. In this regard, the process of transposing the ECN+ Directive provides an important opportunity for Member States to strengthen the investigative powers of competition authorities in this domain.

2. Additionally, **the availability of the software, hardware and cloud computing needed to implement AI techniques can be a barrier to entry**, so it is very important to have a sound knowledge of these markets.

[17] Always following Organic Law 3/2018, of 5 December, on the Protection of Personal Data and guarantee of digital rights.

The development of algorithms with good explanatory and predictive capabilities requires advanced AI and data mining software. Additionally, some AI algorithms, mainly those involved in deep learning, are computing intensive. To train a neural network, which can have a trillion neurons trained in thousands of training iterations, high processing capacity is required. In order to achieve some efficiency, specialised AI processors are used to reduce training times.

What is more, in many cases, the huge amounts of data stored to implement AI techniques create problems in terms of storage and processing, so there emerges a need to rely on IT infrastructure providers, which provide storage and computing capacity in the cloud. The emergence of cloud computing has allowed small businesses to operate without the necessary physical infrastructure, thus reducing barriers to entry. However, the number of companies that provide access to this type of computing is small, including Amazon Web Service, Microsoft Azure, Google Cloud Platform or IBM Cloud.

It should be noted that these companies also develop the software and hardware necessary to process large data sets and they provide it to companies that hire their cloud services. Therefore, small businesses may consider this option very useful and process their data using the software and hardware provided by them. As a result, a large number of companies would be **leaving data storage, control and processing in the hands of a small number of suppliers**, in turn facilitating access to large volumes and a wide variety of data, enabling them to improve their own data analysis algorithms. According to the OECD, if this trend continues, a competition problem may arise in the future, as new companies may not be able to build IT infrastructures powerful enough to enable them to compete with those of the incumbents, and the supply of software, hardware and cloud computing needed to implement AI techniques would be concentrated in the hands of few companies[18].

2.1. While processing capacity is essential to the implementation of AI, to guarantee the existence of AI competition, **it is also essential to ensure that undertakings can access such processing capability (in both software and hardware, and cloud computing) in a neutral manner**. The need to analyse this processing market is even greater insofar as it is highly concentrated among few suppliers that could have a clear **conflict of interest** as companies providing AI tools while also being users of these same tools.

4. Greater permeability of competition authorities

The main contribution contained in this document is the need to ensure that competition authorities can make use of AI to effectively oversee the use of AI by undertakings.

As noted above, in order to make use of AI, it is materially essential to be able to access (i) the information and (ii) the necessary processing capacity. However, we must not forget **the need for access to an intangible element: knowledge in this field**. This is

[18] 'Big Data: bringing competition to the digital era', OECD (2016) (https://www.oecd.org/competition/big-data-bringing-competition-policy-to-the-digital-era.htm)

why it is suggested below that competition authorities be more receptive to outside knowledge, as in general terms, they are primarily made up of law and economics professionals and to a much lesser extent, professionals who have an adequate knowledge of AI and other disciplines that are part of the digital economy (such as data protection).

Although it is true that we must try to train staff internally in relation to these new digital areas, it is also essential to be able to obtain knowledge outside the institution itself. For this purpose, below we propose **greater cross-flow between competition authorities themselves and (i) other bodies or public administrations that are making use of these tools, (ii) research centres and universities, and (iii) data protection authorities** to the extent that the artificial intelligence itself pivots essentially over the data.

- Strengthening cooperation between competition authorities and public bodies by seeking to share knowledge and experience in the field of AI.

  From this cooperation, new ideas and applications for AI techniques can easily emerge, supporting both the functioning of the bodies themselves and citizens.

- In particular, strengthening cooperation between competition authorities and data protection authorities in order to take advantage of possible synergies.

  There may be synergies between data protection and competition authorities in relation to, for example, (i) data portability, (ii) possible qualitative abuses in terms of privacy, and (iii) data merger analysis.[19]

- Increased cooperation between competition authorities, research centres and universities to achieve greater take-up of AI by the public sector.[20]

  Again, in order to take advantage of synergies, it may be very important to strengthen cooperation between competition authorities and research centres and universities. Sharing experiences, knowledge and available data favours both competition authorities and research centres and increases knowledge and take-up of AI by the public sector.

[19] On the areas where such synergies could arise more significantly, see the October 2017 document within the framework of the Digital Clearinghouse (initiative to coordinate data protection, consumer and competition authorities led by EDPS), 'Long Term Impact of Big Tech Sector Mergers: A proposal for specific cooperation mechanisms between competition authorities and data protection agencies', by M. REALP, X. PUIG (ACCO) and E. THOMTON (Competition and Consumer Protection Commission, Ireland), (http://acco.gencat.cat/web/.content/80_acco/documents/arxius/actuacions/20180130_Long-Term-Impact-of-Big-Tech-Sector-Mergers-2.pdf)

[20] The CNMC is currently undergoing training, among other things, on artificial intelligence issues, thanks to the European Commission program to improve the detection of competition infringements.