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Artificial Intelligence, Data and Competition – Note by Türkiye

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More documents related to this discussion can be found at www.oecd.org/competition/artificial-intelligence-data-and-competition.htm

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1. The Emergence of Artificial Intelligence and Its Business Models

1.1. Introduction to Artificial Intelligence

1. In recent years, artificial intelligence (AI) has seen remarkable progress in various domains of learned perception and inference, including tasks like pattern recognition, speech understanding, and recommendation systems. These specialized domains enable AI systems to learn from data patterns and make predictions (Machine Learning), interpret visual information (Computer Vision), and comprehend and generate human language seamlessly (Natural Language Processing or NLP)[1].

2. Within the AI landscape, Generative AI (Gen AI), has emerged as a significant area of focus. It aims to create new and diverse content such as text, images, voice, video, and code by leveraging patterns found in data. Notable examples of Gen AI models include ChatGPT and Google's Bard. Large Language Models (LLMs) are a specific subset of Gen AI models that excel in generating human-like text. LLMs owe much of their capability and recent advancements to the Transformer Model, which serves as their foundational architecture. The Transformer Model has revolutionized NLP tasks by facilitating parallel processing and capturing long-range dependencies in text data. This breakthrough has resulted in more coherent and contextually relevant outputs in natural language generation and understanding tasks, marking a significant milestone in the development of AI-driven language models[2].

1.2. Applications of AI

3. Gen AI models, especially Large Language Models (LLMs), have diverse applications across various domains, showcasing their versatility and impact. They excel in content creation, producing text, music, artwork, scripts, and reports with remarkable proficiency. Moreover, they empower conversational agents like chatbots and virtual assistants, enabling seamless and natural interactions with users. These models also contribute significantly to image generation and editing through advanced techniques such as Generative Adversarial Networks (GANs), enhancing creativity and realism in visual media outputs. In addition to content creation and conversational interfaces, Gen AI plays a crucial role in product design by generating new designs and offering personalized recommendations based on user preferences and data. In healthcare, Gen AI aids in creating synthetic medical data and simulating patient conditions, contributing to research and development efforts. Notably, companies leverage Gen AI to prototype product designs swiftly, with life sciences companies using it to expedite drug design phases significantly. In the entertainment industry, Gen AI enhances video games by creating new content such

[1] BOMMASANİ R., HUDSON D. A., ADELİ E., ALTMAN R., ARORA S., ARX S. v., Chen A. (2021). "*On the Opportunities and Risks of Foundation Models*", Available at: https://arxiv.org/abs/2108.07258.

[2] RUSSELL S. J., & NORVİG P. (2010). *Artificial Intelligence A Modern Approach (3rd Edition b.)*, Upper SaddleRiver, NJ: Prentice Hall.

as levels, characters, and immersive environments, thereby enriching the gaming experience. Furthermore, generative models assist in data augmentation by generating synthetic data, which supplements real data for training machine learning models, proving particularly beneficial in scenarios with limited data availability. Beyond these applications, Gen AI extends its utility to code generation and documentation writing, streamlining processes across various teams, including marketing and sales. Teams leverage Gen AI applications to create compelling content for customer outreach, enhancing engagement and communication effectiveness[3].

1.3. AI Value Chain Overview

4. AI Value Chain consists of three main areas: "AI Infrastructure", "AI Modeling", and "AI Deployment". AI infrastructure encompasses the hardware and software resources needed for AI development and deployment. AI modeling involves creating and training AI algorithms and models using data. Finally, AI deployment focuses on implementing AI models into real-world applications and systems.

5. AI infrastructure is crucial for the functioning of AI systems and can be broadly categorized into two main components: compute and data. Compute resources such as servers, GPUs (Graphics Processing Units), and specialized AI chips are the backbone of AI algorithms and models, powering cloud services, interference, and coordination among different AI components. On the other hand, data-related aspects of AI infrastructure involve storage solutions for managing large datasets used in training AI models. This includes the creation, collection, preparation (conversion, enhancement, formatting, and labeling), and networking infrastructure for efficient data transfer and communication between AI components[4].

6. The reliance on computational performance in AI is evident in its dependency on cloud services, with computing power being the lifeblood of AI systems. Notably, training complex models like GPT-3 demands immense computing power, leading companies like Microsoft to partner with chipmakers like Nvidia to develop advanced supercomputers. Cloud service providers, particularly the "big three" - Amazon, Microsoft, and Google, benefit significantly from the AI boom, with a substantial portion of venture capital funding flowing into these platforms for AI model training and deployment. This trend highlights the dominance of major cloud providers in the AI market, with Amazon leading globally and significant market shares held by Microsoft (Azure) and Google Cloud Platform (GCP). These cloud giants not only provide essential infrastructure for AI but also derive substantial commercial incentives from the growing demand for AI services and technologies.

7. As computational barriers are overcome, data emerges as a critical success factor for AI endeavors. For instance, ChatGPT faced criticism for generating outdated responses due to its training being limited until 2021. Future model success hinges on real-time access to relevant data, with business and personal data serving as crucial sources. Entities controlling internet-connected devices and services that gather extensive data stand to lead

[3]Examples of AI (Artificial Intelligence). (n.d.). Retrieved March 20, 2024, from JavatPoint: https://www.javatpoint.com/examples-of-ai.

[4] HÄRLİN T., ROVA G. B., SİNGLA A., SOKOLOV O., & SUKRAHEVSKY A. (2023, April). "*Exploring opportunities in the generative AI value chain*" McKinsey Digital. Available at: https://www.mckinsey.com/~/media/mckinsey/business%20functions/quantumblack/our%20insig hts/explorin g%20opportunities%20in%20the%20generative%20ai%20value%20chain/exploring-opportunities-in-the- generative-ai-value-chain.pdf.

in AI applications, providing them with superior access to valuable datasets. Google and Microsoft stand out as primary operators of general search engines, continuously indexing the entire web, thereby serving as rich data sources for Gen AI applications[5].

8. AI modeling involves several key aspects that contribute to its effectiveness and functionality. Firstly, it encompasses **upstream foundation modeling**, which involves the programming and training of large-scale models using diverse datasets. This phase is crucial as it lays the groundwork for the development of more advanced AI systems. Additionally, AI modeling incorporates both **open-source** and **closed-source** approaches. Open-source AI models are freely accessible and allow for collaboration and innovation within the AI community, fostering rapid advancements and knowledge sharing. On the other hand, closed-source models are proprietary and may offer specialized functionalities or unique algorithms developed by specific organizations. **Model hubs** play a vital role in AI modeling by providing centralized platforms where researchers and developers can access, share, and collaborate on various AI models and resources. Finally, **downstream fine-tuning** is an essential part of AI modeling, involving the customization and optimization of pre-trained models for specific tasks or domains, enhancing their performance and adaptability in real-world applications.

9. AI deployment refers to the process of putting AI models into action to deliver value and services to end users. This phase involves deploying fine-tuned AI models that have been specifically adapted or fine-tuned for particular tasks or applications. Fine-tuning involves adjusting pre-trained models to perform effectively and accurately in real-world scenarios. This adaptation process ensures that the AI models can address specific business needs, such as customer service automation, predictive maintenance, or personalized recommendations. Effective AI deployment requires considerations such as scalability, reliability, security, and performance monitoring. It involves integrating AI models seamlessly into existing systems or platforms, ensuring they operate efficiently in production environments, and continuously monitoring their performance to make necessary adjustments or improvements. Ultimately, successful AI deployment leads to enhanced user experiences, improved business outcomes, and increased competitiveness in the market[6].

10. To improve AI models and deployment, several strategies can be implemented. Firstly, investing in robust AI Infrastructure is crucial, ensuring adequate compute power and efficient data management. Secondly, adopting a comprehensive AI modeling approach involves leveraging diverse datasets, utilizing both open-source and closed-source models, and collaborating through model hubs for knowledge sharing. Thirdly, fine-tuning pre-trained models for specific tasks or domains enhances performance and adaptability. Finally, for successful AI deployment, focus on scalability by integrating models seamlessly into existing systems, ensuring reliability and security, and continuously monitoring performance for necessary adjustments and improvements[7].

[5] HÖPPNER T. and STREATFEİLD L., (2023), "*ChatGPT, Bard & Co.: an introduction to AI for competition and regulatory lawyers*", Hausfeld Competition Bulletin (1/2023), Article 1, Available at:https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4371681.

[6] HÖPPNER T. and STREATFEİLD L., (2023), "*ChatGPT, Bard & Co.: an introduction to AI for competition and regulatory lawyers*".

[7] AKİNOLA S. (2024, February 2). "*How Artificial Intelligence is improving research*", Retrieved from Punch Newspapers: https://punchng.com/how-artificial-intelligence-is-improving-research/

2. Competition at Different Stages of the Value Chain

11. In the market of AI systems, effective competition between AI model developers in terms of providing quality products and services is of undeniable importance. Accessibility to key inputs, in particular, can be vital to operating and competing in those markets. Accordingly, developments in the market in question depend on a number of factors such as access to data, requirements for and access to computing power, possible advantages that large tech companies, first-movers and incumbent firms have over others and openness of competitive AI models[8].

12. Since AI systems are data-driven systems, the volume, nature, quality and diversity of data on which models are trained will have a significant and direct impact on the development of this process. Thus, companies that have accumulated large and diverse data sets over a long period of time and therefore already have the data to train AI models may have an advantage in the development and deployment of AI products and services. As a consequence, incumbent firms currently operating in digital markets where relevant data can be obtained will also have an advantage at this point. It would be worrying in terms of competition law if firms abuse their leading position in other markets to unduly restrict access to data by rival AI model developers. But interestingly, most popular AI models are known to be pre-trained using only publicly available data. However, when these models need to be developed and trained with larger data in the future, there is a risk of completely running out of publicly available and freely available data. To access a new data source beyond what is freely and publicly available, AI model developers currently have options such as using data already within their own businesses or purchasing data from third parties in return for a fee or licensing terms[9].

13. AI also has the ability to generate synthetic data independent of real-world events. By using synthetic data, organizations can generate virtually unlimited amounts of data without worrying about ethical and legal issues associated with real-world data. And for some companies, this has the potential to emerge as a competitive advantage at the data point. Still, it is not clear whether the use of synthetic data, which is data that imitates real-world data and is not created by humans, during the development of AI models will cause any negativities in the functioning of the models[10].

14. Although computing resources are an input that plays a very important role in all processes related to the development and maintenance of AI systems, these resources are not unlimited, and can even be said to be quite scarce. This situation is a natural consequence of the increasing demand for these resources and the increasingly low supply. The biggest factor causing the supply shortage here is that the computing resources needed to train and run AI models do not consist of simple products and services, but require very large computing systems consisting of specialized chips[11].

15. AI models that are increasingly larger and have more trainable parameters are being developed. Also, it can be observed that models that are larger and use more data and

[8] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version.

[9] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*", (accessed 18 March 2024), Available at:https://www.engage.hoganlovells.com/knowledgeservices/news/ai-and-competition-law.

[10] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version.

[11] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

compute to train and run perform better. However, of course, the development and use of larger models requires more costs[12].

16. Another issue that arises in terms of competition between developers in AI systems and is closely linked to computing resources is cloud computing services. As a matter of fact, it is known that cloud computing services play an important role in the infrastructure stage of the AI value chain and as mentioned, are used as an input in the training process of AI models. Especially the pre-training phase of AI models requires large amounts of computing power, and since most developers do not have sufficient resources and infrastructure in this sense, they provide the relevant service through various agreements and partnerships with cloud service providers. Therefore, inability to access the cloud for any reason will negatively affect the development of AI and the entry of new players into the market[13].

17. Developing AI models requires technical expertise, among many other factors. As mentioned before, skilled researchers and engineers are needed in the AI model development process. However, resources in terms of engineering talent are limited too and if practices such as non-competition obligations arise, the possibility of decreasing the courage and motivation of the workforce in this field to switch to existing or potential competitors is among the concerns expressed by the authorities[14].

18. First of all, as mentioned, the development of AI models requires high capital, financing and significant technical expertise. Therefore, small developers may be at a disadvantage at this point, as training and fine-tuning these models requires high costs and a large amount of knowledge and expertise. The development of AI models may also exhibit economies of scale, as development costs can be spread over a broader customer base and previously developed AI models can be used in the development of future models.

19. Although various studies have not reached a clear conclusion regarding the value of feedback data in terms of contribution to AI model development processes and the relevant issue is controversial, it can be assumed that companies will gain an advantage in AI model development by using the information they have already acquired through their presence in other markets and their wider user base. In this way, companies that have large user bases and an established presence in other related markets will be able to have more real user feedback data than other non-integrated developer companies, using the large volume of feedback data they obtain from users, resulting in a feedback loop[15].

20. Open-source AI models, which are models in which information such as basic code information about the model and the source of the training data are openly shared so that other developers can examine and develop them, allow other developers to build on them and create better models, thus significantly encouraging the increase in innovation in the market. The purpose of open source AI models is basically to contribute to the development of the model by making faster development as a result of being used and learned by other users.

[12] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version.

[13] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[14] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[15] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version.

21. Open-source AI models enable other developers to reduce costs by using publicly available and pre-trained models rather than developing their own AI models from scratch, thus focusing on the development of high-performance, optimized and fine-tuned models. As a result, a significant and rapid increase in innovation can be expected. In addition, the presence of open-source type among AI models may be effective in facilitating new entries into the market and developing existing models more quickly and on a larger scale[16].

22. Therefore, the development and competitiveness of AI models fundamentally depends on access to the key inputs also mentioned above. If access to these inputs is restricted, smaller and new developers may have difficulty competing with large and well-established developers, and as a result, there will be limitations and reductions in competition in the market and ultimately in innovation.

3. Potential Risks to Effective Competition in the Supply of AI

23. Competition law is closely related not only to the core components of AI, but also to the process of AI development. Although open-source models increase the accessibility of AI to some extent, suspicions arise regarding the misuse of such models by developers. Competition law is also closely related in the context of agreements where a single set of technological applications is implemented or a single standard is adopted[17].

3.1. Collusive Conduct

24. In previous years, regulators, including the Turkish Competition Authority (TCA), appear to have determined that if algorithms -which are closely related to AI- are used as a facilitator of pricing agreements between competitors, such algorithmic practices constitute the subject of competition law. In this sense, it has been a matter of debate whether businesses using such automatic systems will be directly responsible for the system behavior and applications in question and under what conditions they will be responsible[18].

25. However, situations where AI, which works with complex algorithms and data analysis and has much more complex automatic decision-making processes and more powerful technology, is not only a facilitator but also a decision maker and/or implementer of anti-competitive behavior, raise new questions. So agreements that are not just facilitated by AI, but directly decided and implemented by AI, are the real complexity, and this type of AI behavior falls somewhere between tacit or express collusion. It remains a question mark whether parallel pricing actions implemented by AI will be examined under the rules on anti-competitive agreements.

26. Here, it is necessary to make a distinction between the behaviors of two separate AI systems implemented by different companies, which are actually independent of each other and emerge as parallel market behavior, and the parallel behaviors that occur as a

[16] Competition and Markets Authority (2023), AI Foundation Models Review: Short Version; BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*"; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[17] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*"; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[18] EZRACHİ, A., & STUCKE, M. E. (2017), "*Artificial intelligence & collusion: When computers inhibit competition*", *U. Ill. L. Rev.*, 1775; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

result of some kind of communication or signaling between the two different AI systems in question[19].

27. In the first case, that is, if there is no cooperation and conscious elimination of competition risks, it can be concluded that the conditions required under the current legal framework in terms of prohibiting the automatic behavior of AI systems will not be met. As a matter of fact, existing case law also allows independently determined parallel behavior. And there is no supporting agreement or concerted action in the scenario in question.

28. If the parallel behavior results from some kind of communication or signaling between different AI systems, that is, when the AI systems are involved in some kind of collusion, the existing legal framework is very likely to be applied in the relevant case. Because in the scenario in question, there is an agreement/consensus even though it does not occur between people[20].

29. The first difficulty faced by the authorities here may be to distinguish between these two scenarios. In particular, the deployment of opaque AI systems, whose operation and decision-making logic are impossible to understand by humans, can make it impossible to determine whether the AI's parallel market behavior is the result of independent price adaptation or an agreement between AIs. In this case, where the authorities can only see the result, that is, parallel price patterns, detecting and proving the existence of a possible violation will be a significant challenge.

30. At this point, questions regarding the extent to which companies using AIs have awareness and control over the functioning of these systems and to what extent AI behaviors can be attributed to the companies using them and to whom the responsibility can be attributed may be a matter of discussion[21].

31. If the possible scenarios regarding collusion between AIs are discussed in more detail, such agreements can be divided into four different subheadings. One of the first scenarios that comes to mind is that AI is used solely as a tool to fulfill people's will and desires to make deals and restrict competition. Here, enforcing the agreement, monitoring and punishing the actions of others will actually be carried out by people who have the will to agree against competition, and AI will be used only as a tool to help achieve this. This scenario is an example where AI is used only as a facilitator, with the AI carrying out instructions from humans. The traditional competition law approach can be applied to such behavior and the practices in question can be discussed even in the context of "object" illegality[22].

32. A second possible scenario could arise if competitors across the industry were using the same algorithm that influences prices and tracks market changes. In this scenario, a common algorithm used by companies within the scope of different vertical agreements may cause horizontal alignment. As the number of users using the same algorithm increases, the alternative universe created by possible manipulation of the algorithm may

[19] YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[20] YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*"; EZRACHİ, A., & STUCKE, M. E. (2017), "Artificial intelligence & collusion: When computers inhibit competition".

[21] YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*"; EZRACHİ, A., & STUCKE, M. E. (2017), "*Artificial intelligence & collusion: When computers inhibit competition*".

[22] EZRACHİ, A., & STUCKE, M. E. (2017), "*Artificial intelligence & collusion: When computers inhibit competition*".

provide an opportunity for exploitation and coordinated price increases. In this scenario, although competitors use the same algorithm, this does not mean that they agree on setting prices. What causes concern here is the parallel use of the same algorithm by competitors. At this point, it may be necessary to determine whether the algorithm is designed in a way that could lead to exploitation. If the algorithm is designed to facilitate collusion between its users, then a classic hub and spoke collaboration will be accepted. If such a facilitating design is not available, the authority will investigate the possible adverse effects of vertical agreements, according to the rule of reason standard. Here, evidence of intent can be used to determine the nature of the agreement, its likely competitive consequences, and how it will be categorized[23].

33. Moreover, if people unilaterally develop AI models that will provide predictable results and respond quickly and in specific ways to changing market conditions, each developer will be able to unilaterally develop their own models, taking into account possible developments in competing models, although there is no evidence of agreement. In this way, anti-competitive effects may arise by indirectly creating an interdependent action between competitors as a result of the adoption of similar algorithms throughout the sector. Certain market conditions will need to exist for the use of industry-wide algorithms to bring about such a change in market dynamics that will lead to conscious parallelism and higher prices. This scenario is likely to occur in markets that are oligopolistic, have few players, products are homogeneous, transparency is high, digitalized, accessibility is high, and competitive response is rapid. Here, companies do not have an agreement among themselves, but they develop and use algorithms only for their own interests. There is also no "agreement" between systems to fix prices as traditionally understood[24].

34. The possible scenario that will be the most challenging for authorities to understand is the possibility that AI acts completely independently. In this case, while competitors use algorithms to achieve a specific goal that they have determined independently - such as profit maximization - AI determines an independent method for itself through trial and learning to achieve the goal in question. There is no legal concept here, and AI follows the strategy it deems most appropriate based on the feedback it collects from the market through trial and learning. This possibility brings with it many problems and questions, such as the controllability of AIs, the awareness of developers and companies using the models regarding their operation, attributability and liability[25].

3.2. Abusive Conduct

35. One of the competitive concerns raised by authorities and researchers is that AI could be used by dominant firms to implement anti-competitive strategies. These possible strategies and practices can be discussed in the context of different harm theories. However, as it is known, before examining the abuse, the authorities must determine that the company in question is in a dominant position in the relevant market. However, it seems difficult to conclude the existence of a dominant position in the AI model market, where a wide variety of players operate. Even in a narrower market definition where only large models are considered, the market will present an oligopolistic structure. A similar situation may occur

[23] EZRACHİ, A., & STUCKE, M. E. (2017), "*Artificial intelligence & collusion: When computers inhibit competition*".

[24] EZRACHİ, A., & STUCKE, M. E. (2017), "*Artificial intelligence & collusion: When computers inhibit competition*".

[25] EZRACHİ, A., & STUCKE, M. E. (2017), "*Artificial intelligence & collusion: When computers inhibit competition*".

in the market for AI infrastructure. However, of course, these are controversial issues that need to be examined in detail and on a case basis[26].

36. Although the forms of abuse in AI-related markets are still quite unclear, certain types of abuse can be foreseen. The first thing that comes to mind at this point is the input foreclosure with respect to key inputs mentioned above. In particular, computing is one of the two most fundamental inputs used in training and running AI models. Therefore, trends in the market to deprive rival developers of that input are quite likely. As a matter of fact, computing essentially forms the infrastructure of AI models, and resources for computing are limited. However, the existence of more than one major infrastructure provider in the market alleviates these concerns to some extent. Similar concerns exist for other key inputs, namely data, and engineers and researchers with technical expertise[27].

37. Authorities also warn that AI can be used to implement predatory pricing strategies by quickly analyzing pricing data and thus determining competitors' reactions to market changes. Concerns have also been raised that dominant companies could use AI integrated into consumer-facing products to exclude competitors and manipulate customers[28].

38. Another concern that arises regarding AI is exclusivity, which is also included in exclusionary abuse practices. As it is known, another key input for AI models is data, and there are concerns that exclusivity regarding data may greatly affect competitors and push them out of the market. However, it should be noted that since AI models are trained with very large amounts of data, it is unlikely that any single company will be able to contain large amounts of data that could lead to market foreclosure. Similarly, the fact that currently models are mostly trained entirely with publicly available and accessible data, alleviates this concern to a certain extent. But, as mentioned before, as AI models are developed, existing publicly available data may not be sufficient and these models can be trained by adding more private and proprietary data sets in order to gain a competitive advantage. In such a case, exclusivity agreements made to lock the proprietary data sets in question may come to the fore[29].

39. As mentioned before, AI models, which are one of the three layers of AI systems, have a platform feature as other developers can build their own products on the models. The platformization of AI models raises concerns about leveraging, especially from models to applications. Because, as mentioned, applications are tools that enable AI models to be distributed to end users. At this stage, the possibility that model developers may prefer their applications, if any, instead of independent developers' applications during the deployment phase also brings to mind self-preferencing concerns.

40. Additionally, as mentioned above, open-source AI models, allow other developers to build on them and create better models, thus significantly encouraging the increase in innovation in the market. However, there are also emerging antitrust concerns regarding open source AI models. One of these is the possible 'open early, closed late' strategy. While open-source models allow developers with limited tools and opportunities to develop

[26] BOSTOEN F. and VAN DER VEER A. (2024),"*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*"; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[27] BOSTOEN F. and VAN DER VEER A. (2024),"*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*".

[28] YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[29] BOSTOEN F. and VAN DER VEER A. (2024),"*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*".

powerful AI models, model providers who think they have already benefited from being open-source may close down the AI model[30].

41. Finally, since the comprehensive and detailed information that AI collects about consumers may also enable it to offer personalized prices, concerns about the use of AI as an intermediary in personalized pricing applications and the facilitation of discrimination through AI in general are among the issues that authorities should follow closely[31].

3.3. Merger Control

42. Since it is a common situation in digital markets for big players to acquire new and promising players for purposes such as integration or to prevent a future threat, there are concerns about the same situation arising in markets related to AI systems. The control mechanism regarding mergers and acquisitions aims to prevent the creation of a dominant position through acquisition and plays an important role in this sense. Although there has been no major and worrying takeover in the market of AI models in the world and in Türkiye, it is expected that authorities will closely monitor AI systems in this regard, given their importance. At this point, it is important that, as in mergers and acquisitions in other digital markets, notification thresholds and criteria for evaluating concentration differ from traditional markets[32].

4. Competition Policy and Enforcement in AI

43. As mentioned in detail above, with the emergence of AI, firms significantly compete along the value chains, from computing resources to data. However, AI may raise a variety of competition concerns. One of these concerns is that algorithms and AI, when evaluated at a horizontal level, can lead to collusion[33]. In addition, AI might be concentrated in the hands of a few large online platforms with access to computing resources and data. This concentration brings with it competitive concerns, such as tying, bundling and exclusive dealing.[34] Competition authorities face the challenges in the context of rapid AI developments. There are a variety of strategies and actions that can be considered by competition authorities to overcome these challenges.

[30] BOSTOEN F. and VAN DER VEER A. (2024),"*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*".

[31] YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[32] BOSTOEN F. and VAN DER VEER A. (2024),"Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools"; YUEN L. M. and CUİDİN V. (2023), "*AI and Competition Law*".

[33] GUPTA S. and UDGATA S., (2019), "*RETHINKING THE CONTOURS OF COMPETITION LAW: The AI Perspective*", Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3444343.

[34] Federal Trade Commission, (2023), "*Generative AI Raises Competition Concerns*", (accessed 17 March 2024). Available at: https://www.ftc.gov/policy/advocacy-research/tech-at-ftc/2023/06/generative-ai-raises-competition-concerns.

4.1. Enhanced Monitoring: New Enforcement Tools and Human Resources

44. Firstly, competition authorities need to adjust their enforcement tools and human resources to adapt to emerging technologies. Authorities are evolving by integrating more diverse skill sets, including data scientists, software engineers and computer programmers, to complement their traditional legal teams. Besides, competition authorities could use AI technologies themselves to better monitor markets and predict potential anticompetitive behaviors. Authorities are also adopting AI-powered detection and enforcement tools, such as employing price-monitoring software and AI trackers for monitoring merger activities.[35] Without proper digital tools for enforcement, competition agencies could actually risk falling behind. They might not grasp how companies' algorithms could violate competition laws, or how market players interact in ways important for analyzing competition. AI could help competition authorities improve efficiency, accuracy, and saving time.[36]These advancements suggest that AI will significantly transform enforcement practices. However, the adoption of AI in enforcement practices raises several concerns. The idea that AI can forecast market issues and take action beforehand introduces the notion of "pre-infringement", a futuristic idea of stopping infringement before they occur. This method could cause discrimination issues, as AI may unfairly focus on certain sectors or companies due to biased data. This raises important questions about the fairness, openness, and enforcement of policies.

45. Furthermore, depending heavily on AI might cause confirmation biases, with systems focused on finding fault potentially missing facts that could prove innocence[37]. Moreover, legal challenges cannot be disregarded, as the use of AI might compromise procedural rights. If AI systems influence any stage of enforcing competition law, leading to final decisions, their outputs must be clear and explainable. Relying entirely on AI, especially when its workings are opaque even to experts, complicates the tasks of case handlers. They would struggle to interpret AI's conclusions and incorporate them into reasoned decision. Therefore, it's crucial for competition authorities to recognize the complexities and obstacles of integrating AI into their decision-making. They must ensure fundamental rights, including the right to a reasoned decision and defense rights[38].

46. Despite AI's potential benefits, these challenges stress the need for careful implementation in regulatory settings. Additional investigation is required for integrating AI into enforcement strategies effectively.

4.2. Adapting Legal Frameworks

47. Another controversial issue related to AI is whether there is a need for regulation. In this context, the relevant debate has focused on whether AI services is included within the scope of sector-specific regulations such as Digital Markets Act (DMA). The European Parliament requested in January 2024 that the European Commission take into account including AI services in the DMA's list of "core platform services". Since AI models are not included in the DMA's list of "core platform services", they are exempt from its

[35] YUEN L. M. and CUİDİN V., (2023), "*AI and Competition Law*".

[36] LORENZONİ I., (2022), "*Why do Competition Authorities need Artificial Intelligence*?", (accessed 18 March 2024), Available at: https://journals.indexcopernicus.com/search/article?articleId=3514021.

[37] YUEN L. M. and CUİDİN V., (2023), "*AI and Competition Law*".

[38] LORENZONİ I., (2022), "*Why do Competition Authorities need Artificial Intelligence?*".

regulations.[39] On the other hand, applications of AI, such as chatbots, can be categorized as "virtual assistants" or "online search engines" under the DMA[40]. Besides, "cloud computing systems", one of the important infrastructure layers of AI are included in the DMA's list.[41] Articles 5 to 7 of the DMA will apply to designated gatekeepers in relation to those services. This implies, for example, that these companies are not permitted to modify their own AI solutions based on any data supplied by business users inside the framework of a cloud computing service.[42] However, some argue that to address the unique competitive challenges surrounding AI, the DMA may need to be amended as the idea of "AI as a platform" had not been foreseen.[43]

48. Another controversial issue is whether the timing is right for such an ex-ante regulation. It is noted by some authors that early intervention in AI carries various risks. It has been argued that given the new and quickly evolving nature of AI, early intervention without waiting for the market to mature could harm competition and innovation. Even the DMA recognizes the risk associated with early intervention: in order to be classified as a gatekeeper, a company must possess an "*entrenched and durable position*", which means its "core platform services" must have had 45 million users in the EU for each of the last three years[44]. Considering that ChatGPT has two more years to mature and new applications have just started the three-year countdown, it will not be affected by the obligations included in the DMA scope.[45] Secondly, there are opinions that such early regulation will provide an advantage the initial entrants in the market. It is stated that an asymmetric regulation that is valid for market leaders but not for other competitors involves risks for the market[46].

49. In this context, the general opinion is that market dynamics should be examined carefully and, if there is a gap in enforcement, regulation should be made after market investigations are carried out and sufficient information is obtained about the market[47]. AI

[39] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*"; HÖPPNER T. and STREATFEİLD L., (2023), "*ChatGPT, Bard & Co.: an introduction to AI for competition and regulatory lawyers*"; BOSTOEN F. and VEER A., (2023), "*Two Views on Regulating Competition in Generative AI*", (accessed 15 March 2024). Available at: https://www.networklawreview.org/veer-bostoen-generative-ai/.

[40] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*"; HÖPPNER T. and STREATFEİLD L., (2023), "*ChatGPT, Bard & Co.: an introduction to AI for competition and regulatory lawyers*".

[41] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*".

[42] HÖPPNER T. and STREATFEİLD L., (2023), "*ChatGPT, Bard & Co.: an introduction to AI for competition and regulatory lawyers*".; PWC,"*AI and Competition Law*", (accessed 16 March 2024). Available at: https://www.pwc.pl/en/articles/ai-and-competition-law.html.

[43] HÖPPNER T. and STREATFEİLD L., (2023), "*ChatGPT, Bard & Co.: an introduction to AI for competition and regulatory lawyers*".

[44]Digital Markets Act, article 3(2)(c), Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R1925.

[45] BOSTOEN F. and VEER A., (2023), "*Two Views on Regulating Competition in Generative AI*".

[46] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*".

[47] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*".; CARUGATİ C., (2024),"*The Generative AI challenges for*

is currently being carefully examined by many competition authorities around the world including, the United Kingdom, Portugal, India, Hungary[48]. In addition, it is stated that it would be beneficial for competition authorities to conduct in-depth studies not only on AI but also on other layers of AI, such as "cloud computing services"[49]. Moreover, given its importance for content creators, it is stated that competition authorities should closely monitor how AI affects competition in many important markets such as search engines and online advertising[50].

50. It is evaluated that TCA will face similar difficulties as mentioned above. TCA has prepared a draft law which envisages the ex-ante regulation of digital markets. Within the scope of this draft law; online intermediary services, online search engines, online social network services, video sharing platform services, number-independent interpersonal communication services, operating systems, internet browsers, virtual assistants, cloud computing services and online advertising services offered by the provider of any of these services are defined as the "core platform service". In this context, it is currently unclear how anti-competitive concerns regarding AI will be evaluated within the scope of this draft law. On the other hand, TCA continues to conduct sector inquiries on markets that can be affected by AI, such as online advertising[51]. TCA also continues to gain experience by conducting various investigations into markets such as online display advertising and ad technology services[52] and search engine[53].

4.3. International Cooperation

51. Collaborating with competition authorities to share knowledge and best practices and to coordinate enforcement actions when necessary. Given the global nature of AI markets, international cooperation is essential for effective enforcement. Competition authorities should undertake joint studies in a forum such as the European Competition Network (ECN) or the International Competition Network (ICN) to promote the exchange of experience. Given the limitless nature of the problems raised by AI, this collaboration can reduce resource waste.[54]

Competition authorities", (accessed 16 March 2024). Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4738748.

[48] CARUGATİ C., (2024), "*Competition Authorities Are Studying Similar Digital Markets, Digital Competition*".

[49] BOSTOEN F. and VEER A., (2024), "*Regulating Competition in Generative AI: A Matter of Trajectory, Timing and Tools*"; CARUGATİ C., (2024),"*The Generative AI challenges for Competition authorities*".

[50] CARUGATİ C., (2024),"*The Generative AI challenges for Competition authorities*", (accessed 16 March 2024). Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4738748.

[51]Available in Turkish at: https://rekabet.gov.tr/tr/Guncel/cevrim-ici-reklamcilik-sektor-incelemesi-eca8a15a14d5ed118eb1005056850339, (accessed 19 March 2024).

[52]Available at: https://rekabet.gov.tr/en/Guncel/investigation-about-alphabet-inc-google--21d473e9b31cee118ec400505685da39, (accessed 19 March 2024).

[53]Available at: https://rekabet.gov.tr/en/Guncel/investigation-on-google-reklamcilik-ve-p-a13d08262d1fee118ec500505685da39; https://rekabet.gov.tr/en/Guncel/investigation-about-google-reklamcilik-v-e8d27123e853ea11811500505694b4c6 (accessed 19 March 2024).

[54] CARUGATİ C., (2024),"*The Generative AI challenges for Competition authorities*".

4.4. Collaboration with Other Regulators

52. Problems encountered in the field of AI arise in many areas other than competition law, such as copyrighted data (intellectual property rights), personal data (data protection), AI risks (AI governance). Therefore, competition authorities should cooperate with relevant competent authorities, (e.g., privacy and consumer protection agencies) to examine the impact of various legal regimes on competition.[55]

4.5. Harmonization of Different Regulations

53. Concerns caused by AI can be regulated by many instruments. For instance, algorithmic exclusion (ranking) and algorithmic exploitation (personalized pricing) are regulated to varying degrees by different instruments, including competition law, DMA, Digital Services Act (DSA), Platform-to-Business Regulation (P2B), Consumer Rights Directive, Unfair Commercial Practices Directive and soon the AI Act.[56] It is important to determine how compatible these instruments are with each other and to ensure that the new regulations comply with other regulations in the sector in order to provide legal certainty to companies.

4.6. Competition Advocacy

54. Competition authorities should undertake competition advocacy on AI and educate stakeholders on this issue. Competition authorities could take an active role in educating consumers, businesses and policymakers about the challenges and opportunities presented by AI in competitive markets. Competition authorities could conduct public awareness campaigns to educate consumers and businesses about the effects of AI on competition, including the importance of data protection, the risks of algorithmic collusion and the rights consumers have in digital markets.

[55] CARUGATİ C., (2024),"*The Generative AI challenges for Competition authorities*".

[56] BOSTOEN F., (2023), "*Artificial Intelligence and Competition Law*" , (accessed 16 March 2024): Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4655894.