GenAI and Antitrust: Tread Lightly in Times of Uncertainty

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Introduction

Developments in artificial intelligence ("AI") have rapidly gained prominence. The most high-profile of these, and arguably the most remarkable, have been innovations in the field of generative AI ("GenAI"). Unlike other applications of AI, GenAI can produce convincing responses to human prompts, allowing unprecedented consumer interaction.[1]

While AI has been part of our lives for decades,[2] GenAI and the foundation models ("FMs")[3] at the heart of this technology surged into the public discourse in November 2022 with the release of OpenAI's chatbot ChatGPT. The launch of ChatGPT, which reached one million users in just five days,[4] expanded public perception of what is possible with GenAI technologies[5] and demonstrated to many that GenAI had practical applications.[6] It also sparked a disruptive technological race among both established players and startups.[7] Since then, the adoption of GenAI technology has been remarkably rapid, and has spawned the release of hundreds of other GenAI chatbots and other applications.

Advancements in GenAI models and applications have the potential to unlock extensive innovative opportunities.[8] With its ability to automate repetitive tasks, optimise processes, and analyse vast amounts of data with unprecedented accuracy, GenAI is expected to drive innovation and enable the creation of new products, services, and supply chains,[9] potentially reshaping competition.[10] Investment banks, consulting firms and researchers project that GenAI will create significant economic value, with some estimating as much as USD 4.4 trillion per year.[11]

Competition authorities are taking a proactive stance to understanding the evolving competitive landscape in the GenAI sector. They are particularly focused on monitoring its impact within their jurisdictions to ensure that markets across the various layers of the GenAI value chain[12] remain competitive and accessible.[13]

This article provides an overview of the main initiatives adopted by competition authorities regarding GenAI, explores potential competition issues associated with GenAI and critically examines the concerns raised by competition authorities. It concludes that the uncertainty surrounding GenAI calls for a cautious approach to antitrust enforcement, allowing this technology room to develop.

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[1] See Regulation 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations 300/2008, 167/2013, 168/2013, 2018/858, 2018/1139 and 2019/2144 and Directives 2014/90/EU, 2016/797 and 2020/1828 (Artificial Intelligence Act), PE/24/2024/REV/1 OJ L, 2024/1689, 12 July 2024, recitals 99 and 105.

[2] For example, AI improves financial forecasting and stock market predictions. It also powers speech recognition, recommendation systems on streaming platforms, smart parking systems, and personalised shopping suggestions.

[3] FMs are deep learning models trained on unstructured, unlabelled data that can be used for a wide range of tasks out of the box or adapted to specific tasks through fine-tuning. See P. Lorenz, K. Perset and J. Berryhill, "Initial policy considerations for generative artificial intelligence" 2023 OECD Publishing, No. 1, OECD Artificial Intelligence Papers, Paris p.6.

[4] According to Greg Brockman, OpenAI's CEO at the time.

[5] T. Oeyen and Y. Yargici, "Uncharted territories: Generative AI, merger control and the Microsoft-Open AI saga", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.18.

[6] See, e.g., E. Mollick, "ChatGPT is a Tipping Point for AI", *Harvard Business Review* (14 December 2022).

[7] Companies active in the GenAI field include, for example, Aleph Alpha, BLOOM (Hugging Face), Claude (Anthropic), Cohere, Gemini and Gemma (Google), Inflection AI, LLaMA (Meta), various versions of Mistral AI, MidJourney, Stability AI, and Titan (Amazon).

[8] See M. Heikkilä, "AI is at an inflection point, Fei-Fei Li says", *MIT Technology Review*, 14 November 2023, available at: *https://www.technologyreview.com/2023/11/14/1083352/ai-is-at-an-inflection-point-fei-fei-li-says/*.

[9] Polaris, "Generative AI Market Share, Size, Trends, Industry Analysis Report, By Component (Software and Services); By Technology; By End-Use; By Region; Segment Forecast, 2023—2032", 2023, available at: *https://www.polarismarketresearch.com/industry-analysis/generativeai-market*.

[10] Virtually every sector of the economy stands to benefit from GenAI. GenAI is already transforming business practices and productivity in many sectors across the economy. It is also increasingly valuable in scientific research, enabling complex models that extend scientists' capabilities. See, e.g., Z. Qiao et al., "State-Specific Protein-Ligand Complex Structure Prediction with a Multiscale Deep Generative Model", 6 *Nature Machine Intelligence*, 195–208 (2024); See also J. Seo et al., "Avoiding Fusion Plasma Tearing Instability with Deep Reinforcement Learning", 626 *Nature*, 746–751 (2024).

[11] See McKinsey, "The economic potential of generative AI: The next productivity frontier", 2023, p.24, available at: *https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20economic%20potential%20of%20generative%20ai%20the%20next%20productivity%20frontier/the-economic-potential-of-generative-ai-the-next-productivity-frontier.pdf*. Research by Goldman Sachs conducted in 2023 estimated that GenAI tools have the potential to add 7% to GDP over the next 10 years, which corresponds to approximately USD 7 trillion. See Goldman Sachs, "Generative AI could raise global GDP by 7%", 5 April 2023, available at: *https://www.goldmansachs.com/insights/articles/generative-ai-could-raise-global-gdp-by-7-percent.html*.

[12] The GenAI sector should be understood as the "value chain of GenAI models", which may indicatively include, among others, the following markets: chips manufacturing, provision of cloud infrastructure, data licensing, supply of specific types of AI workforce, the supply of productivity software, supply of specific chatbot services, supply of specific mobile phone digital assistant services, etc. See European Commission, "Competition in Generative AI and Virtual Worlds", Competition Policy Brief No 3/2024, available at: *https://competition-policy.ec.europa.eu/document/download/c86d461f-062e-4dde-a662-15228d6ca385_en*.

[13] While the role of competition enforcement in preserving competitive GenAI markets is important, it should be noted that the way in which market dynamics and competition will unfold in relation to these technologies is susceptible to being affected by many other factors, including regulation on policy aspects different from competition, such as AI safety, data, and copyright law. See European Commission, "Competition in Generative AI and Virtual Worlds", Competition Policy Brief No 3/2024, available at: *https://competition-policy.ec.europa.eu/document/download/c86d461f-062e-4dde-a662-15228d6ca385_en*.

Competition Authorities' Main Initiatives on GenAI

Although GenAI is still in the early stages of mainstream adoption, it has already attracted scrutiny from competition regulators in major economies.

The UK's Competition and Markets Authority (the "CMA") was the first competition authority to launch, in May 2023, an initial review[14] of the role of AIFMs. In September 2023, the CMA published its initial report,[15] which identified a set of general principles to guide the development and deployment of FMs.[16] In April 2024, the CMA released an Update Report, including a detailed technical paper covering recent market developments.[17]

GenAI has been addressed at the EU level as well. In March 2024, the European Parliament passed the Artificial Intelligence Act,[18] which sets out an ambitious plan to regulate AI.[19] In January 2024, the European Commission (the "EC") launched two calls for contributions on competition within virtual worlds and GenAI.[20] The EC is also looking into some of the agreements that have been concluded between established players and GenAI developers.[21] The CMA,[22] the German Federal Cartel Office,[23] and the US Federal Trade Commission ("FTC") launched similar inquiries into partnerships.[24]

Across the EU, several competition authorities are focusing on GenAI. In November 2023, the Portuguese Competition Authority adopted a report outlining factors affecting competition in the GenAI sector.[25] In January 2024, the Hungarian Competition Authority launched a market investigation to assess the impact of GenAI on consumer behaviour.[26] In February 2024, the French Competition Authority initiated a public consultation, focusing on vertical relationships among GenAI input providers and the potential consolidation of their market presence upstream.[27]

Beyond Europe, in October 2023, U.S. President Biden issued an Executive Order addressing AI-related risks.[28] The Australian Digital Platform Regulator's Forum released a joint working paper on the implications of large language models ("LLMs").[29] In March 2024, the Competition Bureau of Canada published a report examining various issues surrounding AI.[30]

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[14] See Competition and Markets Authority, "AI Foundation models: Initial review", 4 May 2023, available at: *https://www.gov.uk/cma-cases/ai-foundation-models-initial-review*.

[15] See Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023, available at: *https://www.gov.uk/government/publications/ai-foundation-models-initial-report*.

[16] Namely: (i) ongoing access to inputs; (ii) diversity of business models; (iii) sufficient choice for businesses between FMs; (iv) flexibility to switch between or use different FMs; (v) fair dealing, i.e., no anticompetitive conduct; and (vi) transparency around the risks and limitations of FM-generated content. See Competition and Markets Authority, "AI Foundation Models Initial Report", Section 7.

[17] See Competition and Markets Authority, "AI Foundation Models Update paper", 11 April 2024, available at: *https://www.gov.uk/government/publications/ai-foundation-models-update-paper*, pp.14–17. The Update Report highlights three areas of connected risk: (i) companies with control over critical inputs for FM developments could restrict access to these inputs to exclude competitors; (ii) these companies could exploit their positions in consumer or business-facing markets to distort choice in FM services and restrict competition in FM deployment; and (iii) partnerships involving main players could reinforce or extend existing positions of market power through the value chain.

[18] Regulation 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, No 167/2013, No 168/2013, 2018/858, 2018/1139, and 2019/2144 and Directives 2014/90/EU, 2016/797, and 2020/1828, PE/24/2024/REV/1 OJ L, 2024/1689, 12 July 2024, available at: *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R1689*. The Artificial Intelligence Act will enter into force and will apply from 2 August 2026.

[19] The Artificial Intelligence Act implements a sliding scale of rules based on the level of risk: the greater the perceived risk, the more stringent the rules.

[20] European Commission, Press Release, "Commission launches calls for contributions on competition in virtual worlds and generative AI", 9 January 2024, available at: *https://ec.europa.eu/commission/presscorner/detail/en/ip_24_85*. As a follow-up to the calls for contributions, the EC organised a workshop on 28 June 2024. It also sent a series of requests for information to several players in the GenAI sector to gain a better understanding of the market dynamics. In September 2024, the EC published a policy brief. See European Commission, "Competition in Generative AI and Virtual Worlds", Competition Policy Brief No 3/2024, available at: *https://competition-policy.ec.europa.eu/document/download/c86d461f-062e-4dde-a662-15228d6ca385_en*.

[21] See below.

[22] See Competition and Markets Authority, "CMA Seeks views on AI partnerships and other arrangements", 24 April 2024, See at *https://www.gov.uk/government/news/cma-seeks-views-on-ai-partnerships-and-other-arrangements*.

[23] Bundeskartellamt, "Cooperation between Microsoft and OpenAI currently not subject to merger control", Press release, 15 November 2023, available at: *https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2023/15_11_2023_Microsoft_OpenAI.html*.

[24] FTC, "FTC Launches Inquiry into Generative AI Investments and Partnerships", 25 January 2024, available at: *https://www.ftc.gov/news-events/news/press-releases/2024/01/ftc-launches-inquiry-generative-ai-investments-partnerships*. As part of this inquiry, the FTC sent requests for information to Google, Amazon, Anthropic, Microsoft, and OpenAI. FTC Chair Lina Khan commented that the FTC is taking a closer look at the input providers and whether they are in the position to offer unfavourable commercial terms and pricing to further entrench their positions. FTC, "Remarks of Chair Lina M. Khan at the FTC Tech Summit", 25 January 2024, available at: *https://www.ftc.gov/system/files/ftc_gov/pdf/2024.01.25-chair-khan-remarks-at-ot-tech-summit.pdf*.

[25] The Portuguese Competition Authority has underscored the importance of access to data, access to cloud computing or specialised hardware, and access to FMs in GenAI as crucial elements for fostering a competitive environment. See Autoridade da Concorrência, "Competition and Generative Artificial Intelligence", 5 November 2023, available at: *https://www.concorrencia.pt/en/articles/adc-warns-competition-risks-generative-artificial-intelligence-sector*.

[26] Gazdasági Versenyhivatal, "GVH launches market analysis on the impact of artificial intelligence", 4 January 2024, available at: *https://www.gvh.hu/en/press_room/press_releases/press-releases-2024/gvh-launches-market-analysis-on-the-impact-of-artificial-intelligence*. In October 2024, the Hungarian Competition Authority released a study examining the impact of AI on market competition and consumers. See Gazdasági Versenyhivatal, *Study summarising the results of the market analysis number AL/234/2024 of the Hungarian Competition Authority*, October 2024, available at: *https://gvh.hu/pfile/file?path=/en/resolutions/sectoral_inquiries_market_analyses/market_analyses/mesterseges-intelligencia_piacelemzes_hirdetmeny_240104_a&inline=true*.

[27] Autorité de la Concurrence, "Generative artificial intelligence: the Autorité starts inquiries ex officio and launches a public consultation", 8 February 2024, available at: *https://www.autoritedelaconcurrence.fr/en/press-release/generative-artificial-intelligence-autorite-starts-inquiries-ex-officio-and-launches*.

[28] See White House, *Fact Sheet: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence*, 30 October 2023, available at: *https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/30/fact-sheet-president-biden-issues-executive-order-on-safe-secure-and-trustworthy-artificial-intelligence/#:~:text=The%20Executive%20Order%20establishes%20new,around%20the%20world%2C%20and%20more*.

[29] LLMs make up a class of FMs that can process massive amounts of unstructured text and learn the relationships between words or portions of words known as tokens. This enables LLMs to generate natural-language text, performing tasks such as summarisation or knowledge extraction. See P. Lorenz, K. Perset and J. Berryhill, "Initial policy considerations for generative artificial intelligence", OECD Publishing, No. 1, OECD Artificial Intelligence Papers, Paris, 2023, p.6. See also Digital Platform Regulators Forum, "Examination of technology—Large Language Models", 25 October 2023, available at: *https://dp-reg.gov.au/publications/working-paper-2-examination-technology-large-language-models*.

[30] Competition Bureau Canada, "Artificial intelligence and competition", 20 March 2024, available at: *https://competition-bureau.canada.ca/how-we-foster-competition/education-and-outreach/artificial-intelligence-and-competition*.

The initiatives adopted by competition authorities in relation to GenAI provide an insight into potential future developments.[31] While in many jurisdictions market studies and reports only give rise to the power to make recommendations, an increasing number of competition authorities are gaining more extensive market investigation powers.[32] These powers enable authorities to intervene in markets and address competition concerns without needing to find infringements of the law and impose remedies to address impediments to more effective competition. As such, market investigation powers could play an increasingly important role in the fast-paced GenAI sector, where traditional enforcement measures may be perceived as too slow or lacking in remedial power, or where agencies feel the to intervene to enhance competition without any finding of wrong-doing.[33]

Potential Competition Concerns

Initial assessments by competition authorities have focused on identifying potential competition concerns related to GenAI. These include: (i) scarcity of critical inputs for developing FMs as a potential bottleneck; (ii) the risk that GenAI partnerships could reinforce or extend existing positions of market power; and (iii) the concern that established players may leverage their market positions to distort choice and restrict competition.

These theoretical risks, which are analysed further below, are based on established antitrust principles and provide a framework for competition authorities to assess current market developments.

Access to inputs

Competition authorities have raised concerns that the critical resources needed to develop GenAI—data, computing power, technical expertise, and capital—could become barriers to entry and expansion.[34] The underlying concern is that firms that control critical inputs for developing FMs may restrict access to them. They may prevent other firms from developing new, competitive FMs that might challenge their own. They may also protect their position in related markets by making it harder for potential competitors in those markets to develop or deploy FMs.[35] Over time, this may create barriers to market entry and lead to under-provision or lower levels of innovation.

Data

Data is an important input for GenAI development. To work well, FMs must be "trained" using significant volumes of data, such as textual, audiovisual, and other types of data.[36] During training, the FM parameters are progressively updated until the model creates sufficiently accurate outputs.[37]

Training data often derives from publicly available unstructured sources.[38] FMs may also rely on proprietary datasets for training, such as licensed or in-house data.[39] Proprietary data, however, has not played a major role in the development of models.[40] FMs may also be trained using synthetic data, artificially created by a computer, rather than collected from the real world.[41]

When an FM has been trained, it can be "fine-tuned" to improve its performance through tailored training on a smaller, specialised dataset (e.g., financial data, conversations, and medical records). Fine-tuning may involve proprietary data. For instance, start-ups might use client data to create customised fine-tuned FMs.

Some competition authorities have emphasised that proprietary data may play an increasingly important role in the development of GenAI, giving rise to market-access concerns and intellectual property issues.[42] In addition, GenAI providers may rely on data sets that are not easily replicable by competitors. As the quality and diversity of training data can have a significant impact on the performance of an FM, a firm that is present in a number of markets may have the ability and incentives to give its own GenAI privileged or preferential access to these datasets at the expense of potential competitors.

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[31] To support enforcement in the AI space, competition authorities have dedicated part of their staff to this task, and some have hired experts in the field. For example, the CMA established a Chief Data and Technology Insights Officer position and a Data, Technology and Analytics (DaTA) unit. Similarly, the Directorate General for Competition of the European Commission established a Chief Technology Officer position and a Data Analysis and Technology unit.

[32] OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.168.

[33] Market investigation powers already exist in a number of jurisdictions, including the UK, Italy, Iceland, Greece, Mexico, South Africa, and Germany. There are also proposals within other jurisdictions to introduce these powers, such as in the Czech Republic, Norway, and Sweden. OECD, "Artificial intelligence, data and competition—Background Note".

[34] See for example, Competition and Markets Authority, "AI Foundation Models Update paper", 11 April 2024, para.31. See also OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, Ch.3.

[35] The CMA has observed that "*materially restricting access to key inputs such as compute, data or expertise would prevent challengers from building effective, competitive models. It might* also *reinforce incumbents' positions in related markets such as search and productivity software, by making it harder for potential rivals there to develop or deploy capable models that could provide the building blocks for a next generation competitive alternative, which could result in reduced choice and quality, as well as increased prices for downstream business customers and consumers.*" See Competition and Markets Authority, "AI Foundation Models Update paper", 11 April 2024, para.31.

[36] OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.43. See also below.

[37] See G. Langus, N. Maier and R. Muhamedrahimov, "Balanced and Transparent Antitrust in the AI Space", Dossier, *Artificial Intelligence and antitrust*, Concurrences 2-2024, p.12.

[38] E.g., accessed by web scraping and crawling, and relying on public datasets, news articles, scientific journals, and user-generated content. See Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023, para.2.10.

[39] The decision in relation to whether to pursue an open or proprietary approach may be driven by a variety of factors, including safety and security considerations. See R. Alaily, *The New AI Economy: Understanding the Technology, Competition, and Impact for Societal Good*, Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.8.

[40] OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.46.

[41] Synthetic data can be used to augment existing data, fill in missing data, or create entirely new datasets for training FMs. W. D. Heaven, "Synthetic data for AI", *MIT Technology Review*, 23 February 2022.

[42] See, for example, Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023, paras 3.5 et seq.

Computing power

Significant computing resources are required to develop FMs.[43] FM developers usually rely on latest-generation hardware, such as graphics processing units ("GPUs"),[44] which excel at high-speed processing.

FM developers can access computing power by building their own infrastructure. Alternately, they can, and often do, enter into agreements or partnerships with cloud service providers[45] to gain access to the necessary computing capabilities to deploy, customise, or run FMs.[46]

Technical expertise and talent

Developing GenAI models requires a blend of talent and technical expertise, given the inherent complexity of FMs. This expertise spans data science, machine learning, programming, mathematics, statistics, and domain-specific knowledge—all highly sought-after skills in the AI industry.[47]

Competition authorities have suggested that accessing expertise and talent can be challenging and may act as a barrier to competition.[48] A scarcity of skilled labour may also incentivise firms to take action to alleviate wage pressures and staff turnover. For instance, firms might engage in wage-fixing or enter into no-poaching agreements to limit competition in relation to talent.[49] Practices, such as non-compete clauses, that hinder the ability of workers to switch jobs or start their own businesses may also impact competition by reducing fair compensation and stifling development.[50]

The extent to which a shortage of expertise might delay GenAI development remains uncertain. The recent surge in interest in GenAI has led to an increase in labour supply in this field, with substantial growth in the AI workforce in many countries.[51] Moreover, the establishment of new

companies by former employees of large tech companies indicates that even if the entry of new talent is limited, existing talent may play an important role in market-entry.[52]

Capital

Developing and training an FM demands substantial financial resources.[53] Capital is crucial not only to expand beyond niche markets but also to leverage data, computing power, and technical expertise, enabling faster scaling and innovation.[54]

The extent to which capital may act as a barrier to entry is unclear.[55] Costs may decrease significantly with advancements in techniques and hardware. It is also likely that, given the expected growth of GenAI, investment capital will continue to be available,[56] especially if long-term returns remain promising. However, the unpredictable regulatory environment could lead to concerns about potential returns and hinder efforts to monetise GenAI.

AI partnerships

GenAI start-ups often form partnerships with, or secure investments from, established digital players.[57] These agreements vary widely, ranging from buy access to infrastructure to more extensive arrangements involving investment or service contracts. Fundamentally, these agreements provide start-ups with the computing power, funding, and distribution support needed to train models.[58]

Competition agencies have strained to assert jurisdiction to review these arrangements, principally under merger control rules. While there is room to debate whether merger-control rules should extend this far, the substantive analysis carried out to date suggests that

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[43] For example, GPT-3 is estimated to have required over a thousand GPUs, while Meta's LLaMA used over two thousand. Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023, para.2.17.

[44] OECD, "A blueprint for building national compute capacity for artificial intelligence", OECD Digital Economy Papers, No. 350, 28 February 2023, available at: *https://www.oecd.org/en/publications/a-blueprint-for-building-national-compute-capacity-for-artificial-intelligence_876367e3-en.html*.

[45] Cloud service providers include established US firms such as Microsoft, Amazon, Google, Oracle, and IBM, as well as firms from China such as Alibaba, Huawei, Tencent, and Baidu. There are also specialised entrants such as Coreweave, Denvr Dataworks Corporation and OVHCloud.

[46] Partnerships between FM developers and cloud providers (some of whom are developing their own FMs) have begun to draw significant attention from competition authorities. A number of antitrust enforcers are scrutinising whether such strategic agreements could be considered a "concentration" under merger control rules (See below).

[47] Companies are fiercely competing for top talent, often offering substantial financial incentives. Inflection AI, "The new Inflection: An important change to how we'll work", 19 March 2024, see at, *https://inflection.ai/blog/the-new-inflection*.

[48] See, for example, Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023, paras 3.39 et seq.

[49] See OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.139.

[50] These concerns led the FTC to adopt a rule banning noncompete clauses nationwide in 2024. See FTC, "FTC: Announces Rule Banning Noncompetes", 23 April 2024, See at, *https://www.ftc.gov/news-events/news/press-releases/2024/04/ftc-announces-rule-banning-noncompetes*.

[51] See Stanford University, "Artificial Intelligence Index Report 2024, Human-Centred Artificial Intelligence", 2024, available at: *https://aiindex.stanford.edu/report/*.

[52] See Stanford University, "Artificial Intelligence Index Report 2024, Human-Centred Artificial Intelligence", 2024.

[53] See Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023.

[54] Firms often benefit from the scale needed to make the investments necessary to drive innovation and recoup the costs of these investments in the face of uncertainty. As Joseph Schumpeter explained, innovation or dynamic competition occurs through "*gales of creative destruction*" whereby one firm competes for the market by creating a new product, only to be challenged by additional "*leapfrog competition*" that supplants the formerly dominant firm with a still newer product that not just dazzles consumers but allows for the firm to recoup the costs of its innovation. See J. A. Schumpeter, *Capitalism, Socialism, and Democracy*, (first published in 1943, Taylor & Francis e-Library 2003), pp.84, 87.

[55] Many antitrust scholars would not necessarily consider capital requirements (or relatedly, scale economies) to be an entry barrier. In line with George Stigler's work, these scholars restrict entry barriers to costs borne exclusively by an entrant. Other scholars align with Stigler's definition but acknowledge that capital requirements and scale economies can have anticompetitive implications from a consumer welfare perspective if these costs impede entry. See P.R. Fee, H. M. Mialon, M. A. Williams, "What is a Barrier to Entry?", 94 *American Economic Review*, 461 (2004).

[56] There have been substantial investments in GenAI, from corporations, venture capitalists, and public authorities. Many start-ups have successfully raised equity investments. For example, Mistral reportedly secured close to USD 527 million across two funding rounds. See Stanford University, "Artificial Intelligence Index Report 2024, Human-Centred Artificial Intelligence", 2024, available at: *https://aiindex.stanford.edu/report/*. This trend has led to a significant increase in the rapid adoption of GenAI applications by consumers and businesses.

[57] The CMA has identified an interconnected web of over 90 AI partnerships. See Competition and Markets Authority, "AI Foundation Models Update paper", 11 April 2024, figure 5, para.43.

[58] The CMA has identified an interconnected web of over 90 AI partnerships. See Competition and Markets Authority, "AI Foundation Models Update paper", 11 April 2024, figure 5, para.43.

competition agencies have sought to apply a traditional framework when carrying out their substantive analysis. Whether concerns arise depends on various factors, including the specific terms and conditions of the arrangement, the relative market positions of the parties and their competitors, and the level of "control" involved. Several competition authorities (e.g., in the EU,[59] the UK,[60] Germany,[61] and the United States[62]) have launched inquiries to assess the impact of these partnerships on competition, particularly under merger control law (see below). To date, however, there have been almost no instances of agencies identifying concerns in practice.

Other types of transactions have also been subject to scrutiny, even if they do not fall within the scope of merger control. In particular, competition authorities have considered whether hiring staff from a competitor can amount to an acquisition (a so-called "acqui-hire").[63] Whether such situations are subject to merger control is both situation- and jurisdiction-specific (See below).

Leveraging conduct

Another concern that competition authorities have raised in relation to GenAI is the potential for established firms to leverage their market power to foreclose rivals in adjacent or downstream markets.[64] Having substantial market power in several layers of the GenAI technology stack may allow these players to protect against disruption, or to harness it to their particular advantage, with a view to extending or entrenching their market positions, potentially harming future competition.[65]

These potential concerns stem from the supply and demand-side complementarities that may occur when providing adjacent services or products. Competition agencies argue that this dynamic may lead to the formation of digital "ecosystems" and facilitate the entrenchment of dominant market positions.[66]

Concerns related to ecosystems typically focus on theories of harm associated with integration of products or technologies.[67] Several large firms in the GenAI space have found it beneficial to integrate FMs into their ecosystems of products and services.[68] Doing so can benefit businesses and consumers in terms of innovation and efficiencies. However, concerns could arise if practices involving tying, bundling, or self-preferencing practices foreclose others from the market.

An FM provider might naturally prioritise its own applications over those of independent developers that want to access its model. While refusing access to a critical input can in some circumstances be anticompetitive, competition agencies should be slow to intervene in ways that discourage innovation or encourage free riding. There are well established frameworks from assessing whether a refusal to supply or discrimination is anticompetitive, for example, that seek to balance the need to encourage and reward innovation while ensuring competition is not eliminated.

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[59] See below.

[60] See Competition and Markets Authority, "CMA seeks views on AI partnerships and other arrangements", 24 April 2024, available at: *https://www.gov.uk/government /news/cma-seeks-views-on-ai-partnerships-and-other-arrangements*. See below.

[61] Bundeskartellamt, "Cooperation between Microsoft and OpenAI currently not subject to merger control", Press Release, 15 November 2023, available at: *https://www .bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2023/15_11_2023_Microsoft_OpenAI.html*.

[62] FTC, "FTC Launches Inquiry into Generative AI Investments and Partnerships", 25 January 2024, See, *https://www.ftc.gov/news-events/news/press-releases/2024/01/ftc -launches-inquiry-generative-ai-investments-partnerships*.

[63] The most notable example is the case of Microsoft's hiring of two of the three co-founders of AI start-up Inflection as part of a licensing deal to host its models on Microsoft's cloud service. See GCR, "Microsoft's Inflection tactics may signal a need for new legislation, Mundt says", 12 April 2024, available at: https://globalcompetitionreview.com/article/microsofts-inflection-tactics-may-signal-need-new-legislation-mundt-says. See below.

[64] See OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.143.

[65] See European Commission, CMA, US Department of Justice, and US FTC, "Joint Statement on Competition in Generative AI Foundation Models and AI Products", 23 July 2024, available at: *https://competition-policy.ec.europa.eu/about/news/joint-statement-competition-generative-ai-foundation-models-and-ai-products-2024-07-23_en*.

[66] See G. Langus, N. Maier and R. Muhamedrahimov, "Balanced and Transparent Antitrust in the AI Space", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.11: "*On the supply side, tech platforms and other ecosystem participants benefit from cost savings on common components of the services' infrastructure and from a combination of user data from different services. On the demand side, ecosystem participants benefit from network effects and from being able to offer users a one-stop shop for a bundle of services. Smaller firms often co-exist with large tech platforms in an ecosystem, sometimes in synergy and other times in competition, by providing complementary or competing, technologies and services.*"

[67] The following competition concerns have been raised:

(i)   Technologies and services within one ecosystem are not always compatible with those in other ecosystems, which can make switching between ecosystems costly;

(ii)   Players that control foundational technologies within an ecosystem may have an incentive to introduce hurdles for smaller firms that seek to offer competing services. These concerns are being investigated by the EC to determine whether Microsoft may have infringed EU competition rules by tying or bundling its communication and collaboration product Teams to its popular suites for businesses Office 365 and Microsoft 365, to the detriment of competitors such as Zoom or Slack. See European Commission, COMP/AT.40721—Microsoft Teams, and the related EC press release, No P/23/3991, 27 July 2023, available at: *https://ec .europa.eu/commission/presscorner/detail/en/ip_23_3991*.

(iii)   Ecosystems may be difficult to replicate, which could lead to barriers to entry and expansion, further entrenching ecosystem players. See the ecosystem-related theories of harm recently proposed by the EC, e.g., in the *Booking/eTraveli* merger. Booking.com, which offers hotel room bookings, recently attempted to extend its activities in the flight booking services sector by acquiring eTraveli. The EC prohibited the acquisition due to market power leveraging concerns. See European Commission, Decision of 25 September 2023, COMP/M.10615—*Booking Holdings / eTraveli Group*, pp.199 and ss. The case took into account, among other things, the importance of considering the specific features and effects of ecosystem dynamics, of network effects, as well as of behavioural biases, such as defaulting, customer inertia or single-homing. *Ibid.*, pp.118 and ss. Booking has challenged the EC's decision before the EU General Court. See Case T-1139/23 - *Booking Holdings v Commission*.

See also, G. Langus, N. Maier and R. Muhamedrahimov, "Balanced and Transparent Antitrust in the AI Space", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.14.

[68] For example, Microsoft is allegedly deploying its own FMs and those of its partner OpenAI in the Copilot feature integrated in its productivity software (Microsoft Office), PC operating system (Windows) and search (Bing). See Competition and Markets Authority, "AI Foundation Models Update paper", 11 April 2024, available at: *https:/ /www.gov.uk/government/publications/ai-foundation-models-update-paper*.

Critical Assessment

The approach of competition authorities to GenAI is based on the view that delayed action could repeat the "mistakes" purportedly made during the early years of Web 2.0 in addressing issues in digital markets.[69] Critics assert that these mistakes include failing to appreciate the importance of data in online markets, allowing anticompetitive mergers to go unchecked, and enabling early movers to entrench their market positions.[70]

One prominent idea is that intervention came too late, if at all, to maintain effective competition in those markets.[71] Hence, it is better to intervene early. As Lina Khan, Chair of the US FTC, has emphasised, "*public officials have a responsibility to ensure this hard-learned history doesn't repeat itself.*"[72] Along the same lines, former European Commissioner for Competition Margrethe Vestager has called for an approach that is capable of "*respond[ing] faster than we did for Web 2.0.*"[73] The fear is that GenAI will be dominated by a few technology companies, and that these will be the same companies that are already successful in the digital sphere.

It is highly debatable whether this view is correct. The cases usually cited to suggest that agencies should have been tougher and acted sooner do not withstand much scrutiny. For example, there is no certainty that Instagram and WhatsApp would have succeeded the way they have if they had not been acquired by Meta.

This analytical approach is in any event problematic.

- First, these calls for early-stage intervention closely resemble those raised during the last major disruptive technology over three decades ago: the public launch of the World Wide Web in 1991.[74] Many viewed the web as too risky to leave unregulated. During its early growth phase, however, the U Congress exercised notable restraint, with the first significant internet regulation emerging in the Telecommunications Act of 1996.[75] This light-touch approach to regulation contributed to the innovation and growth we continue to see today.[76] Although calls for regulation have persisted, history serves as a cautionary tale against hindering innovation in a developing and dynamic technological landscape.[77]

- Second, in recent years, technology regulation and antitrust enforcement in the digital sector have primarily focused on consumer-oriented, two-sided digital platforms (*e.g.,* search engines, social networks, e-commerce sites, and app stores). These platforms often experience strong network effects that can lead to tipping and winner-takes-all dynamics. GenAI, however, is different. Participants in the GenAI sector typically operate in a business-to-business context, selling inputs to other businesses (e.g., semiconductors are used by cloud providers, with data and cloud computing power being sold to FM developers, and FMs and tooling are sold to app developers). These relationships are typically one-sided, with products and services that are positively priced, either for a single fee or on a subscription or consumption basis.[78] Moreover, whereas providing consumer-facing services to additional users often involves little marginal cost, responding to AI queries is expensive.

While competition authorities could draw on past enforcement experience in relation to digital platforms over the past decade in order to address specific GenAI competition concerns, the uncertainty surrounding the advancement and deployment of GenAI calls for a cautious approach to antitrust enforcement.

[69] European Commission, Press Release, "Commission launches calls for contributions on competition in virtual worlds and generative AI", 9 January 2024, available at: *https://ec.europa.eu/commission/presscorner/detail/en/ip_24_85*. On this point, See F. Bostoen and A. van der Veer, *Regulating competition in generative AI: A matter of trajectory, timing and tools*, Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.27.

[70] As Lina Khan, Chair of the US FTC, noted: "*we are still reeling from the concentration that resulted from Web 2.0, and we don't want to repeat the mis-steps of the past with AI.*" See R. Foroohar, "The Great US-Europe Antitrust Divide", *Financial Times*, 5 February 2024, available at: *https://www.ft.com/content/065a2f93-dc1e-410c-ba9d-73c930cedc14*.

[71] A counterpoint to this argument is that digital markets inherently have features that lead to relatively high levels of concentration, which can benefit consumers in several ways. See, e.g., G. Manne and D. Auer, Antitrust Dystopia and Antitrust Nostalgia: Alarmist Theories of Harm in Digital Markets and Their Origins, 28 Geo. Mason L. Rev. 1279, 1294 (2021).

[72] L. Khan, "We Must Regulate AI. Here's How", *New York Times*, 3 May 2023, available at: *https://www.nytimes.com/2023/05/03/opinion/ai-lina-khan-ftc-technology.html*.

[73] M. Vestager, *"Making Artificial Intelligence Available to All—How to Avoid Big Tech's Monopoly on AI"*, Speech/24/931, 19 February 2024, available at: *https://europa.eu/newsroom/ecpc-failover/pdf/speech-24-931_en.pdf*. Similarly, the President of the French Competition Authority Benoît Coeuré, has observed that "*we need to learn the lessons from the past and act pre-emptively, building on our knowledge of digital ecosystems to secure a level playing field from the start.*" B. Coeuré, President of the French Competition Authority, "Artificial intelligence: making sure it's not a walled garden", Keynote address at the Bank for International Settlements—Financial Stability Institute policy implementation meeting on big techs in insurance, Basel, 19 March 2024, available at: *https://www.autoritedelaconcurrence.fr/sites/default/files/2024-03/20240319-BIS-Speech.pdf*. The President of the Portuguese Competition Authority has noted that GenAI is a "*poster child for all the challenges digital markets pose to competition.*" Autoridade da Concorrência, "Competition and Generative Artificial Intelligence", 5 November 2023, p.42, available at: *https://www.concorrencia.pt/en/articles/adc-warns-competition-risks-generative-artificial-intelligence-sector*. See also L. Radic, K. Stout, What is the Relevant Product Market in AI?, Artificial Intelligence and Competition Policy, in *Competition Policy and Artificial Intelligence*, A. Abbott, T. Schrepel (eds.) Concurrences, September 2024, p.108.

[74] See, e.g., CERN, "A Short History of the Web", available at: *https://home.cern/science/computing/birth-web/short-history-web*: "[T]he first Web server in the US came online in December 1991, once again in a particle physics laboratory: the Stanford Linear Accelerator Center (SLAC) in California."

[75] Specifically, Title V of the Communications Decency Act of 1996, § 230 (adding some protections to online service providers from third-party content).

[76] See generally A. Thierer, "Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom", Mercatus Center, George Mason University (2016).

[77] See J. M. Yun, The Folly of AI Regulation, in *Competition Policy and Artificial Intelligence*, A. Abbott, T. Schrepel (eds.) Concurrences, September 2024, p.251.

[78] See, for example, R. Alaily, "The New AI Economy: Understanding the Technology, Competition, and Impact for Societal Good", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.9.

It is difficult to predict how innovation will develop in a new industry, and GenAI is no exception. Instead of (almost reflexively) applying existing competition tools to alleged competitive failures in GenAI,[79] competition authorities should reassess their assumptions based on the current technological landscape.

Intervention aimed at addressing potential antitrust concerns in GenAI must be carefully considered, weighing the costs it may entail[80] and evaluating whether such intervention might stifle innovation and, as a result, competition. The prospect or threat of overzealous competition law enforcement intervention may increase uncertainty, which may in turn reduce investor incentives, and discourage innovation. It may also act as a barrier to entry, particularly for smaller firms, which may be less well equipped to deal with the regulatory burdens of providing information or complying with obligations.

Competition is intense at all layers of the GenAI value chain

The GenAI sector is dynamic and still in its infancy, marked by strong R&D activity and a diverse array of players.[81] Numerous FMs and applications are being rapidly developed, varying in performance, capability, and efficiency.[82] Some FMs serve general purposes, while others are designed for specific tasks,[83] with applications emerging across industries such as education (e.g., Khanmigo), hospitality (e.g., OpenTable AI), productivity (e.g., Geppettochat), and marketing (e.g., Jasper AI).

While downstream FM services make use of similar technological inputs, competition occurs at the level of the individual application, with suppliers striving to innovate and differentiate their offerings.[84]

The variety of players, including many start-ups, suggest that barriers to entry are not a significant impediment to the development of new GenAI FMs or applications. Rather, there is intense competition among FMs developers, which continue to outperform one another with each new release.

Successful start-ups have quickly managed to develop FMs that can compete head-to-head with those developed by established players. Some have even rapidly achieved unicorn status, exceeding the USD 1 billion valuation mark.[85]

Examples of this meteoric rise include OpenAI[86] and Mistral AI,[87] which have succeeded in creating leading GenAI models despite not having proprietary access to a large amount of user data. In fact, the most relevant data for start-ups in a given market may not necessarily come from large incumbent platforms in other markets, but rather from data specific to the market in which the start-up operates or to the particular problem it is trying to solve.[88] The real challenge in developing cutting-edge GenAI is not so much data collection, but the development of innovative *AI training processes and architectures.*

While the volume of data may be less critical, the quality and uniqueness of the data are more important.[89] As a result, the access of incumbent platforms to large numbers of users and data in their primary markets may have only a marginal impact on their competitiveness.

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[79] See, e.g., European Commission, Press Release, "Commission Launches Calls for Contributions on Competition in Virtual Worlds and Generative AI", 9 January 2024, available at: *https://home.cern/science/computing/birth-web/short-history-web.*

[80] On the various costs associated with intervention, See K. Curry and J. Hill, *GenAI – Some Reflections on the CMA's Update Paper*, 2024.

[81] See European Commission, "Competition in Generative AI and Virtual Worlds", Competition Policy Brief No 3/2024, available at: *https://competition-policy.ec.europa.eu/document/download/c86d461f-062e-4dde-a662-15228d6ca385_en.*

[82] See Stanford University, "Ecosystem Graphs for Foundation Models", available at: *https://crfm.stanford.edu/ecosystem-graphs/index.html?mode=table.* FM developers and providers include AI21 Labs, Amazon, Aleph Alpha, Alibaba, Anthropic, Anyscale, Baidu, Cohere, Databricks, Deci, Eleven Labs, Fireworks AI, Google, Gretel AI, Hugging Face, Huawei, IBM, Inflection AI, Intel, Kakao Brain, Meta, Microsoft, Mistral AI, Naver, Nixtla, NVIDIA, OpenAI, Oracle, Perplexity AI, Replicate, Stability AI, Tencent, Technology Institute Abu Dhabi, Together AI, Writer, and Yandex.

[83] Some start-ups have developed general purpose conversational chatbots similar to OpenAI's ChatGPT (e.g., Anthropic's Claude and Cohere), while others focus on specific domains, such as video creation (e.g., Runway and Synthesia), coding (e.g., Replit and Tabnine), automated actions (e.g., Adept and DoNotPay), and AI applications and communities (e.g., Hugging Face and Weights & Biases).

[84] Customers can interact with FMs in various ways. Some FMs are standalone services like chatbots (e.g., Google's Gemini, Inflection AI's Pi, and OpenAI's ChatGPT) and virtual assistants (e.g., Amazon Alexa, Fireflies, Google Assistant, Microsoft's Copilot, and Otter). Others are integrated with or add-ons to existing applications and services.

[85] Interest and investments in GenAI start-ups by venture capital firms and major tech companies have garnered significant media attention. For instance, in 2023, Anthropic, "*one of AI's hottest start-ups*" according to the New York Times, secured $7.3 billion in funding. See E. Griffith and C. Metz, "Inside the Funding Frenzy at Anthropic, One of AI's Hottest Start-Ups" New York Times, 20 February 2024, available at: *https://www.nytimes.com/2024/02/20/technology/anthropic-funding-ai.html.* Similarly, in 2024, the Financial Times reported that Cohere, another prominent GenAI start-up, was in discussions to raise up to $1 billion in financing. On this point, See, for example, R. Alaily, "The New AI Economy: Understanding the Technology, Competition, and Impact for Societal Good", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.4.

[86] OpenAI has become the leader in GenAI chatbots and established a strong consumer brand. OpenAI's ChatGPT offers various deployment and monetisation strategies, ranging from open source to open access via API. OpenAI was recently valued at $86 billion, driven by the widespread adoption of its premium ChatGPT product. See Bloomberg, "OpenAI Deal Lets Employees Sell Shares at $86 Billion Valuation", 17 February 2024, available at: *https://www.bloomberg.com/news/articles/2024-02-17/openai-deal-lets-employees-sell-shares-at-86-billion-valuation.*

[87] Mistral AI, despite having no proprietary access to hardware or data, has been able to compete effectively with the much larger models of some of its competitors, and its models are now considered among the best performing ones. See LMSYS Org., "Chatbot Arena: New models & Elo system update", 7 December 2023, available at: *https://lmsys.org/blog/2023-12-07-leaderboard/.* Mistral AI raised $113 million in seed funding within just a few weeks of inception and is now valued at around $5.8 billion. See Seifted, "Mistral closes €600m at €5.8bn valuation with new lead investor", 10 June 2024, available at: *https://sifted.eu/articles/mistral-468m-round-news.* Similarly to OpenAI, Mistral AI produces models with different degrees of openness and on various monetisation strategies. On the one hand, its open source enables the company to leverage on improvements to the model contributed by the AI members and the machine learning community. On the other hand, Mistral AI develops proprietary models tailored to specific business clients. Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, Box 3, para.59.

[88] See International Centre for Law & Economics, "European Commission Consultation, Competition in Generative AI", 11 March 2024, p.8.

[89] Only certain companies may have access to the data needed to fine-tune an FM for a specific purpose. For instance, a financial institution may have exclusive access to data for fine-tuning models for detecting fraudulent transactions. See T. Schrepel and A. Pentland, "Competition between AI Foundation Models: Dynamics and Policy Recommendations", MIT Connection Science Working Paper, 2024. Additionally, developments such as synthetic data (*i.e.*, data generated by AI models themselves) and reinforcement learning (*i.e.*, the machine learning task of learning a policy from reward signals that maximises a value function) demonstrate the potential of using less but higher-quality data. See I. Shumailov et al., *The curse of recursion: Training on generated data makes models forget*, arXiv preprint arXiv:2305.17493 (2023); and R.S. Sutton and A.G. Barto, *Reinforcement Learning: An Introduction*, The MIT Press, 2nd edition, 2018.

This is supported by empirical studies which suggest that data has diminishing marginal returns,[90] i.e., beyond a certain point, acquiring more data does not confer a meaningful advantage on the acquiring firm.[91]

Open models ensure competition and innovation

Open-source GenAI systems and components, when adapted and maintained, are capable of effectively competing with proprietary systems.[92] To date, most FMs are open-source.[93] In the training phase, for example, LlaMA (Meta), GPT-3 (OpenAI), and Stable Diffusion (StabilityAI) have been pre-trained entirely on open-source data.[94]

The reliance of successful companies on publicly available datasets to train their LLMs[95] suggests that data availability in various formats is not a barrier to entry. It also indicates that no single data source is indispensable and that open-source GenAI systems and components are well-positioned to compete effectively with proprietary alternatives.[96]

Open-source FMs play a pivotal role in ensuring effective competition. They allow new firms to enter the market with fewer resources, enabling them to scale-up quickly, stimulating pro-competitive follow-on innovations.[97] Open-source FMs also impose a competitive constraint on downstream applications and fine-tuned FMs developed by the creators of the underlying models. This helps reduce the risk of the market tipping towards a small number of non-publicly available FMs.[98]

In addition, the rising demand for data from entrants in the LLM space prompted the emergence of secondary data providers to fulfil that need. These data sources encompass "data warehouses", providers of synthetic datasets, and specialised data suppliers that cater to LLM models or developers of GenAI applications.[99]

Finally, when assessing the need for intervention, competition authorities should also consider the impact of the legislation designed to increase access to data, such as the Digital Markets Act ("DMA"),[100] the Artificial Intelligence Act[101] and the Data Act.[102] This legislation may already mitigate risks to effective competition in the GenAI space. For example, interoperability obligations under the DMA may improve the ability of some operators to access users on existing platforms.[103]

Technological advancements reduce computing and economic costs

While training FMs can be costly,[104] it is uncertain how these costs will change as GenAI and related markets mature.

Techniques and hardware in the GenAI field are advancing, lowering the computing power needed and making it more affordable.[105] These improvements have already enhanced the cost-effectiveness of FMs, allowing new entrants with limited resources to compete with established players. Enhanced hardware enables advanced GenAI applications to run on devices with lower computing power,[106] while methods like federated learning are gaining popularity for their efficiency, reduced computing needs, and improved privacy.[107] In addition,

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[90] See also G. Manne and D. Auer, Antitrust Dystopia and Antitrust Nostalgia: Alarmist Theories of Harm in Digital Markets and Their Origins, 28 Geo Mason L. Rev. 1281, 1344 (2021).

[91] As Catherine Tucker observes: "*empirically there is little evidence of economies of scale and scope in digital data in the instances where one would expect to find them.*" C. Tucker, Digital Data, Platforms and the Usual [Antitrust] Suspects: Network Effects, Switching Costs, Essential Facility, 54 Rev. Indus. Org. 683, 686 (2019).

[92] OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.45; and Competition and Markets Authority, "AI Foundation Models Initial Report", 18 September 2023, p.11.

[93] OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.41.

[94] In the fine-tuning phase, where the model's accuracy is improved through dedicated training, data is often human-generated in-house or sourced from specialist third-party data providers. Specialist third-party data providers include Scale AI, Prolific, Surge AI, Super Annotate, and Dataloop.

[95] Financial Times, "Microsoft strikes deal with Mistral in push beyond OpenAI", 2024.

[96] G. A. Manne & D. Auer, "From Data Myths to Data Reality: What Generative AI Can Tell Us About Competition Policy (and Vice Versa)", CPI (February 2024).

[97] See IBM Data and AI Team, "Open Source Large Language Models: Benefits, Risks and Types", IBM Blog, September 27, 2023, available at: *https://www.ibm.com/think /topics/open-source-llms*. See also Information Technology & Innovation Foundation, *"Comments to the European Commission's Directorate General for Competition on Virtual Worlds and Generative AI"*, 8 March 2024, available at: *https://itif.org/publications/2024/03/08/comments-to-dg-comp-on-virtual-worlds-and-generative-ai/*.

[98] Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, para.57.

[99] See A. Murali, "The Ins and Outs of a Data Marketplace", Forbes, 12 May 2021, available at: *https://www.forbes.com/councils/forbestechcouncil/2021/05/12/the-ins-and -outs-of-a-data-marketplace/*.

[100] Regulation 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 2019/1937 and 2020/1828 (Digital Markets Act), PE/17/2022/REV/1 OJ L 265, 12 October 2022.

[101] Regulation 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations 300/2008, 167/2013, 168/2013, 2018/858, 2018/1139 and 2019/2144 and Directives 2014/90/EU, 2016/797 and 2020/1828 (Artificial Intelligence Act), PE/24/2024/REV/1 OJ L, 2024/1689, 12 July 2024.

[102] Regulation 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation 2017/2394 and Directive 2020/1828 (Data Act), PE/49/2023/REV/1 OJ L, 2023/2854, 22 December 2023.

[103] OECD, "Artificial intelligence, data and competition—Background Note", DAF/COMP(2024)2, 9 May 2024, para.190.

[104] For example, GPT-4 reportedly cost over $100 million to train, while Meta estimates the cost of its open foundation model LLaMA at $4 million. Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", February 2024, para.29, available at: *https://copenhageneconomics.com/wp-content/uploads/2024/03 /Copenhagen-Economics-Generative-Artificial-Intelligence-The-Competitive-Landscape.pdf*. See also, J. Vipra and S. Myers West, "Computational Power and AI", AI Now, 27 September 2023, available at: *https://ainowinstitute.org/publication/policy/compute-and-ai#h-policy-responses*.

[105] Techniques such as pruning (which reduces model complexity) and quantisation (which reduces the precision of calculations) have been especially effective in this regard. Other examples of promising innovation to increase computational efficiency include: (i) low-rank adaptation, which decreases trainable parameters by 10,000 times and GPU memory needs by three times through low-rank decomposition of weight matrices; (ii) small language models, designed to match the capabilities of larger models like GPT-4 while requiring less computing power; and (iii) step-by-step distilling, which fine-tunes smaller language models by extracting useful insights from larger ones, allowing them to outperform larger models with fewer parameters. See Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, Box 5, para.68.

[106] For example, Nvidia's "*Chat with RTX*" and "*Stable Diffusion*" allow users to generate images from text locally on their computers, provided they have at least a mid-range graphics card.

[107] Federated learning enhances privacy, data security, and bandwidth efficiency by training models directly on users' devices instead of centralising data on a single server. See H. Ludwig and N. Baracaldo, *Federated Learning, A Comprehensive Overview of Methods and Applications*, (Springer, 2022).

the costs of pretraining models are decreasing, and companies are developing small language models tailored for specific applications, which are cheaper to train.[108]

Many governments are investing in publicly-owned supercomputers, to support cloud and GenAI technologies,[109] such as France's National Centre for Scientific Research[110] and Italy's Leonardo high-performance computing cluster.[111] At the EU level, initiatives are underway to provide supercomputers to innovative GenAI start-ups, as outlined in the AI innovation package launched by the EC in January 2024 to support AI start-ups and SMEs.[112]

GenAI draws major investment

GenAI has attracted significant investments from venture capital firms and large technology companies,[113] either directly or by forming commercial or strategic partnerships. The largest independent LLM developers have successfully secured hundreds of millions of dollars in outside funding.[114] Several start-ups have been able to enter or accelerate their growth thanks to these investments.[115]

This surge in investment is expected to lower entry barriers by providing firms, particularly resource-constrained start-ups, with access to crucial resources.[116]

GenAI partnerships serve important purposes, and must be assessed on a case-by-case basis

Partnerships, financial investments, and other connections among companies in the GenAI sector have been widespread.[117] Several competition authorities, including the EC, the UK CMA, the German Bundeskartellamt, and the US FTC, are currently investigating these agreements.[118]

Regulators' concerns appear to reflect the view that arrangements between platforms and model developers may constitute horizontal acquisitions (or a functional equivalent) that remove a potential or actual challenger. An important consideration is whether they may replicate a merger scenario by giving the larger player significant control over the start-up. In this respect, one potential issue is whether the investor firm gains privileged access to the start-up's FMs (e.g., through exclusive IP licensing rights) or control (which may be decisive) over the start-up. If so, the question becomes whether this access or control results in anticompetitive effects. If the target start-up company is one of many similar competing firms, the answer is almost certainly not.

While each agreement must be assessed on its merits, it seems unlikely that the AI partnerships currently under scrutiny warrant intervention. At the very least, given the competitive landscape of the GenAI space, there is little to suggest that these transactions require closer scrutiny compared to similar deals in other sectors.

First, it is not clear that these transactions can be qualified as acquisitions. Merger control is designed to prevent the creation of a dominant position via acquisition and only applies when there is a change of control, meaning one firm acquires decisive influence over the other.[119] So far, however, the partnerships being scrutinised seem to involve the acquisition of minority stakes that do not result in any change of control over the target companies. For example:

- Microsoft's $16 million investment in Mistral AI represents less than a 1% equity stake in the company, which is valued at

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[108] T. Dotan, D. Seetharaman, "For AI Giants, Smaller is Sometimes Better", *Wall Street Journal*, 6 July 2024, available at: *https://www.wsj.com/tech/ai/for-ai-giants-smaller-is-sometimes-better-ef07eb98*.

[109] For example, the EC approved State aids by seven Member States to support the development of cloud and high-end technologies. See European Commission, "Commission approves up to €1.2 billion of State aid by seven Member States for an Important Project of Common European Interest in cloud and edge computing technologies", Press Release, 5 December 2023, available at: *https://ec.europa.eu/commission/presscorner/detail/en/ip_23_6246*.

[110] See *http://www.idris.fr/eng/jean-zay/jean-zay-presentation-eng.html*.

[111] See, *https://leonardo-supercomputer.cineca.eu/?__cf_chl_tk=n3FwypsKH59qN8waVATUU7GeRJ4y8u4__mPRX4Vdk7E-1722349975-0.0.1.1-4180*.

[112] European Commission, "Commission launches AI innovation package to support Artificial Intelligence start-ups and SMEs", 24 January 2024. See, *https://ec.europa.eu/commission/presscorner/detail/en/ip_24_383*.

[113] In 2023 alone, Anthropic raised $7.3 billion. Earlier this year, the Financial Times reported that Cohere, another AI start-up, was in talks to raise up to $1 billion in financing. See G. Hammond and T. Kinder, "Cohere in talks to raise as much as $1bn as AI arms race heats up", *Financial Times*, 18 January 2024, available at: *https://www.ft.com/content/631e91f6-4b24-4d4f-80cc-503be97a79c8*.

[114] As of March 2024, $5 billion for Anthropic, $641 million for Aleph Alpha, $553 million for Mistral AI, $435 million for Cohere, and $321 million for AI21 Labs. See, *https://dealroom.co/*.

[115] These include Adept, AI21 Labs, Aleph Alpha, Anthropic, Cohere, Databricks, Deci, EvolutionaryScale, Inflection AI, Mistral AI, OpenAI and Stability AI.

[116] Venture capital investments in a significant number of new players indicates investor confidence in the future of the sector. The GenAI sector is projected to grow significantly, with estimates that it could reach $1.3 trillion by 2032. Bloomberg, "Generative AI to Become a $1.3 Trillion Market by 2032, Research Finds", 1 June 2023, available at: *https://www.bloomberg.com/company/press/generative-ai-to-become-a-1-3-trillion-market-by-2032-research-finds/*. See also Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, p.21.

[117] See European Commission, CMA, US Department of Justice, and US FTC, "Joint Statement on Competition in Generative AI Foundation Models and AI Products", 23 July 2024, available at: *https://competition-policy.ec.europa.eu/about/news/joint-statement-competition-generative-ai-foundation-models-and-ai-products-2024-07-23_en*.

[118] In addition to the partnership cited below (*Microsoft/Mistral AI*, *Amazon/Anthropic*, and *Microsoft/Inflection AI*) Microsoft has invested around $13 billion in OpenAI from 2019 to 2023 and owned a 49% stake in OpenAI in January 2024. The CMA launched an investigation into Microsoft's partnership with OpenAI in December 2023. See, *https://www.gov.uk/cma-cases/microsoft-slash-openai-partnership-merger-inquiry*. In January 2024, the EC announced it would assess whether Microsoft's investment in OpenAI was subject to review under the EU Merger Regulation. In June, the EC determined that the agreement did not constitute a notifiable merger. However, it will continue to scrutinise the exclusivity agreements between the two companies (See, *https://globalcompetitionreview.com/article/ai-partnerships-microsoftopenai-avoids-eu-merger-probe-exclusivity-clauses-draw-scrutiny*). In November 2023, Germany's Bundeskartellamt announced that it lacked jurisdiction to investigate Microsoft's partnership with OpenAI due to OpenAI's limited operations in Germany from 2019 to 2021. However, the Bundeskartellamt noted that OpenAI had substantial operations in Germany in 2023, indicating that any future deals might need to be notified (see *https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2023/15_11_2023_Microsoft_OpenAI.html*). It is also worth mentioning that Google is reported to have invested around $2 billion in Anthropic. In October 2024, the CMA launched an investigation into Google's partnership with Anthropic (see *https://www.gov.uk/cma-cases/alphabet-inc-google-llc-slash-anthropic-merger-inquiry#:~:text=30%20July%202024%3A%20The%20Competition,creation%20of%20that%20situation%20may*). Meanwhile, the Google/Anthropic partnership is also under scrutiny in the US (see *https://globalcompetitionreview.com/gcr-usa/article/ftc-launches-ai-inquiry*).

[119] For example, for the EU, See EC Merger Regulation art.3.

$2.1 billion.[120] Such a *de minimis* stake is unlikely to enable Microsoft to exert significant control or influence over Mistral AI's competitive strategy. There are also no reports of Microsoft acquiring seats on Mistral AI's board or special voting rights.[121]

- Amazon's reported $4 billion investment in Anthropic,[122] a company valued at $18.4 billion, does not grant Amazon a majority stake or sufficient voting rights to influence Anthropic's competitive strategy.[123]
- Similar considerations apply to Microsoft's dealings with Inflection AI.[124] While Microsoft obtained a non-exclusive licence to distribute Inflection AI's model on its cloud service, and hired two of Inflection AI's co-founders, along with several of its staff, to join a newly formed unit within the company, there is currently no evidence to suggest that this arrangement will grant Microsoft control over Inflection AI's competitive strategy.[125] The licensing agreement has no direct impact on either

organisation's corporate structure. In fact, licensing agreements are routine business transactions. If anything, the movement of several Inflection AI employees to Microsoft reflects a competitive labour market.[126]

Secondly, these partnerships do not involve competitively significant behavioural commitments from the target companies. For instance, there are no reports of exclusivity agreements or other arrangements that would restrict third-party access to these companies' underlying AI models.[127]

Thirdly, it is not clear that these partnerships remove a potential challenger from the LLM layer of the GenAI sector to an extent that significantly reduces competition, taking into account (as a rule-of-reason or similar balancing analysis requires) operational or other efficiencies attributable to a particular acquisition.[128] On the contrary, these partnerships seem to be pro-competitive, as they allow start-ups to enter and expand in the GenAI field quickly by providing access

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[120] In the UK, the CMA found that the Microsoft's partnership with Mistral AI did not qualify for investigation under the UK's merger control regime because Microsoft had not acquired the ability to materially influence Mistral AI's commercial policy. See, *https://assets.publishing.service.gov.uk/media/664c6cfd993111924d9d389f/Full _text_decision.pdf*. See also T. Warren, *Microsoft Partners with Mistral in Second AI Deal Beyond OpenAI*, The Verge, 26 February 2024, available at: *https://www.theverge .com/2024/2/26/24083510/microsoft-mistral-partnership-deal-azure-ai*.

[121] See International Centre for Law & Economics, "Comments of the International Centre for Law & Economics", CMA Invitation to Comment on AI Partnerships, 9 May 2024, p.3.

[122] Anthropic, founded in 2021 by former OpenAI engineers, has developed an LLM called Claude, which competes with OpenAI's ChatGPT and Google's Gemini. In August 2024, the CMA initiated a merger inquiry into Amazon's partnership with Anthropic. See, *https://www.gov.uk/cma-cases/amazon-slash-anthropic-partnership -merger-inquiry#launch-of-merger-inquiry*. However, in September 2024, the CMA concluded that this partnership does not qualify for investigation under the merger provisions of the Enterprise Act 2002, as Anthropic's annual revenue in the UK is below £70 million and it accounts for less than a quarter of the market. See, *https://assets .publishing.service.gov.uk/media/66f680eec71e42688b65eda0/Summary_of_phase_1_decision_111024.pdf*.

[123] Reports also indicate that this deal will not give Amazon any board seats or special voting rights. Amazon does not have a director or observer role on the Anthropic board according to Reuters, "Microsoft's and Amazon's AI partnerships draw UK watchdog scrutiny", 24 April 2024, available at: *https://www.reuters.com/technology/uk -competition-watchdog-seeks-views-ai-partnerships-2024-04-24/*. See also International Centre for Law & Economics, *Comments of the International Centre for Law & Economics*, CMA Invitation to Comment on AI Partnerships, 9 May 2024, p.3.

[124] In July 2024, the CMA opened a formal investigation into Microsoft's hiring of some former employees of Inflection AI and its entry into associated arrangements with Inflection AI. See, *https://www.gov.uk/cma-cases/microsoft-slash-inflection-ai-inquiry*. In September 2024, the CMA cleared the partnership following a Phase 1 review. The CMA found that Microsoft's hiring of Inflection AI employees with relevant know-how constitutes a merger under UK law and the CMA had the jurisdiction to review it under its share of supply test. The CMA, however, concluded that Microsoft's relationship with Inflection AI does not raise competition concerns because the latter does not provide a competitive constraint to its rivals for the development and supply of consumer chatbots and FMs. See, *https://www.gov.uk/cma-cases/microsoft-slash-inflection -ai-inquiry#cma-clearance-decision*.

[125] See M. Sullivan, "Microsoft's Inflection AI Grab Likely Cost More Than $1 Billion, Says An Insider (Exclusive)", Fast Company, 26 March 2024, available at:*https:/ /www.fastcompany.com/91069182/microsoft-inflection-ai-exclusive*; and J. Bort, "Here's How Microsoft Is Providing a "Good Outcome" for Inflection AI VCs, as Reid Hoffman Promised", Tech Crunch, 21 March 2024, available at: *https://techcrunch.com/2024/03/21/microsoft-inflection-ai-investors-reid-hoffman-bill-gates/?guccounter =1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAJEKSO89hZ1vWDv2nhXqsKTwvdYa5vi _d00EGT2vh2GFCUdM2cF2xnvWBSnSM4c8JJIhPdZAiZG7t6_5mSbQ2isASx80IBzRjq9UqKZy1eZadAfLPajvBleIrw0j8TJ7vzCu7VcWcVu3i3mgquVtg0Xft2YN -RAWdx2y0xZ2Jv6f*.

[126] Arguably, this hiring is not anticompetitive because it is not designed to keep key employees away from a competitor, but rather to establish a new competitor in the form of Microsoft's new AI business unit. It is worth noting that in the US, the FTC recently announced a new rule to ban non-compete clauses in employment agreements. According to the FTC, this ban is necessary to protect the "*fundamental freedom of workers to change jobs, increasing innovation, and fostering new business formation.*" FTC, "FTC Announces Rule Banning Non-competes", 23 April 2024, available at: *https://www.ftc.gov/news-events/news/press-releases/2024/04/ftc-announces-rule-banning -noncompetes*. If Inflection AI had imposed non-compete obligations on its employees, they would not have been able to leave for Microsoft. Whilst one competition authority supports employees' ability to move between companies, another asserts that when employees exercise this freedom, their actions are deemed anticompetitive. See Information Technology & Innovation Foundation, "Comments to the UK CMA Regarding Microsoft and Inflection AI," 9 May 2024, available at: *https://itif.org /publications/2024/05/09/comments-competition-markets-authority-regarding-microsoft-inflection-ai/*.

[127] For example, the partnership between Microsoft and Mistral AI does not give Microsoft exclusive access to Mistral AI's LLMs. Mistral AI has three models (Mistral 7B, Mixtral 8x7B, and Mixtral 8x22B) under an Apache 2.0 open-source license, allowing anyone to use these models without restrictions. Mistral AI makes these open-source AI models available via a range of cloud partners. See Mistral AI, Mistral technology, available at: *https://mistral.ai/technology/#deployment*. In addition, Mistral AI does not have exclusive access to Microsoft's cloud services for its LLM. Microsoft's Azure AI Studio offers a catalogue of leading AI models, including to Mistral's competitors such as GPT-4 (OpenAI), Llama (Meta), Command (Cohere), and Dolly (DataBricks). See Microsoft, Azure AI Studio, available at: *https://ai.azure.com/explore/models*. See Information Technology & Innovation Foundation, "Comments to the UK CMA Regarding the Microsoft-Mistral AI Partnership", 9 May 2024, available at: *https://itif .org/publications/2024/05/09/comments-competition-markets-authority-regarding-microsoft-mistral-ai-partnership/*. Similarly, the partnership between Amazon and Anthropic does not prevent competitors from using Anthropic's models or Amazon's cloud services. In addition, Anthropic does not have exclusive access to Amazon's cloud services. See Information Technology & Innovation Foundation, "Comments to the UK CMA Regarding the Amazon-Anthropic Partnership", 9 May 2024, available at: *https://itif.org/publications/2024/05/09/comments-competition-markets-authority-regarding-amazon-anthropic-partnership/*. Finally, Microsoft's licensing of Inflection AI's models does not, and will not, prevent competitors from using Inflection AI's models or Microsoft's cloud services. The partnership does not give Microsoft exclusive access to Inflection AI's LLMs. In addition, Inflection AI does not have exclusive access to Microsoft's cloud services for its LLM. See Information Technology & Innovation Foundation, "Comments to the UK CMA Regarding Microsoft and Inflection AI", 9 May 2024, available at: *https://itif.org/publications/2024/05/09/comments-competition -markets-authority-regarding-microsoft-inflection-ai/*.

[128] See Jonathan M. Barnett, The Case Against Preemptive Antitrust in the Generative Artificial Intelligence Ecosystem, in *Competition Policy and Artificial Intelligence*, A. Abbott, T. Schrepel (eds.) Concurrences, September 2024, p.280.

to funding and computing resources.[129] On the other hand, established players may look for synergies between their existing products and the niche player's offerings. Nor do these partnerships have the typical characteristics of "killer acquisitions".[130] Far from "killing" the innovation pipeline of the start-up, it is usually the case that the established player's aim is to harness and incorporate the innovative potential of the start-up into its broader ecosystem.

While a detailed assessment of all existing partnerships is beyond the scope of this article, it seems highly unlikely that these deals will negatively impact the competitive landscape in the GenAI sector. On the contrary, such partnerships could lead to faster, more efficient GenAI models – efficiency that could be passed on to customers and drive innovation.[131]

Antitrust enforcement, therefore, should not be based on theoretical concerns but on specific evidence of anticompetitive behaviour that harms consumers. Pushing for intervention whenever incumbent tech firms (often operating in adjacent markets) form strategic relationships with GenAI start-ups could undermine a crucial source of competition to keep today's leading AI firms in check. And to be fair to the competition agencies, none of the decisions so far reached when analysing these arrangements have found cause for competitive concern on the facts.

Early-stage GenAI deployment poses low risk of leveraging market power

Currently, there is little or no sign of a risk of leveraging market power at the GenAI FM level.[132] Most FM developers already provide their own user-facing applications[133] or offer competing developers the ability to build applications on top of their existing models via open models.[134]

GenAI firms at different levels of the value chain compete in relation to various aspects to differentiate themselves. The main drivers of competition include task specificity,[135] price,[136] speed,[137] and licensing structure.[138] The success of several players in the GenAI space demonstrates that specialisation is a viable business model.[139]

GenAI applications are typically introduced through the integration of new features into existing products and services. This integration provides an opportunity for challengers to compete with more established players and increase the level of innovation.

However, as noted above competition authorities emphasised that integration could pose a risk, allowing players in adjacent markets to leverage their market power from the platform to the application layer.[140] It remains uncertain whether entirely novel competition issues will arise. Most of the potential concerns raised by competition authorities so far seem to fall largely under the categories of existing and traditional theories of harm for abuse (*e.g.,* tying, bundling, and self-preferencing anticompetitive conduct).[141]

Competition authorities, however, appear eager to identify new theories of harm, especially in relation to "ecosystems." The concern is that, when platforms purchase competitors on the fringe of their operations, and incorporate their services into their broader ecosystem, this may eliminate potential competition (see above).[142] For example, in the proposed acquisition of eTraveli by Booking, the EC investigated whether the acquisition of a neighbouring linked service by a firm

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[129] This has been the case with the partnership between Microsoft and OpenAI, as well as with numerous successful start-ups such as Anthropic, Stability AI, Cohere, Mistral AI, Adept, Character.ai and Cohere, all of which have relied on various forms of investment and partnerships to enable them to enter and expand in the market.

[130] OECD, "Start-ups, Killer Acquisitions and Merger Control", 2020, available at: *https://web-archive.oecd.org/2020-10-16/566931-start-ups-killer-acquisitions-and-merger-control-2020.pdf*.

[131] Potential efficiency gains may include combining complementary skills and assets of the involved players, which may result in the issuing of a better or new product or technology that would not otherwise come to light, as well as disseminating technological expertise across the market.

[132] Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, para.83.

[133] For example, OpenAI, Anthropic, and Mistral AI.

[134] For example, Jasper.ai using OpenAI's GPT models.

[135] GenAI firms often specialise in certain areas (e.g., BloombergGPT specialises in finance, and Isomorphic Labs in drug discovery) and tasks (e.g., GitHub Copilot specialises in coding, and Perplexity.ai in search).

[136] Several GenAI providers (e.g., OpenAI, Gemini, and Claude) offer chat interface access to their models for around $20 per month. However, the prices for API access may vary among these providers. See K. Wiggers, "Anthropic Claims Its New AI Chatbot Models Beat OpenAI's GPT-4", TechCrunch, 4 March 2024, available at: *https://techcrunch.com/2024/03/04/anthropic-claims-its-new-models-beat-gpt-4/*.

[137] Speed is a crucial factor, with models like GPT Turbo and Claude Instant focusing on delivering faster inferences to meet the demands of real-time applications. See B. Edwards, "Anthropic Introduces Claude, a "More Steerable" AI Competitor to ChatGPT", Ars Technica, 17 March 2023, available at: *https://techcrunch.com/2024/03/04/anthropic-claims-its-new-models-beat-gpt-4/*.

[138] Firms also compete on the licensing structure. For example, Meta's Llama, Mistral AI's Mixtral-8x7B, and the BLOOM models created by independent researchers use an open-source licence that allows users to use, reproduce, distribute, and modify the original model. Other GenAI FMs (e.g., OpenAI's GPT-3 and Anthropic's Claude) have built proprietary FMs. From a consumer's point of view, having different licensing models increases the options in the market. From the supply side, an open-source model maker does not bear the full cost of creating and sharing the models. For instance, Mistral AI shared its models via a torrent file on a peer-to-peer file-sharing network. On this point, See Information Technology & Innovation Foundation, "Comments to the European Commission's Directorate General for Competition on Virtual Worlds and Generative AI," 8 March 2024, available at: *https://itif.org/publications/2024/03/08/comments-to-dg-comp-on-virtual-worlds-and-generative-ai/*.

[139] Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, paras 84–85.

[140] See above.

[141] See M.G. Jacobides and I. Lianos, "Ecosystems and competition law in theory and practice", Industrial and Corporate Change, Volume 30, Issue 5, October 2021. The impact of these practices must be evaluated on a case-by-case basis, beginning with determining whether the firm treas market power in the leveraged market. See C. Carugati, "Foreword", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.2. On this point, See F. Bostoen and A. van der Veer, "Regulating competition in generative AI: A matter of trajectory, timing and tools", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.31. See also M.G. Jacobides and I. Lianos, "Ecosystems and competition law in theory and practice", Industrial and Corporate Change, Volume 30, Issue 5, October 2021.

[142] N. Mazzarotto and C. Wilkinson, "New applications of theories of harm: innovation, non-price foreclosure and ecosystems—what makes the outcome of a competition review harder to predict?", *Competition Law & Policy Debate*, Vol. 8, Issue 3, 2024, p.159.

operating an ecosystem may raise competition concerns by entrenching the acquirer's already strong market position in specific markets.[143]

The challenge with theories of harm related to ecosystems is that their scope has not yet been clearly established and is often highly uncertain, with a poorly defined conceptual underpinning.[144] Evaluating these theories involves a complex balancing act between the costs (such as reduced competitive pressure within the acquiring platform's ecosystem) and the benefits (i.e., synergies and efficiencies).[145] This analysis presents significant practical challenges, as methods for weighing these trade-offs are still developing, and measuring them accurately is difficult..[146]

Faced with such uncertainty, competition authorities may be tempted to avoid dealing with the complexity by employing a partial framework of analysis or by ignoring significant effects, whether pro- or anti-competitive, through a narrow market definition. Such an approach, however, would lead to inferior competitive outcomes and may even undermine the trust of businesses and the public in competition authorities.[147] It may also deter firms from launching new services or considering potentially pro-competitive mergers.

Competition authorities should be encouraged to outline their theories of harm clearly and before analysing whether the evidence supports those theories. This approach is needed to ensure that a workable and predictable framework for analysis can emerge.

Finally, for services acting as "gateways", the *ex ante* regulatory framework established by the EU DMA and in other jurisdictions are equipped to manage and address concerns around interoperability and the fairness, transparency and contestability of markets as these emerging technologies reach broader use. Although GenAI applications are not classified as "core platform services" ("CPSs") in the EU, and are therefore not directly subject to its rules,[148] they will be governed by the DMA when provided by a designated gatekeeper and integrated into CPSs, such as chatbots within operating systems, search engines, or virtual assistants. They will also be subject to the DMA rules if they are integrated into new CPSs and meet the thresholds to be designated as a gatekeeper (e.g., if OpenAI were to launch its own search engine and this engine met the DMA's thresholds).[149]

Conclusions

GenAI will significantly impact and shape various markets in the coming years. Its deployment will bring innovation, new business models, and new ways of doing things.[150]

The dynamic nature of GenAI, along with available evidence, suggests that, technically and commercially, competitive entrants can access the necessary inputs for entry. Investments and alliances, which have raised antitrust concerns, currently seem to be efficient arrangements for aggregating the resources needed to develop GenAI models and applications.

At this embryonic stage of GenAI's development, early-stage antitrust enforcement seems to lack reasonable justification, as it could lead to interventions that suppress innocuous or efficient business practices. Such a pre-emptive stance would also contrast with the conventional fact-intensive approach to antitrust enforcement, which evaluates competitive conditions in specific markets on a case-by-case basis and typically avoids making predictive assessments about the trajectory of a particular market.[151]

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[143] Booking.com offers hotel room bookings. It recently attempted to extend its activities into flight booking services by acquiring eTraveli. The EC prohibited the acquisition due to market power leveraging concerns. See European Commission, Decision of 25 September 2023, COMP/M.10615—*Booking Holdings/eTraveli Group*. The closest an authority has come to this type of reasoning is likely the CMA's assessment of the *Facebook/Kustomer* merger. In that case, the CMA evaluated whether the merger would enhance Facebook's data advantage, potentially raising barriers to entry in the digital advertising market—a market in which the CMA had already determined that Facebook holds significant market power. The CMA's assessment was relatively brief and concluded that the merger did not substantially increase the data available to Facebook. However, the CMA seems to indicate that it—like the EC—is prepared to apply these types of theories of harm in the future. Competition and Markets Authority, Decision of 27 September 2021, *Facebook, Inc./Kustomer, Inc.* See N. Mazzarotto and C. Wilkinson, "New applications of theories of harm: innovation, non-price foreclosure and ecosystems—what makes the outcome of a competition review harder to predict?", *Competition Law & Policy Debate*, Vol. 8, Issue 3, 2024, p.160.
[144] In the *Booking/Etraveli* prohibition, the EC set aside the well-established economic framework of the Non-Horizontal Merger Guidelines (i.e., the Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings, OJ C 265, 18 October 2008, or "NHMG") and focused instead on a theory of harm based on "ecosystem" concerns. The justification for this shift in analytical framework appears questionable. The core economic logic underpinning the EC's ecosystem concerns appears to be a question of foreclosure that would be suitable for analysis under the NHMG. By rejecting these guidelines the EC seems to have set itself a materially less rigorous benchmark for assessing nonhorizontal competition concerns. Booking has challenged the EC's decision before the EU General Court. See (T-1139/23) *Booking Holdings v Commission* (T-1139/23). Since the transaction was cleared at Phase I by the CMA, which assessed the same theories of harm, this may also signal a policy divergence between the EC and other regulators. See RBB, "Flight of fantasy? The European Commission's Booking/Etraveli prohibition", RBB Brief 68, September 2024.
[145] In particular, this assessment should also consider the potential impact on the relevant markets and an effects-based analysis that takes into account any efficiencies or any pro-competitive benefits to consumers from integration, such as whether certain product integrations are genuine product improvements and enhance customisation.
[146] N. Mazzarotto and C. Wilkinson, "New applications of theories of harm: innovation, non-price foreclosure and ecosystems—what makes the outcome of a competition review harder to predict?", *Competition Law & Policy Debate*, Vol. 8, Issue 3, 2024, p.160.
[147] See G. Langus, N. Maier, and R. Muhamedrahimov, "Balanced and Transparent Antitrust in the AI Space", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.14.
[148] Regulation 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 2019/1937 and 2020/1828 (Digital Markets Act), OJ L 265, 12 October 2022, p.1, arts 2(2) and 3(1).
[149] On the application of DMA to AI, See G. Langus, N. Maier, and R. Muhamedrahimov, "Balanced and Transparent Antitrust in the AI Space", Dossier, Artificial Intelligence and antitrust, Concurrences 2-2024, p.14. See also Copenhagen Economics, "Generative Artificial Intelligence: The Competitive Landscape", 2024, paras 88–89.
[150] See European Commission, "Competition in Generative AI and Virtual Worlds", Competition Policy Brief No 3/2024, available at: *https://competition-policy.ec.europa.eu/document/download/c86d461f-062e-4dde-a662-15228d6ca385_en*.
[151] This practice reflects both rule-of-law principles and the error-cost framework for antitrust enforcement, which seek to minimise the error costs of false positives and false negatives by adhering to an appropriately calibrated evidentiary threshold for taking enforcement action. See Jonathan M. Barnett, The Case Against Preemptive Antitrust in the Generative Artificial Intelligence Ecosystem, in *Competition Policy and Artificial Intelligence*, A. Abbott, T. Schrepel (eds.) Concurrences, September 2024, p.269.

This is not a call for a lax approach to antitrust enforcement or a more permissive treatment of GenAI under current laws. However, while competition concerns in various applications of GenAI should not be ignored, the most sensible regulatory approach involves robust monitoring of the ecosystem for potential anticompetitive practices, with intervention based on compelling evidence. Given the broad scope of regulations and novel theories of harm being proposed in competition policy, the real challenge for regulators is to apply competition rules in a way that encourages the development of GenAI.

Competition authorities should enforce laws and regulations cautiously, allowing evolving markets and technologies room to develop. This includes conducting objective fact-finding inquiries without presuming anticompetitive effects, accounting for uncertainty, and carefully defining the scope of the theories of harm to be tested.[152]

Most importantly, competition authorities and regulators should resist the urge to conflate perceived concerns about competition in technology markets in the past with competition in AI. The instinct to intervene early is understandable. But there are fundamental difference in business model, the role of network effects, and the speed of innovation. Agencies should of course intervene when there is evidence of genuine competitive concerns, but will inevitably do more harm than good by intervening too quickly with the aim of avoiding perceived mistakes of the past.

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[152] It would also be beneficial to perform periodic evaluations of the rules to ensure that the existing framework is still adequate and up to date.