Memorandum

Subject:	Generative AI Systems
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To:	European Commission
Date:	10 March 2024

Overview

We welcome the opportunity to offer our views as part of the European Commission's call for contributions on Generative AI systems. We offer this contribution having been involved for several years in policy discussions on competition law enforcement in the digital economy and having written extensively on the topic.

Our contribution makes the following key points:

> First, the emerging AI foundation model supply chain, like the digital economy, has several factors and characteristics that can lead toward concentrated markets.
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> Second, ecosystems that control the leading foundation models can have far more power than the current dominant ecosystems in affecting the dynamics of competition and changing the nature and value of innovations. Under this scenario, AI will herald significant disruption outside the dominant ecosystems' value chain, while promoting sustaining innovations that reinforce the dominant ecosystems' power.
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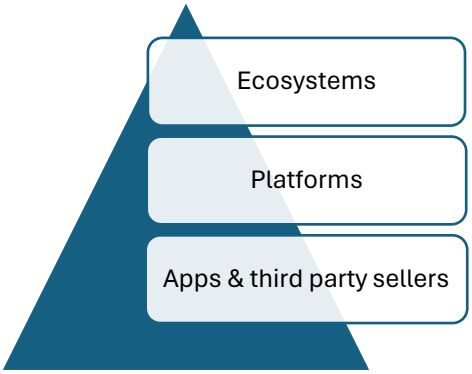
> Third, this anticompetitive outcome is not preordained but requires a nimbler regulatory response. But jurisdictions cannot simply rely on competition per se. They also must ensure, through regulation and competition enforcement, that the ensuing competition is a healthy race-to-the-top rather than a toxic race-to-the-bottom.

Our contribution herein draws on insights that we expressed in more detail in our recent working paper 'Antitrust & AI Supply Chains', our Independent Expert Report on 'Digitalisation and Its Impact on Innovation' commissioned by DG Research & Innovation, and our two books 'How Big-Tech Barons Smash Innovation' and 'Competition Overdose'.

We do not consult for any of the firms cited herein, nor have we received any financial compensation for this memorandum.

I. The emerging AI foundation model supply chain, like the digital economy, has several factors and characteristics that can lead toward concentrated markets.

In the digital economy, we have seen the following hierarchy of market power:



While some apps are worth millions of US dollars and some powerful platforms are worth billions of dollars, ecosystems are worth over a trillion dollars. Consider the market capitalization of today's dominant ecosystems: Microsoft (over $3 trillion), Apple ($2.6 trillion), Amazon ($1.821 trillion), Alphabet ($1.688 trillion), and Meta ($1.289 trillion). Our most recent book explores how ecosystems provide far greater power than a mere dominant platform, including greater power over information flows, the entry of suppliers, the fees charged, the friction on the market, the users' incentive to seek outside options, and the supply and demand for innovations.[1] We refer to these giants as the Big Tech Barons. While some competitive pressure exists between these ecosystems, each benefits from significant market power in relation to its users and sellers. Many of these ecosystems operate like a sovereign autonomy – a private market – where the ecosystem sets the rules for users, app developers, sellers, and advertisers. Moreover, the potential harm far exceeds the traditional monopolistic rents, can extend far beyond their ecosystems, can stifle beneficial innovations, and harm individual autonomy, well-being, and democracy.

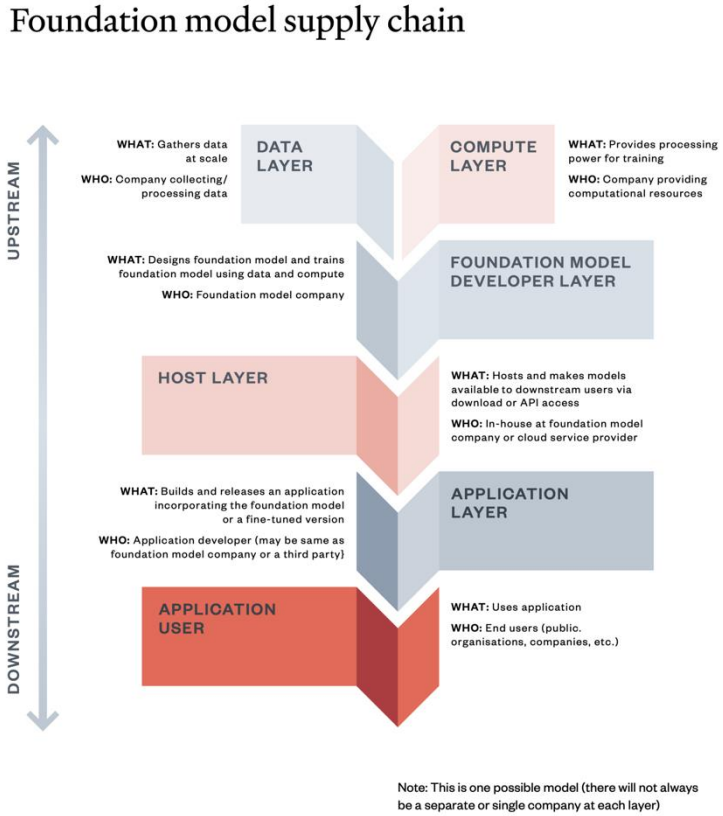
Although the digital economy has features that contribute to winner-take-most-or-all (e.g., network effects, economies of scale, importance of personal data), these powerful ecosystems did not arise organically. Instead, mergers and anticompetitive practices contributed to their attaining and maintaining their dominance. But despite numerous investigations worldwide, several high-profile decisions in Europe and elsewhere, and heightened regulatory scrutiny under new laws, these digital ecosystems still dominate. In fact, despite ongoing enforcement and increased regulation, they expand and entrench their power.

Meta, for example, faces antitrust and increased regulatory scrutiny in Europe. In the US, the FTC is challenging Meta's acquisitions of Instagram and WhatsApp. A bipartisan coalition of states is challenging Meta's exploitation of teenagers. The U.S. Senate Judiciary Committee indicated in January 2024 further regulations.[2] But the day after the Senate hearings, Meta's

[1] Ariel Ezrachi and Maurice E. Stucke *How Big-Tech Barons Smash Innovation—and How to Strike Back* (HarperCollins, 2022)
[2] https://www.nytimes.com/live/2024/01/31/technology/child-safety-senate-hearing

stock jumped over 20%.[3] While such a price increase might be seen with a penny stock, one had never seen a nearly $200 billion increase in market capitalization in one day: Meta set a new stock market record.[4] Wall Street clearly does not see Meta's dominance under threat.

As our working paper 'Antitrust & AI Supply Chains' explores, the emerging AI foundation model supply chain exhibits features that might lead to even more powerful ecosystems. The Ada Lovelace Institute, an independent UK research institute with a mission to ensure that data and AI work for people and society, illustrates the emerging AI foundation model supply chain[5]:



In a competitive market, each layer in the foundation model supply chain might have multiple rivals, and no rival operates on multiple layers. For example, many semiconductor firms provide the accelerator computer chips and software needed to train the foundation model. Another set of companies provides the data to train the foundation model. A third set of companies provides the computational power. A fourth set develops the AI foundational models. Next are the hosts who make these models available to all the different developers who use the foundation model for their apps, products, or services.

[3]https://finance.yahoo.com/news/meta-stock-jumps-20-after-earnings-in-biggest-market-cap-jump-in-stock-market-history-212511451.html.
[4]Ibid.
[5]https://www.adalovelaceinstitute.org/wp-content/uploads/2023/07/ALI-Foundation-model-supply-chain__.png

As our working paper explores, once we relax these assumptions, antitrust risks emerge when these stacks become concentrated, and powerful firms vertically integrate along the supply chain.

When considering the control of essential inputs along the supply chain, one needs to distinguish between effective competitors that can influence future competition dynamics, and 'dynamic takers' who operate on the market, at times, with relative success, but cannot impact future trajectory. Once one moves from a simple quantitative review of the market to a qualitative review of 'dynamic setters' and 'takers', the picture that emerges supports a conclusion of further power entrenchment.

The foundation model supply chain can have mixed competitive effects downstream. On the one hand, in lowering the cost to access a foundation model, the current supply chain can increase dynamism in secondary application markets. Firms can use the foundation models to disrupt many traditional markets, lower costs, increase efficiencies, and spur innovation. There can be significant advances in many industries, from health to education to commerce. On the other hand, the developers in the downstream application layer can become increasingly dependent on the leading foundation models. The way the technology is used and licensed creates a structural dependency that cuts across the application layer.

The more developers who rely on the foundation model, the better the model can become, and the harder it might be for the developers to switch to other foundation models or develop their own. The dependency often comes with obligations that restrict use and hinder potential disruption. As a result, any downstream competition and innovations will complement (rather than potentially disrupt) the Big Tech Baron's services, AI technology and ecosystem. The asymmetry in power between the upstream foundation model and downstream operators increases.

So where does this leave downstream players who rely on commercial foundation models? A start-up, for example, can use OpenAI's application programming interfaces ("APIs") to integrate GBT's services into the start-up's own applications, products, or services.[6] Under the API access business model, the developer sends its or its users' prompts to the foundation model. But the developer lacks access to the foundation model's code, training data, or model weights and biases.[7] Instead the developer shares data with the foundation model and receives the model's output.

Here a positive feedback loop can emerge under the API access model: as more developers rely on a few foundation models, the more data and the greater the variety of the data (audio, visual, text, depth, movement, thermal, etc.) that flows from the developers and their customers to these multi-modal foundation models. The increasing inflow of data can help improve these AI foundation models, which as a result can attract even more developers.[8] Accordingly, it

[6] https://openai.com/policies/business-terms.
[7] CMA 'AI Foundation Models: Initial Report' at 15.
https://assets.publishing.service.gov.uk/media/65081d3aa41cc300145612c0/Full_report_.pdf
[8] CMA Report at 69.

might be harder for another company to develop a foundation model that competes against these dominant AI foundation models.

We already see such network effects for search engines, especially for unusual (tail) inquiries. The more one Googles, the more opportunities for the search engine to learn about relevant responses, and the better its performance relative to other search engines. Now we can have network effects on multiple levels: from improving the model's capabilities across many services and products to improving customized responses for each end-user.

Even when the current foundation model is relatively open, it gradually can close.[9] It is therefore important to distinguish the ability of downstream operators to use functions of the AI foundation models and integrate them into their product and service offering, and their inability to control, replicate, develop, or influence its input and output.

There are other risks as well that emerge from the increased dependency. As more developers rely on a particular foundation model, any risks, biases, or flaws in that model will cascade to millions, if not billions, of users.[10] The foundation model providers will largely, if not entirely, control the safety of the AI technology, the risks of hallucinations, biased, hateful, discriminatory or misleading outputs, and may externalize many of the risks to downstream corporations.[11]

II. Ecosystems that control the leading foundation models can have far more power than the current dominant ecosystems in affecting the dynamics of competition and changing the nature and value of innovations.

The concentration of the foundation model layer and the dependency of the application layer are only part of the potential anticompetitive effects. As the foundation model's technology is incorporated into more apps, services, and products, the control of key inputs offers the dominant players a unique bargaining position and the ability to influence competition and the evolution of technologies and innovation in secondary markets.

This position is exacerbated by the terms of service of some of the leading foundation models, who expressly limit competing AI development. For example, OpenAI's terms and conditions prohibit the development of artificial intelligence models that compete with its products and services.[12] Google imposes a similar restriction for licensees for its AI foundation models that

[9] FTC, 'Generative AI Raises Competition Concerns' (Federal Trade Commission Technology Blog, 29 June 2023) <https://www.ftc.gov/policy/advocacy-research/tech-at-ftc/2023/06/generative-ai-raises-competition-concerns> (discussing how the "open-first, closed later" tactics may form part of this strategy).

[10] https://www.adalovelaceinstitute.org/resource/foundation-models-explainer/

[11] Elizabeth Seger et al., 'Democratising AI: Multiple Meanings, Goals, and Methods' (2023) AIES '23: Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society 715, 719 <https://doi.org/10.1145/3600211.3604693>; Kelsey Piper, 'Are we racing toward AI catastrophe?' (*Vox,* 9 February 2023) <www.vox.com/future-perfect/23591534/chatgpt-artificial-intelligencegoogle-baidu-microsoft-openai>.

[12] https://openai.com/policies/business-terms.

limit the ability to develop machine learning models.[13] Meta's license with commercial and individual users restricts them from using the model to train other AI models.[14]

Consequently, companies can use the Big Tech Barons' foundation models to develop apps, products, and services that disrupt traditional industries; but they cannot disrupt the foundation model.

Nor, as we discuss, can firms develop products and services that compete with the foundation model's products and services. So as more people use the start-ups' AI apps, which rely on one of the leading foundation models, it may become harder to develop a foundation model that disrupts the Big Tech Barons' models and AI-related products and services.

This asymmetry in the market will intensify, as those in control of the infrastructure and inputs can influence innovation in the downstream markets.[15] Furthermore, the leading foundation models exist within their owner's sprawling ecosystems. In controlling the ecosystem, the Tech Barons have many weapons to affect the supply and demand of AI innovations, including multiple weapons to marginalize or exclude potential disruptive threats. This includes downgrading or denying services to potential competitors, bundling products (for example: cloud services and generative AI), excluding the developers from their app stores and ecosystems, making it harder for end users to find the innovation, and self-preferencing.[16]

In addition to the downstream dependency and distortion of innovation paths, the ongoing vertical integration of foundation models herald their own expansion downstream. As we have seen with the current dominant ecosystems, the Tech Barons do not sit still. Instead, they expand their ecosystems to other products and services, and when they do so, their incentives often change. As a result, they have acquired, copied, or killed off rivals in that space.

III. This anticompetitive outcome is not preordained but requires a nimbler regulatory and competition law response.

Before reflecting on the need for intervention, it is important to observe that these anticompetitive effects are not preordained. For example, open-source models may improve,[17] thus decreasing costs and barriers to expansion and entry, and in doing so levelling the playing field.[18] The proliferation and scale of competing foundation models could support greater

[13] Google, GENERATIVE AI ADDITIONAL TERMS OF SERVICE Last Modified: August 9, 2023, https://policies.google.com/terms/generative-ai; https://ai.google.dev/terms ("You may not use the Services to develop models that compete with Gemini API or Google AI Studio. You also may not attempt to extract or replicate the underlying models (e.g., parameter weights).").
[14] Users can only "use the outputs to further train the Llama 2 family of models". https://llama.meta.com/faq.
[15] FTC 'Generative AI Raises Competition Concerns'.
[16] On the available levers to distort competition and innovation, see: Ariel Ezrachi and Maurice E. Stucke, *How Big-Tech Barons Smash Innovation* (n 1).
[17] Jon Victor, 'Open-Source AI Is Gaining on Google and ChatGPT' (*The Information*, 15 May 2023) www.theinformation.com/articles/open-source-ai-is-gaining-on-google-and-chatgpt.
[18] International Finance Corporation, World Bank Group, 'The Role of Artificial Intelligence in Supporting Development in Emerging Markets' (2019) <https://openknowledge.worldbank.org/server/api/core/bitstreams/1a1fb8aa-3f48-5d75-96da-4e2f6d77638e/content>.

contestability.[19] With increased investment, these alternative models could increase their footprint. Furthermore, cloud computing, and open-source repositories can lower barriers to entry and increase the opportunities for growth for those who would otherwise have no, or limited, access to the technology. These processes can support the democratization effect of the technology.

These competition and innovation dynamics have been used by some to argue against antitrust intervention and call for more limited regulatory requirements on AI systems.[20] After all, in a fast-moving innovation market, intervention could easily miss the mark and chill, rather than promote, competition. Competition dynamics, it is argued, could offer a superior outcome, and ensure the effective evolution of the technology and markets. However, these dynamics should be considered in context, while noting the Tech Barons' ongoing control and influence.

Competition law and related regulations have a role to play in ensuring the technology delivers an optimal outcome. As one reflects on the adequate level of intervention, it may be helpful to recall the "1 in 60 rule of thumb" used by navigators worldwide. According to this rule, a small degree error, insignificant in a short voyage, will increase the longer one travels. A one-degree error in navigation will lead a pilot one mile away from her destination for every 60 miles of travel. What does this rule have to do with competition law enforcement and AI? It helps illustrate how seemingly minor failures to 'get it right' can lead us off course. With the speed at which the technology and its implementations are advancing and the way in which they affect markets and the stability of society, this rule serves to remind us of error costs. While over-intervention may slow the speed of our journey by delaying some innovations and possibly chilling some investments, under-intervention that fails to address the risks of generative AI and foundation models, might lead us to unwanted destinations – way off target.

We have seen over the past two decades many digital markets tip to one or two powerful firms. We have also seen how these powerful firms expanded their ecosystems. Positive feedback loops, the control over a wide user base, extraction of personal data, and anti-competitive practices have enabled a few corporations to entrench their power and affect the dynamics of competition and innovation. Digital markets, while dynamic in many ways, have proven to not easily self-correct once markets tip in favour of these Tech Barons. And to the same extent, once AI foundation model supply chain tips into the control of a few firms, these markets will not self-correct.

We are at a critical juncture which requires targeted, yet measured, action. Our research is currently directed at exploring avenues that would enhance the effectiveness of competition

[19] Note for example: StableDiffusion, Europe's Mistral AI (which includes Microsoft as an investor) and Aleph Alpha.

[20] See for example: Billy Perrigo, 'Exclusive: OpenAI Lobbied the E.U. to Water Down AI Regulation' (*TIME Magazine*, 20 June 2023) < https://time.com/6288245/openai-eu-lobbying-ai-act/>.; Also note lobbying directed at limiting regulation of 'general purpose' AI systems in the upstream market, and focus on regulation of companies deploying the technology, rather the originators of the technology. See: Natasha Lomas, 'Report details how Big Tech is leaning on EU not to regulate general purpose AIs' (*Tech Crunch*, 23 February 2023) https://techcrunch.com/2023/02/23/eu-ai-act-lobbying-report/?guccounter=1.

law and related regulation and align the market participants' incentives with wider societal goals. Broadly speaking:

(i) Multiple tools are necessary to ensure a healthy trajectory of markets (including competition, privacy, consumer protection, and IP laws).

(ii) At the *competition law* level, for Article 102 TFEU and the European Merger Regulation to be more effective, the agencies and courts must better understand the power of ecosystems (as opposed to the power of particular platforms), including their power to distort innovation paths. Ecosystem power differs from traditional notions of market power. Consequently, agencies and courts should focus on possible abuse of ecosystem power aimed at entrenchment, through leveraging, tying and exclusionary practices.

(iii) Consideration of the scope of competition law,[21] as well as the use of external regulatory benchmarks to inform competition decision making, would be of value.[22] This is particularly so since intervention will undoubtedly dictate trade-offs between efficiency and economies of scale and scope, and the need to safeguard the evolution of AI markets and ensure their contestability.

(iv) At the *regulatory level*, the current design and scope of the Digital Markets Act and Digital Services Act offer some, yet incomplete relief, to the concerns raised by foundation models. The forthcoming AI Act could supplement the regulatory structure when dealing with risk associated with foundation models but does not directly address the problem of entrenchment and increased concentration. Changes may be required to increase the relevance of regulatory tools to address the AI supply chain. In that respect, ex-ante regulation could play an important role in aligning private corporate behaviour with public interests, albeit any intervention is likely to be challenged by entrenched interests. When considering the dense EU regulatory landscape, it is important to note that the wider EU regulatory framework, concerning data, privacy, and political stability, may generate inconsistent effects with respect to the AI supply chain.

(v) Possible changes to regulatory tools would need to take account of the overall burden on undertakings, the possible externalities between jurisdictions, and the interconnections between trade policies and competition law.

(vi) *Enforcement capacity* – at both regulatory and competition levels need to increase to match the level of business activity. Global cooperation and alignment are integral and necessary to ensure effective outcomes. No jurisdiction can shoulder the regulatory framework.

(vii) *Support policies* should be used to instil growth and innovation in AI. The EU has a role to play in creating the conditions and infrastructure for EU innovation and disruption. Financial grants, tax breaks, loans, guarantees, and capital investments can play an important role in increasing the competitiveness of AI supply chain.

[21] European Commission, 'A Dynamic and Workable Effects-Based Approach to Abuse of Dominance' *Competition Policy Brief* (March 2023).
[22] Case C-252/21 *Meta Platforms v Bundeskartellamt* ECLI:EU:C:2023:537.

Policies should facilitate technology transfers, commercialise innovations, facilitate access to input, and strengthen available human capital. These efforts should be guided by the 'Value, Incentives, and Diversity' principles which we explored elsewhere.[23]

(viii) Finally, competition is not an elixir. We have already seen companies racing to release foundation models, even though the models suffer from biases, hallucinations, and other quality problems. Competition can pressure firms to release faster foundation models that can undertake even more services without mitigating the models' potential risks. Encouraging this toxic competition can cause even greater harm to society. Enforcement, through competition law or regulation, should be mindful of the nature and quality of rivalry and innovation it fosters: namely, we want to promote a race to the top and not to a potentially horrific bottom.

[23] Ariel Ezrachi and Maurice E. Stucke *How Big-Tech Barons Smash Innovation* (n 1) Chapter 11