

A contribution to the consultation regarding generative AI systems

8th March 2024

1) What are the main components (i.e., inputs) necessary to build, train, deploy and distribute generative AI systems? Please explain the importance of these components

From a competition standpoint, we believe that data is the foundational input for training generative AI models. The quantity, quality, and diversity of the data can directly affect the performance and capabilities of the AI system. From a competition viewpoint, access to unique, high-quality datasets can provide a significant competitive edge.

Training advanced generative AI models requires substantial computational resources. Access to high-performance computing (HPC) infrastructure, such as GPUs, is crucial. Companies that can afford significant computing resources may innovate faster. However, the resources are available and competition among the providers (various global and local providers). The bottleneck there is quite low-tech - building permitting processes and unnecessary bureaucracy in authorization procedure for new datacentres and lack of necessary infrastructure.

Talent is also important: Expertise in AI, machine learning, data science, and related fields is crucial for developing, training, and deploying generative AI systems. Companies that can attract and retain top talent have a competitive advantage in innovation and the ability to solve complex problems. The competition for skilled professionals can be fierce, with large companies often in a better position to offer attractive compensation and resources. The governments (and EU) should focus on easing high-skilled immigration and lowering barriers to attract scientists from third countries, including China and Russia. We would like to direct your attention to Financial Times article from November 7, 2023, by Anu Bradford, director of the European Legal Studies Center at Columbia Law School:

In Europe as well, any national security concerns over Chinese espionage, however legitimate, should be balanced against the EU's pressing need to cultivate

technological innovation and nurture successful AI companies. Neither will emerge from industrial subsidies and restrictive trade and technology policies alone. Universities remain the most effective gateway for foreign AI talent to enter Europe, especially if governments proactively facilitate those students' ability to stay and establish careers and personal networks after graduation.

Intellectual Property can also play a role. Patents, copyrights, and trademarks protect innovations in AI algorithms, datasets, and system designs. Companies that effectively manage their IP rights can safeguard their innovations from competitors, license their technology, and create additional revenue streams. The regulators shall, however, safeguard that IP is not used anti-competitively, to block competitors from entering the market or to limit innovation through aggressive litigation strategies.

Regulatory Compliance, especially in Europe, is an extremely important part of the success in the AI ecosystem. Data privacy laws, ethical AI use principles and regulation and any industry specific regulation is difficult to navigate. Large companies have a competitive edge, as they can afford huge compliance departments (e.g. Meta reportedly hired 1000 compliance employees to address Digital Services Act). New regulations may be extremely difficult and expensive to comply with, which should the Commission address in their periodic revisions.

2) What are the main barriers to entry and expansion for the provision, distribution or integration of generative AI systems and/or components, including AI models? Please indicate to which components they relate.

There are technical, economic, regulatory and ethical barriers. We believe that the technical and economic barriers are not too important, as they can be overcome easily. It can be demonstrated by a huge increase in availability of Generative AI models by various companies and organisations - OpenAI, Microsoft, Meta, Google, NVIDIA, Anthropic, Cohere, Adept, Stability AI, Character.ai, Midjourney, AI21 Labs, Hugging Face, Model Zoo, Databricks, Mosaic, Runway, Jasper, Inflection etc.

However, regulatory barriers are very important and can hinder development of Gen AI. The regulatory environment in the EU is already very complex. We understand the concerns about privacy, security, ethics, and fairness. However, they have to be weighed against the sheer potential of innovation, economic development and transformative nature of AI. We believe that the EU has so far failed in it, staying excessively on the “safe”, conservative and precautionary side.

As a result, the investors flock to other region, as evidenced by the Dealroom.co data:

Generative AI VC funding by regions



2023 data as of 17th Jan 2024

Source: Dealroom.co

The EU might be a regulatory powerhouse, but regulation does not create investment incentives, nor innovation. To found an AI startup in the EU, the investors have to take into account compliance with various existing or upcoming regulations and directives - AI Act, NIS 2, GDPR, Data Act, Cyber Resilience Act, Copyright Directive etc. In other regions, there is either less emphasis given on precautionary regulation, or there are exemptions such as AI sandboxes etc.

Data privacy laws, such as the GDPR, impose strict rules on how personal data can be collected, processed, and stored. These regulations affect the ability of AI developers to gather and use the vast amounts of data required for training and refining generative AI models. Compliance requires robust data handling and privacy protection measures, which can be resource-intensive and technically challenging, especially for smaller entities.

The training of generative AI models often involves consuming vast quantities of data, including text, images, and videos, which may be protected by copyright. The legal framework around the use of such copyrighted material for training AI models is still evolving, with significant variations across jurisdictions. This uncertainty can limit access to high-quality training data and raise concerns about potential litigation, hindering the development and deployment of generative AI technologies.

Focusing on easing the regulatory burden especially for AI startups and scale-ups should be the primary concern for the European Commission and other legislative bodies.

3) What are the main drivers of competition (i.e., the elements that make a company a successful player) for the provision, distribution or integration of generative AI systems and/or components, including AI models?

1. Technological Innovation: The ability to develop cutting-edge AI models and algorithms that offer superior performance, efficiency, and capabilities is a fundamental driver of competition. Innovation in AI architectures, training techniques, and optimization methods can lead to the creation of more powerful, efficient, and versatile generative AI systems.

The innovation aspect of Gen AI is underlined by large public and private investments into Research and Development. In this regard, countries / blocs that invest more into R&D will be more successful innovators.

The evidence can be found e.g. in the Bertelsman Foundation article from Sep 12, 2023 “Infographic: AI Research and Development in the U.S., EU and China” by Daniela Rojas Medina:

The U.S. was a leader in AI research in the early 2000s. Its institutions published more AI-related papers than those in any other country. But in 2006, China took the lead as the source of 58,067 AI publications. The U.S. and the EU trailed with, respectively, 52,671 and 49,540. Chinese researchers have since become even more prolific, publishing 155,487 AI papers in 2022, followed by those in the EU with 101,455 and U.S. researchers’ 81,130. The Chinese accounted for [nearly 40% of global AI publications](#) in 2021.

In the 2010s, while China’s technology industry was still developing, U.S. researchers argued that China’s lead in volume of papers did not erase the quality of its research and AI talent. The talent gap continues, as more than half of the best Chinese AI scientists work or pursue graduate degrees outside their country, but the quality of China’s AI research papers has improved significantly over the years. A study from [Nikkei Asia](#) measuring the quality of AI research by counting the number of papers in the top 10% of citations in other papers shows that China overtook the U.S. in the quality of its AI research by 2019. By 2021, China accounted for 7,401 of the most-cited papers, 70% more than the number of the most-cited U.S. papers.

American technology companies continue to dominate the AI research space with six corporate giants, including Google, Microsoft and IBM, among the top 10 producers of the most-cited research. Chinese companies are gaining traction, however. Only one company was in the top 10 in 2012; there were four in 2021. Tencent, Alibaba and Huawei have forged ahead in the number of AI papers that they produce and the citations that these publications receive.

2. Infrastructure: Companies with access to substantial computational resources and efficient distribution networks have a competitive edge. Today they have multiple choices from which to source compute capacity. These include on-premises solutions, solutions deployed in a co-located environment, specialty ML cloud providers, online

solutions provided by cloud services providers, or hybrid solutions combining these options. For example, cloud providers (e.g. AWS, Google, Microsoft, Oracle, OVH) are competing intensely; on-premises providers (HP, Dell, IBM) are offering new products to serve the AI space; and highly successful startups focusing on AI/ML training e.g., CoreWeave, Llama Labs, SF Compute, and Omnivia are also emerging to provide compute solutions. Model developers are using a variety of IT providers for their compute capacity needs. For example, Mistral AI's open-source models were trained on CoreWeave. Imbue, a startup based in San Francisco, is developing models on a cluster built by Dell. Adept AI and Character AI trained their models on Oracle. And Aleph Alpha, a German startup, is training models on HP servers.

3. Usability: Ultimately, AI models that provide better results and have friendly interfaces. or have APIs that are easily integrated to existing business processes, have competitive advantage.

4. Data Access and Quality: The availability and quality of data are critical for training generative AI models. Companies that have access to large, diverse, and high-quality datasets—or the means to generate or acquire such data—have a significant advantage in developing more capable and generalizable AI systems.

4) Which competition issues will likely emerge for the provision, distribution or integration of generative AI systems and/or components, including AI models? Please indicate to which components they relate.

We believe that with regard to provision of the generative AI systems, possible market concentration shall be closely watched. Also, access to data is important - there are companies with exclusive access to large and unique datasets, such as stock photo providers, that may be investigated for potential significant market power abuses. Regarding distribution, we see interoperability and standards as the potential issue - lack of interoperability may lead to vendor lock-in. The same applies for any potential licensing demands by governments which could create barriers for smaller entities or limit cross border availability of some models.

The competition watchdogs should closely monitor any integration issues. Companies which control key technologies or platforms might limit integration capabilities for competing AI solutions. We expect that competitive edge will be gained by companies that are able to seamlessly integrate their AI solutions into their customers' systems and infrastructure.

While we understand the national security implications of cutting edge technologies such as AI, these must be weighed very carefully towards any potential losses stemming from limiting free trade with third countries. Recent spike in protectionist measures and demands for the EU to increase its “strategic autonomy” might increase prices, decrease competition and limit access to advanced technologies or proprietary external components necessary to build and scale AI models. Free trade and vendor diversity, including the third country parties, is the best antidote to any unhealthy dependencies and it is in the European interest to maintain the trade as free and unencumbered as possible.

Competition in Generative AI is currently dynamic and rapidly evolving. It is generally working well to deliver value, service, and choice to all types of customers. Premature regulatory intervention to address perceived constraints could have unintended consequences. Potential competition concerns (such as tying, bundling, exclusive dealing, and anticompetitive M&A transactions) can be assessed and, if needed, addressed under existing competition rules.

5) How will generative AI systems and/or components, including AI models, likely be monetised, and which components will likely capture most of this monetization?

Monetizing any service means leveraging its capability to generate value.

We expect that the AI systems / models will be monetized directly by subscription services (as we see today with subscription based access to many LLMs) and by licensing the AI technology or components to customers for use in their own products or services (e.g. LLM enhanced customer care chatbots). This includes content and media generation by AI systems.

Indirectly, generative AI systems create spillover revenue in other industries, such as data gathering for learning of LLMs, and also by creating products using AI systems, such as e.g. better personalized targeted advertising and better analysis tools that are able to sift through large amounts of data quickly and deliver results. The possibilities are pretty much endless.

We presume that the most money will go to the AI models (especially if they offer unique capabilities in terms of quality, speed or energy savings). Datasets used to train generative AI models can be a significant source of value, especially in fields where data is scarce or highly specialized.

Customization and system integration for specific customer needs will also be a great source of value for AI companies.

Barring any excessive consolidation on the foundation AI model vendors (which is nowhere to be seen), we do not expect the market to become uncompetitive, because barriers to entry are low and potential value that can be created and captured by any potential market entrant is likely huge.

However, it is necessary to understand that the AI driven growth and AI driven economy is in its beginning. We strongly discourage any excessive and ex-ante competition intervention to the market as we do not see any market failure yet (and potentially we may never see it).

6) Do open-source generative AI systems and/or components, including AI models compete effectively with proprietary AI generative systems and/or components? Please elaborate on your answer.

Many companies have been working on Foundation Models for years, and there are already many different FMs available, big and small, open-source and proprietary, each with potential. No one knows which models will be the most successful. Rather than a “winner takes all” situation; we expect many—potentially thousands—of different models, both big and small, to succeed. There will not be one FM to rule them all and bigger may not necessarily be better. This is the case because different models work better for different use cases, or on different sets of data. Some models are great for summarization, others are great for reasoning and integration, and still others have great language support.

There are dozens of open-source generative AI models, many of them are supported by big-tech companies such as Meta or Google. We do not see any reason why these models cannot compete effectively.

However, excessive regulation may hamper development of open-source AI (as well as open-source anything). One of the examples might be Cyber Resilience Act which has not contained (and the final version may not contain) any provisions that would exempt open-source hardware and software from burdensome regulatory demands. Open-source projects are subject to the CRA in case it has committers employed by a commercial entity. This may limit the number of contributors to open source projects. Also open-source projects receiving donations from commercial entities might ultimately fall under the strict rules of the CRA even though they may be non-commercial in nature.

If the commission indeed wants to maintain competition between proprietary and open-source models, which we think is healthy for the whole current and future AI

ecosystem, it must avoid any overregulation that may affect open-source projects and force them to either fold or spend relatively huge costs on regulatory compliance.

7) What is the role of data and what are its relevant characteristics for the provision of generative AI systems and/or components, including AI models?

Absolutely crucial. Data is crucial for training, validating, and improving the performance of generative AI systems. The quality, quantity, and relevance of the data directly impact the effectiveness and efficiency of the AI systems.

Data is a Competitive Asset. Companies with access to vast amounts of high-quality data can leverage data to train more effective and sophisticated AI models. This creates a competitive advantage, as such models can offer better, more accurate, and more personalized services or products. Exclusive control over certain datasets can also act as a barrier to entry for new competitors, potentially leading to monopolistic or oligopolistic market conditions.

Some big-tech companies (especially those with huge number of users) may leverage this data pool and create strong network effects. It may further entrench the competitive advantage of dominant players and make it harder for new entrants to compete. These companies have a regulatory advantage in being able to obtain consent from their users to further use data for many purposes, something that the smaller competitors or B2B focused companies may lack.

Some data may be exclusive and rare, e.g. proprietary data of social platform user interaction. Some companies may be compelled to enter exclusive agreements to access or share their data, giving certain competitors an advantage (e.g. healthcare providers). We suggest a close monitoring of these potential exclusive partnerships and agreements especially if one of the parties is heavily regulated industry such as telecoms, energy, banking or healthcare. The challenges posed by data exclusivity and rarity may be mitigated by data sharing initiatives, open data or mandated interoperability standards.

8) What is the role of interoperability in the provision of generative AI systems and/or components, including AI models? Is the lack of interoperability between components a risk to effective competition?

From the competition point of view, mandating interoperability can be actually harmful. There is value in interoperable systems, and also in proprietary alternatives and niches.

Coexistence often allows for more competition than mandated interoperability. For example, in electromagnetic spectrum management, freeing certain spectrum for unlicensed use unlocked tremendous value, while systems that are operating in this spectrum are not interoperable, but they coexist together based on certain loose set of rules to assure they do not jam or interfere with each other. In a healthy and competitive market, customers should be able to choose between open and closed options, understanding the various trade-offs involved, yet be protected from abusive anti-competitive power. After all, the internet itself allows for various use cases to exist alongside each other - while some applications work alongside the internet itself (such as private networks).

There is no need for a distinct approach to competition in AI, just classic monopolies or oligopolies ex-post oversight. Regulators should in general let technology markets, vendors and consumers make their own choices. Interoperability may be incentivized (e.g. by some basic requirements when the AI projects are subsidized or sourced by the government), but not mandatory. Fragmentation of the ecosystem may be actually good, because it allows for different business models to thrive.

9) Do the vertically integrated companies, which provide several components along the value chain of generative AI systems (including user facing applications and plug-ins), enjoy an advantage compared to other companies? Please elaborate on your answer.

In theory, yes. The control over the whole value chain might mean advantage for vertically integrated companies over smaller entities that do not enjoy such economies of scale. This can limit the variety of AI applications and services available in the market. Also they can “lock” the customer in their proprietary service, which can reduce consumer choice and hinder market competitiveness.

However, they also may benefit from cost efficiencies and thus offer lower prices, innovate more rapidly and have better access to model training data.

On the other hand, we have seen that vertical integration might actually destroy value as parts of the ecosystem might be more valuable than the whole. The example might be vertical disintegration of the telecom sector into passive infrastructure and services, which unlocked a lot of value for shareholders.

Vertical integration of AI companies might pose the same problem for the investors - namely that the different components along the value chain have such a divergent value that holding them together may be counterproductive for the shareholders. We believe

that the market will correct itself over time in this case. Structural separation of the AI players should never be mandated without proof of clear anticompetitive behaviour.

Potential competition concerns (such as tying, bundling, exclusive dealing, and anticompetitive M&A transactions) can be assessed and, if needed, addressed under existing competition rules.

10) What is the rationale of the investments and/or acquisitions of large companies in small providers of generative AI systems and/or components, including AI models? How will they affect competition?

Large companies acquire smaller providers for many reasons - access to innovative technologies, talent acquisition, IP rights etc. We do not see it necessarily as anticompetitive and reducing market fragmentation. Having a number of larger powerful players, larger number of smaller but niche and/or more innovative players and constantly emerging and dying startup companies is an example of market forces in action. The constant M&A is also a sign of a healthy market that needs not to be excessively monitored and / or regulated.

Moreover, the regulator - in case of reviewing the potential merger or acquisition - has multitude of measures available: divestitures, mandating access and/or interoperability, mandating non-discrimination, price controls, licensing certain patents or technologies to competitors or mandating different behavioural practices.

We do not believe that it is necessary to adopt any other special competition rules for generative AI systems. Existing rules are sufficient to mitigate any possible anticompetitive M&A transactions.

11) Do you expect the emergence of generative AI systems and/or components, including AI models to trigger the need to adapt EU legal antitrust concepts?

Any regulation should be proportionate and targeted to a specific concern with AI/ML technology and related use cases to avoid distortion of competition. Overly burdensome regulation may make it unnecessarily difficult for competition and innovation to flourish, and at worst may lead to concentration and become a significant barrier to entry in its own right.

It is possible that the antitrust framework has to be adapted to address the challenges posed by generative AI systems. As always, the regulation shall be ex-post and address real harm not theoretical damages.

There are several new potential competition problems, such as data asymmetry - Firms with more data can train better AI models, potentially leading to monopolistic or oligopolistic market structures where new entrants cannot compete effectively due to lack of access to similar quality or quantity of data. However, we do not see why EU shall need to adapt the legal framework.

12) Do you expect the emergence of generative AI systems to trigger the need to adapt EU antitrust investigation tools and practices?

Yes. AI systems can offer “plausible deniability” by companies that engage in anticompetitive behaviour. They could theoretically facilitate tacit collusion without explicit communication between competitors, leading to higher prices or reduced innovation. Algorithms might independently learn to avoid competitive pricing strategies, resulting in outcomes similar to traditional collusion but without direct coordination and difficulty to prove with traditional antitrust measures and tools.

We believe that the Commission should conduct further research into the potential of AI driven collusion

Dominant firms could use AI to preference their own products or services over those of competitors in subtle, algorithm-driven ways that are difficult to detect and prove. This could foreclose market opportunities for competitors and harm consumer choice. AI's ability to analyze vast amounts of data can lead to precise consumer profiling, enabling firms to engage in discriminatory pricing or manipulate consumer behavior in ways that exploit vulnerabilities. This raises concerns about fairness and transparency.

Dominant firms might use their control over key technologies, datasets, and intellectual property to suppress innovation by competitors or potential entrants

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