

European Commission's call for contributions on competition in Generative AI

Competition in Virtual Worlds and Generative AI

AMETIC (Association representing the digital industry sector in Spain) is grateful for the opportunity to respond to the public consultation launched by the European Commission on 9 January.

After a brief general reflection on the different aspects of the consultation, you can also find answers more specifically to the list of questions in the consultation itself.

Background:

The European Commission (EC) launched on 9 January a call for contributions on competition in Generative AI. The purpose is to gather specific information and views from regulatory experts, academia, industry and consumer organizations. The contributions will influence the EC's thinking and potential policy recommendations at the end of 2024.

The EC provides [a list of questions](#) for orientation only to guide the input needed. Contributions can be a position paper replying to the topics raised by the questions. Contributions should be sent at COMP-GENERATIVE-AI@ec.europa.eu by 11 March 2024 in pdf format. The EC intends to publish the contributions and there is an option to submit confidential or non-confidential versions, or both.

Purpose:

The document provides input to feed a contribution on the following points:

- the potential of Generative AI to unlock innovation,
- the competition dynamics in Generative AI, and
- the adequacy of competition rules to the AI context.

AMETIC. contributions Generative AI

The potential of Generative AI to unlock innovation is indisputable.

Generative AI holds immense potential to revolutionize innovation across numerous industries. Though it's still in its early stages, its transformative capabilities are undeniable. The Foundation Models (FMs) powering Generative AI are diverse and constantly evolving, enabling a wide array of applications. From personalized healthcare treatment plans to smarter financial analysis, from automating code generation to optimizing manufacturing processes, the possibilities are virtually endless. Generative AI is poised to shape the future of various fields, from healthcare and finance to technology and architecture, by providing powerful tools for problem-solving, decision-making, and creativity.

Competition in Generative AI is rapidly evolving, with an increasing number of players in this space.

The landscape of Generative AI is undergoing a swift transformation, with a surge in the number of competitors entering the field. Several factors are driving this change, including the availability of high-quality data, scalable computing power, and continuous advancements in machine learning technologies.

Many companies have dedicated years to developing Foundation Models (FMs), resulting in a diverse range of models, both open-source and proprietary, each offering unique strengths and potential. The success of these models cannot be predicted by a single factor; instead, a multitude of models, each catering to different use cases and data sets, are expected to thrive. This diversity is driven by various factors, such as superior data quality, innovative algorithms, and efficient data utilization.

The cost and time required to build, train, and deploy large language models are decreasing due to technological innovations. Customizing pre-trained models through fine-tuning is becoming more accessible, fostering the emergence of competitive models. Additionally, AI providers, including startups, are leveraging third-party models, customized marketing strategies, and machine learning stack optimization to gain a competitive edge.

Finally, strategic investments from both private and public sectors play a crucial role in promoting competition. These investments enable companies to pool resources and expertise, fostering rapid and impactful innovation through collaboration.

Competition rules are adequate to ensure innovation in the AI space.

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.

However, to the extent that regulation is considered necessary, it should be proportionate and targeted to a specific concern with a 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. We welcome the initiative of the European Commission to understand the Generative AI space and the opportunity to engage constructively on these important issues.

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

- **Data Processing Layer:** This layer is responsible for gathering, preparing, and processing the data required to train the generative AI model. It involves creating and managing a diverse and high-quality dataset, referred to as a corpus, that the model can learn from. The quality and relevance of the data directly impact the model's performance, making this layer a critical foundation for successful generative AI systems.
- **Generative Model Layer:** In this layer, the appropriate generative AI model is selected and trained using the prepared data. The choice of model depends on the specific requirements

of the task, with popular options including GANs, VAEs, and transformer-based models like GPT. Training involves adjusting the model's parameters to minimize errors and improve its ability to generate relevant and high-quality outputs.

- **Feedback and Improvement Layer:** To ensure continuous improvement, this layer involves collecting feedback on the model's performance and using it to refine the model further. This process may include techniques like reinforcement learning, human-in-the-loop feedback, and evaluation metrics to optimize the model's performance and adapt to new data or requirements.
- **Computational Resources:** Powerful hardware (GPUs and TPUs) is required for efficient training. These hardware accelerators are essential for handling the intensive computational workloads involved in training large neural networks. Striking a balance between computational power and environmental impact is essential, emphasizing the need for energy-efficient algorithms and hardware configurations to mitigate the environmental footprint associated with the widespread adoption of generative AI technologies.
- **System Architecture:** A well-designed architecture is paramount for the successful distribution of generative AI systems. This encompasses the overall infrastructure, pipeline, and delivery mechanisms, influencing factors like scalability, latency, and energy efficiency during deployment.

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.

- Limited AI Skills and Expertise:
 - Relates to: All components.
 - Importance: A shortage of skilled professionals who understand generative AI can hinder adoption and successful implementation. Applies to both R&D profiles as well as industrial / company professionals.
- Data Complexity and Access:
 - Relates to: Data Processing Layer.
 - Importance: Handling diverse and complex data sources can be challenging. Irrelevant or inaccurately labeled datasets may impact model effectiveness. Data Spaces or Data Access Protocols key (sovereign, IP etc).
- Ethical Concerns:
 - Relates to: All layers, especially Feedback and Improvement Layer.
 - Importance: Ensuring ethical use of generative AI is crucial. Both us as R&D and companies must address biases, privacy, and fairness concerns.
- Intellectual Property Rights Infringement:
 - Relates to: Generative Model Layer.
 - Importance: Protecting intellectual property while using pre-trained models or generating new content is essential. AI Act should help, but tricky. Ensuring fair compensation to data rights holders.
- Data Explainability:
 - Relates to: Generative Model Layer.
 - Importance: Understanding how the model generates content is critical for transparency and trust. Black-box models are not adequate for some applications.
- Model Hallucinations:
 - Relates to: Generative Model Layer.

- Importance: Models occasionally produce unrealistic or nonsensical outputs. Addressing this is vital for practical applications. RAG¹ as key technique.
- Regulatory Requirements:
 - Relates to: Deployment and Integration Layer.
 - Importance: Compliance with regulations (such as AI Act) affects deployment and global operations. LLMOps as key success factor.
- Language and Cultural Diversity:
 - Relates to: Europe's diverse cultures and languages.
 - Importance: Linguistic diversity in Europe.
- **Data Access and Privacy Concerns:** Obtaining high-quality and use-case-specific datasets may be challenging. Privacy regulations can limit data accessibility.
- **Computational Costs:** High hardware costs for training and inference can be a barrier for smaller companies.
- **Regulatory Compliance:** Adhering to evolving AI regulations may pose challenges.
- **Model and AI-based system governance.** It relates to the AI models (managing their lifecycle and to end) and to the AI-based systems and solutions used in the organization, which need to be governed in technical, business and compliance terms, amongst others.

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?

- **Innovation in Algorithms:** Companies with customized layers on their generative algorithms can gain a competitive edge.
- **Scalability and Performance:** Companies capable of scaling their models while maintaining high performance.
- **Efficient Use of Data:** Making the most of available data for training and model improvement by prioritizing interoperability. A company embracing a Data Spaces approach, can benefit from seamless data exchange while ensuring robust standards for data privacy and security. This commitment could play a significant role in fostering a collaborative and innovative ecosystem.
- **Computational resources:** Being able to count on a sufficient investment in computational resources makes the difference with the rest of the companies.
- **Understanding business needs** and being able to build solutions based on AI models which address specific business needs.

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.

¹ RAG Retrieval-Augmented Generation. RAG is a technique for enhancing the accuracy and reliability of generative AI models with facts fetched from external sources. In other words, it fills a gap in how LLMs work.”
[\[https://blogs.nvidia.com/blog/what-is-retrieval-augmented-generation/\]](https://blogs.nvidia.com/blog/what-is-retrieval-augmented-generation/)

- **Data Monopolies:** Companies controlling large and diverse datasets may have a competitive advantage.
- **Algorithmic Dominance:** A single company dominating advanced generative algorithms may limit competition.
- **Lock-in Effects:** Proprietary formats or standards could create barriers to switching providers.
- **Computational capacity:** The imbursement in computational resources is an economic barrier.

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?

- **Licensing Models:** Charging for the use or integration of generative AI models.
- **Service Subscription:** Providing generative AI as a service with subscription-based models
- **Consultation:** Charging for prompt engineering, customization or consulting services based on generative AI outputs.
- **Data provision:** Quality data producers ask for compensation when using their data for model training.
- **Turnkey projects:** systems and solutions that are based on AI or generative AI components, which address a specific business need, which are sold to a customer as a project.

Depending of the generality or specificity of the use cases, and on the number of end users, the turnkey or the subscription model may make more sense.

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.

Open-source systems, by virtue of their collaborative nature, provide a platform for a diverse community of developers to contribute, share ideas, and collectively enhance the software. This collaborative approach often results in innovation, adaptability, and a wide range of applications.

Proprietary systems, on the other hand, maintain a closed environment with exclusive features and optimizations. This exclusivity can confer a competitive edge by allowing for tightly integrated solutions, specialized functionalities, and a potentially faster development cycle.

While open-source systems emphasize inclusivity, transparency and community-driven development, proprietary systems focus on a more controlled and closed environment to leverage their unique features and maintain a distinct market position.

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?

Data plays a critical role in AI an general and generative AI in particular. The availability, quality and volume of data generally mark the quality and performance of a model.

- **Training Data:** High-quality datasets containing high intra and inter-variability are essential for training accurate and unbiased models.
- **Real-time Data:** Continuous access to real-time data enhances the adaptability, resilience, and relevance of generative AI systems.

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?

A well-established interoperability framework ensures that different generative AI solutions can work together cohesively, promoting flexibility and scalability in deployment.

However, the lack of interoperability poses a notable risk, potentially leading to vendor lock-in. Without standardized protocols for data exchange and system compatibility, users might find themselves constrained to a specific vendor's ecosystem. This limitation not only hampers consumer choice but also introduces hurdles to healthy market competition.

In addressing these challenges, Data Spaces emerge as a promising solution. By implementing Data Spaces, which provide standardized environments for secure and efficient data exchange, interoperability concerns can be mitigated. Data Spaces act as neutral grounds where different generative AI components can interact seamlessly, fostering an ecosystem that values choice, competition, and collaborative innovation.

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.

Vertically integrated companies might enjoy an advantage compared to other companies. The key is to ensure that the advantage is fair and compliant to competition regulations, principles and best practices. For example, to ensure that a vertically integrated company, which may own a critical component in one of the links of the value chain, provides access to it to third parties under fair market conditions.

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 traditionally invest in or acquire small providers for an inorganic growth aiming to have the most innovative technology to be differentiated from competence or even trying to eliminate competence. Regarding AI systems, components and models, large companies are expected to act in the same manner, affecting the free competence by monopolistic behaviors.

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?

The emergence of generative AI may necessitate a re-evaluation of antitrust concepts to address issues like data monopolies and algorithmic dominance.

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

The ever-evolving AI landscape may require adjustments to antitrust investigation tools to effectively address competition concerns in the generative AI sector.