Fastweb's Contribution

Competition in Virtual Worlds and Generative AI
Calls for contributions

Fastweb S.p.A.

Fastweb S.p.A. (hereinafter also "Fastweb") is an electronic communications operator providing communication services throughout the Italian national territory.

In the current panorama of the Italian telecommunications wireline market, Fastweb operates since 1999 and is one of the main operators of ultra-wideband services for business and consumer customers, having an extensive fibre-optic network infrastructure covering 56,000 km throughout the Country. In the wireless communications sector, Fastweb operates since 2019 as MNO, and is engaged in the development of a network natively based on 5G mobile radio technology. In addition, Fastweb is currently engaged in the provision of Fixed Wireless Access services in 5G technology.

With about 3,2 million wireline and 3,5 million mobile customers, Fastweb is one of Italy's leading telecommunications operators.

Since its establishment in 1999, the company has focused on innovation and network infrastructure to guarantee the highest quality in the provision of ultra-broadband services and to promote the digitalisation of the country.

In this framework, Fastweb has purchased NVIDIA DGX H100 systems and will make available to the whole AI national ecosystem the first and most powerful NVIDIA DGX AI-powered supercomputer in Italy. Thanks to this investment, Fastweb can use the highly performant NVIDIA DGX H100 cluster for artificial intelligence, which will be made available in the cloud as an IaaS (Infrastructure as a Service) to its customers for the development of AI and generative AI applications.

Fastweb will leverage NVIDIA AI Enterprise software, to develop and deploy the first large language model (LLM) natively trained in the Italian language. A group of generative AI experts will work through deep learning systems to develop an LLM based on large sets of data in the Italian language. The combination of NVIDIA DGX H100 systems, the national LLM and Fastweb's cloud and cybersecurity infrastructures will make available an end-to-end system through which companies, public administration, startups and other players will be able to develop generative AI applications for any vertical – from healthcare to education and mobility. It relies on robust and secure management of data – which is stored in data centres within the national borders – transparent LLM governance, and compliance with all national and EU policies.

In the light of its market positioning, Fastweb is deeply interested in contributing to the present Calls for contributions on theme of Competition in Virtual Worlds and Generative AI. However, considering that Fastweb is not currently fully involved in the development of virtual worlds, this contribution will be limited to issues related to generative AI.

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***

The main components necessary to build, train, deploy and distribute generative AI systems are different and heterogeneous in nature.

In fact, the main inputs include data, algorithms, adequate computing power, technical expertise, and capital.

- **Data** - Undoubtedly, in this context, **data** (specifically 'big data') plays a fundamental role, serving as a key component that has contributed to the emergence of AI systems. Substantial volumes of data are essential for training artificial intelligence models, including generative ones. To effectively train AI systems, it is crucial to have high-quality, diverse, and representative data. In particular, it is paramount that data be obtained legitimately, whether it be through the utilization of public or private datasets. The emphasis on data quality extends to the certification of these datasets, ensuring that their origin is meticulously traced. A certified dataset implies that its source is reputable and acknowledged by industry standards, categorizing the information within as of high quality. By incorporating certified data, the generative AI algorithm gains a foundation of reliability, as the transparency and traceability of the data contribute significantly to the overall quality of its outputs. This commitment to obtaining and certifying data ethically underscores the importance of upholding standards for trustworthy and impactful AI applications.

- **Sophisticated algorithms -** Sophisticated algorithms serve as the backbone of generative AI, due to their pivotal role in the model's ability to understand, learn, and generate new content. These models can be developed based on different technologies and techniques, which significantly impacts the capabilities and the types of tasks the models can effectively perform. Moreover, to ensure the robustness and effectiveness of generative AI models, standardized and agnostic tests are conducted, allowing for a comprehensive assessment of model performance. This evaluation process is essential not only for benchmarking models against one another but also for identifying and addressing potential biases or underperformance issues that may arise during model development. This scrutiny ensures that generative AI models meet high standards of reliability and fairness.

- **Computing power** - For the development of sophisticated algorithms, the expansion of **computing power** is crucial. AI systems, including generative ones, demand substantial computing power during both the training and utilization phases. The computational cost of developing a specific model depends on several variables, including chips, GPU, model and data size, the hardware employed, and the chosen cloud provider.

- **Technical expertise - Technical competence**, along with a **well-structured corporate organization**, is essential for the development and maintenance of generative AI systems. Strong technical skills spanning various sectors are necessary. Furthermore, a sound business organization is crucial to support the implementation and the ongoing maintenance of effective security and monitoring measures throughout the system's lifecycle.

- **Capital - Capital** is a crucial factor in the construction and maintenance of these systems, as it is essential for acquiring necessary inputs. Funding is required for various purposes, including the utilization of cloud services or supercomputers, securing a skilled workforce, and potentially covering the cost of high-quality data if it is not freely accessible. Adequate capital availability enables a swift recovery from input shortages.

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.***

The main barriers to entry and expansion for the supply, distribution, or integration of generative AI systems and/or components include but are not limited to:

- **Data accessibility** - Data accessibility is a frequent challenge, as obtaining diverse, high-quality training data can be both difficult and cost-prohibitive, especially considering privacy concerns and complex procedures aimed to obtain licenses, as imposed by relevant legislation, such as copyright laws. Companies possessing substantial amounts of non-publicly accessible data can leverage their dominant positions in critical markets, hindering competitors from entering or sustaining their presence in generative AI-related markets.

- **Computing power accessibility** – Access to suitable computing power could be more challenging for European-based firms with respect to extra-EU competitors. In fact, the former could be limited in achieving suitable computing power by the regulatory constraints descending by the compliance with national regulation and/or the EU energy and environmental regulations, to which Extra-EU competitors might not be subject (e.g. serving European customers from data centers located outside Europe).

- **Technical expertise** - Research and development in generative AI requires specialized and expert workers. Currently, however, the availability of such skilled workers is limited. This scarcity could pose a considerable challenge for companies aiming to advance in this field.

- **Exploitation of leadership positions in key markets** - Companies exploiting their leadership positions in key markets can obstruct innovative challengers utilizing generative AI systems by leveraging their control over inputs. Such companies may also resort to aggressive practices, such as tying or bundling products and services.

- **Mergers or acquisitions** - Mergers or acquisitions could result in a significant reduction of competition in the markets for developing or deploying such AI systems.

- **Interoperability** - Undue restrictions on the ability to switch from one system provider to another it may lead to "lock-in" phenomena.

- **Investments** - Significant investments are necessary to attain the required computing power for training generative models and to ensure the proper functioning of systems as well as the compliance with regulations.

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?***

In Fastweb opinion, the main competition drivers are:

- **Access to data** - Effective competition in the development of generative models relies heavily on access to data. Until now, instant access to data has been pivotal in creating an environment for new developers to experiment with and create innovative models. Presently, as public data on the web and other sources may run out, generative model developers have two options for obtaining new data: (1) utilizing in-house data, such as unpublished articles or private analyses, or (2) purchasing data from third-party providers, such as publishers and

image archives, in exchange for a fee and/or license terms. Looking ahead, as data becomes scarcer and more expensive, many small businesses may encounter challenges in accessing adequate data to compete effectively. Open source models, allowing developers access to the underlying model's weights, can foster innovation and competition by enabling a broad range of developers to enhance and create better models.

- **Access to computing power** - Generative AI models require large, distributed computing systems, often consisting of hundreds of specialized chips used for training and executing artificial intelligence models, called artificial intelligence accelerator chips. At present, there is a high demand for artificial intelligence accelerator chips compared to the available supply, making them expensive to acquire and limited in availability. NVIDIA is currently the leading provider of chips used for artificial intelligence purposes, although other companies are at various stages of developing their own artificial intelligence acceleration chips. Foundation Models (FM) have also increased in size. One of the initial foundation models, BERT, was introduced in 2018 with 354 million identifiable parameters (values encoding model knowledge). Since then, models such as palm, GPT-3 and Megatron-Turing NLG have been developed with hundreds of billions of parameters, and the most widely used open source models leverage tens of billions of parameters. The main reason behind this trend is a positive observed relationship between scalability and performance, known as "scalability law", indicating that larger, more data-trained models using extensive computing resources for training and execution tend to yield better results with respect to smaller models; Foundation Models, in particular, require a large amount of computing power. Most developers lack the internal computational infrastructure to train models and, therefore, depend on agreements or partnerships with Cloud Service Providers (CSPs). Cloud services are becoming crucial inputs for numerous businesses and organizations, serving as a cornerstone for recent technological innovations, including artificial intelligence.

- **Innovation, security, and compliance** - Investing in innovation facilitates the development of advanced generative AI systems, offering a competitive advantage. Indeed, pioneering new techniques can result in superior performance in generating results, making them more appealing in markets, particularly when accompanied by stringent security measures.

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.***

The development and competitiveness of generative AI systems depend on access to key inputs, such as computing power, data, skills, and funding. If these key inputs become limited, smaller developers may face challenges competing with larger, established companies that have more resources. This could potentially result in a decline in competition and innovation within the sector, which could ultimately harm consumers.

Competition concerns that may arise include:

- **Monopolies or oligopolies** – companies that have exclusive access to all or some inputs (such as specific categories of data and computing power) can establish a significant competitive advantage, erecting barriers for new entrants. This challenge is exacerbated by

the substantial capital needed to access essential data, technical expertise, and other resources.

- **New unfair and anti-competitive business practices** - exploiting new AI systems to engage in unfair and anti-competitive business practices, such as discriminatory algorithms, could lead to competition concerns.

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?***

Monetization of generative AI systems and components, including AI models, can be achieved by leveraging various business models. The choice of business model may depend on several factors, including specific system usage and requirements.

Hereafter is reported a non-exhaustive list of monetization strategies:

- Charging users a price for using the AI system, such as through a subscription or license; this approach could be extended even to algorithms, data or other components of the generative AI systems.
- Offering a free "basic" version of a generative artificial intelligence system and charging users for "premium" features, or even financing them through advertising.
- Creating generative AI systems according to the specific needs of the customers.
- Deploying the infrastructure, providing cloud-based services, including Infrastructure as a Service (Iaas) and Platform as a Service (Paas).
- Charging strategic partners fees for services and applications integrated into the AI systems.

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.***

In general, open source generative AI systems and components can effectively compete with their proprietary counterparties in certain contexts. Such systems and components benefit from rapid evolution, thanks to the diverse contributions from individuals improving open-source projects. Moreover, open systems can reduce entry barriers due to their cost-effectiveness and flexibility.

However, it is noteworthy that proprietary solutions hold several advantages over open alternatives, especially in terms of safety and regulatory compliance. In fact, proprietary solutions often rely on specialized know-how not typically accessible to the public. Additionally, the organization structures of companies managing proprietary solutions provide greater assurances of compliance with the law, especially concerning areas such as copyright or privacy.

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 crucial role in the development of generative AI systems, as it is needed to train the model and extract patterns that the model can exploit to provide meaningful outputs.

Relevant characteristics for the provision of generative AI systems and/or components, including AI models, are listed below:

- **Quantity** - Large volumes of data are often required to train models effectively, allowing them to learn diverse patterns and relationships.
- **Quality** - Data must be accurate, relevant, complete, and unbiased. The quality of the input data directly influences the reliability and performance of the model.
- **Variety** - Diverse datasets, both in terms of cultural diversity and different perspectives, contribute to a more robust and adaptable model. A wide variety of data helps in capturing a broader range of patterns.

Furthermore, promoting the use of AI generative systems trained with certified data—verified by entities such as universities and technical experts—is considered beneficial. Certification by reputable sources enhances the reliability and quality of the training data, contributing to the overall effectiveness of the generative model.

In addition, from the technical standpoint, taking into account how data is encoded and fed into the model is crucial. Proper encoding impacts the model's ability to understand and extract meaningful patterns from the data.

Moreover, as mentioned earlier, it is essential to ensure that access to data is made straightforward and accessible to the greatest extent possible.

Efforts should be made to minimize any practices that hinder easy access to data, including proprietary data that should be available to companies of varying capacities and sizes. Therefore, it is essential to prevent the adoption of licensing models of releasing IP rights, that could unfairly discriminate against smaller companies with limited resources and entail high transactional costs.

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?***

Interoperability is a critical factor in the delivery of generative AI systems and their components, encompassing AI models. It promotes seamless integration with different systems, standardization, and healthy competition, thereby preventing situations of being locked into a specific technology.

Indeed, effective competition within the generative systems development value chain can be enhanced when developers have the flexibility to effortlessly transition between different AI systems.

The lack of interoperability among components poses a risk to the efficacy of competition.

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 that provide different components along the value chain of generative AI systems can enjoy significant advantages over other companies. This vertical integration allows these companies to control and optimize various aspects of the generative AI ecosystem, leading to several benefits, such as simplified integration between different components, exploitation of their market position (e.g. tied sales) or the benefit of economies of scale.

Vertical integration can also offer efficiency, advanced features and the ability for users to access a wider range of services that work well together. Partnerships also play a role in stimulating competition, especially by supporting smaller companies that may struggle to compete in the development and supply of both upstream and downstream FM services in the generative AI sector. In some cases, an integrated approach allows companies to offer customers a wider choice.

However, it's essential to acknowledge that vertical integration and partnerships can create opportunities for companies to manipulate competition, potentially leading to less favorable market outcomes. For example, concerns may arise if a vertically integrated entity with significant market power imposes restrictive conditions in a partnership agreement that hinder effective competition from other entities in downstream markets.

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?***

Investments and acquisitions of small suppliers of generative AI systems and components, including AI models, by large companies are driven by various logics and can affect competition differently.

For instance, when driven by the goal of market expansion, these investments and acquisitions may target the development of innovative solutions: the intention is to provide the buyer with a competitive edge derived from possessing cutting-edge technologies and top-tier human resources.

However, there's a potential downside as it may impede the research and growth of other highly innovative companies, leaving them behind and more disadvantaged, particularly when they can no longer compete effectively due to the substantial investments made by larger entities.

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 Systems and Components, including AI models, may give rise to the need to adapt EU antitrust legal concepts. This need may arise mainly from the emergence of market dominance or monopoly situations, which could facilitate anti-competitive behaviour. The concept of control may also need to be reviewed in the light of future market scenarios.

According to Andrea Renda, one of the experts who has contributed the most to shaping the AI Act behind the scenes, we are going toward a 'platformisation' of the AI market, whereby most new AI models will be built upon a handful of foundation models. This market concentration could lead to several ways dominant players could further entrench their position. For instance, when an AI solution is built on a Foundation Model, the downstream economic operator might be forced to run its AI application on the same cloud infrastructure, in a process known as 'bundling'.

That is already the case when an AI solution is built as an Application Programming Interface (API) to a Foundation Model, which provides a sort of filter adapting the model's response to the needs of the AI solution. As the query is being run directly to the Foundation Model, the API is supported by its underlying cloud infrastructure.

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

Adapting EU antitrust investigative tools and practices to address the unique challenges posed by generative artificial intelligence systems is crucial to ensure effective regulation, promoting fair competition and protecting consumer interests. Regulators may need to work with experts in artificial intelligence, law, and economics to develop structures that can keep pace with the evolving dynamics of the artificial intelligence industry.

This is because generative artificial intelligence systems can involve complex algorithms, making it difficult to detect collusion or anti-competitive behaviours resulting from algorithmic coordination. Alternatively, antitrust agencies may need to develop tools to assess the impact of data on competition and determine whether companies use data control to gain an unfair advantage or assess the impact of lock-in phenomena.

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