

Competition in Virtual Worlds and Generative AI

Position Paper of the Federation of German Industries

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As the development of Virtual Worlds and Generative AI systems continues, it is evident that this new wave of digital transformation will have extensive impacts, introducing new technologies, business models and market segments. The Federation of German Industries (BDI) welcomes the fact that the European Commission wants to develop a deeper knowledge of the competitive situation in relation to Generative AI systems and Virtual Worlds at an early yet rapidly developing stage. This understanding will enable the Commission to collect crucial market insights and to respond promptly and with well-founded decisions with its existing mechanisms if competition issues may arise.

Generative AI

Currently no need for new regulation

The existing EU competition rules, recently complemented by the DMA, appear to be flexible and sufficiently adaptable to deal with potential anticompetitive behaviour or market distortions that may arise from Generative AI system offers. They need to be applied effectively and swiftly, taking into account the fast-evolving nature of the market. They also need to be applied in a flexible manner to new market dynamics (e.g. network effects or leveraging potential). There is currently no need for new regulation or guidelines. There is always the danger that early or disproportionate regulatory interventions could hinder the development and adoption of Generative AI technologies in Europe and worldwide, which could stifle innovation and European competitiveness. Generative AI is a field of high-level dynamism and innovative potential which should not be unnecessarily restricted by stringent rules. The recent AI Act foresees a far-reaching regulation for the sector. The Digital Markets Act, the Data Act and the antitrust enforcement powers of the Commission already address many potential competitive risks that might arise in the future.

In BDI's view, the Commission should promote dialogue and cooperation with other jurisdictions and international organizations to ensure a coherent and consistent global framework for Generative AI that supports innovation and competition.

Main components for Generative AI

The most important elements needed to build, train and distribute Generative AI systems (or Foundation Models - FMs) are data, computational capacity and technical expertise. Competition may occur at various levels.

- *Data*: Both stages of training, pre-training and fine-tuning, require data. The pre-training phase uses data to establish the FMs' knowledge base, while the fine-tuning phase enhances the FMs' precision through targeted training. The scale and quality of the data are crucial, and the data can be either proprietary or open source. However, data needs to be labelled which requires a lot of manual keywording that can be only partially automatized. If the data is well curated, less data is needed. However, this requires even more manual work.
- *Computational Capacity*: Generative AI models need to be trained on high performance machines, consisting of several thousand of computers with powerful Graphic Processing Unit (GPU) chips in extensive data centers. The training takes weeks and can cost up to several millions EUR for a single training session if one has to rent the necessary hardware/computational capacity. Similar compute power is needed for deploying these models. The AI accelerator chip field is becoming increasingly competitive, with several FM developers and cloud providers either developing their own chips or supporting other suppliers to enter the market. The required computational power is normally supplied by traditional cloud providers or alternatively from publicly or privately owned supercomputers. As entry requires enormous financial resources and specific expertise, public funding could help to build up alternative sources for compute power.
- *Technical Expertise*: Technical expertise is needed, which is the reason why the leaders in this business are well equipped tech giants, or at least companies based in places of high density of AI-expertise. Technical expertise includes applications skills in data science, engineering, machine learning, programming, mathematics, and statistics. There is also the need for many less skilled workers doing the keywording and verifying the outputs of the model. The necessary skills and expertise may vary based on the FM's type and complexity.

Current developments and challenges ahead (not exhaustive):

- Development and supply of FMs is still in its early stage and FM developers face increasing and strong competition from new entrants, including many start-ups. The pool of FM developers is constantly increasing, with a large variety of end products. The availability of FMs through APIs and open-source licenses enables new entrants to enter and scale quickly as long as they have the funding or partner with relevant players.
- There is a high demand for novel and varied models that cater to the diverse needs of customers, such as models that are applicable in industrial settings that necessitate stringent security and reliability. Integrating SMEs and their needs into this dynamic environment is deemed essential for maintaining European competitiveness. Industrial applications offered by European companies for equipment and operator clients globally should be encouraged.
- Downstream FM applications have been growing rapidly across a variety of industries. The downstream application layer encompasses applications that incorporate FMs. Customers can interact with FMs in many ways. Some FMs are deployed as standalone services such as chatbots and virtual assistants, others are integrated with existing services or are add-ons to existing

applications and services. While these downstream FM services utilize similar technological inputs, competition takes place at the level of the individual application in specific domains. There is currently strong competition among providers to innovate and distinguish their offerings, which needs to be preserved.

- Labelling and sorting of data requires a consistent investment in terms of funds and time. Copyrights must be respected which was previously not always the case for models that have been developed by early participants in the AI space.
- Privacy protecting laws, like the GDPR, may be a hurdle for entering the market, making the data handling more expensive compared to the USA or China.
- Renting or buying hardware for training models is also expensive, considering that many attempts are needed before finding the optimal model architecture. The demand for hardware resources is expected to grow, and it can be a great challenge to keep up with this demand.
- Furthermore, the quality of the model plays an important role and confers a competitive advantage for European providers. Initially, big players suffered from releasing unripe models.
- The EU AI Act will also influence the market. For example, the providers of general-purpose AI will have to summarize and document to the authorities the training data used for training the models and create a policy for respecting copyright laws. These obligations could require excluding part of the training datasets used in the past.

Need for cooperation

- Numerous tech companies involved in the Generative AI sector operate at various levels of the AI stack. As far as we know, no single entity to this point seems to encompass the entire AI stack including customer-facing AI applications, and no company has control over all these components.
- All companies, including tech companies, need to collaborate or form partnerships with other entities to successfully market their products or services. Investments or partnerships at open and fair terms between established technology companies, large and small companies enable or accelerate the latter's market entry into AI, thereby driving competition and creating customer benefits and efficiencies.

Virtual Worlds

Currently no need for new regulation

Currently, it is not necessary to create new legislation or to change the EU's antitrust concepts or investigative tools and practices regarding competition in Virtual Worlds. The existing antitrust rules, if applied quickly and in an effective manner, are sufficient to ensure an effective competitive environment. Current competition law already grants the European Commission far-reaching investigative powers. Extensive new intervention tools and regulation for the digital sector have only just been created with among others the Digital Markets Act, AI Act and Data Act. The effects of these new rules on competition and competitiveness have to be studied and tested in practice. Excessive or too restrictive regulation of new markets could have a deterrent effect on innovation and European competitiveness. Especially the Industrial Virtual World business with its high dynamism and innovative strength should

be kept open and not unnecessarily be limited by restrictive rules. The Commission needs to stay vigilant and react if the market conditions change and anticompetitive problems arise and also take the fast-evolving nature of the markets into account.

Industrial Virtual Worlds

When looking at competition in Virtual Worlds, it is important to distinguish between Virtual Worlds in the B2C sector, such as gaming or social meeting spaces, and Industrial Virtual Worlds in the B2B sector. Industrial Virtual Worlds support companies by giving them the possibility to test and optimize industrial processes and products by using real-time industrial digital twins. Industrial Virtual World platforms are a new and highly dynamic sector made up of a multitude of different market players, including digital players, industry companies, component and service providers (such as system integration, visualization engines or cloud services), consulting companies, etc. Start-ups and new entrants play an important role. Many of the industrial players are European companies. Cooperation and new forms of partnerships between the different market players are crucial for the further development of Virtual Worlds.

Currently no significant entry barriers

The Industrial Virtual World is an emerging area that is highly competitive and provides many opportunities also for SMEs and new market entrants. BDI does currently not see any significant obstacles to growth or market barriers regarding Industrial Virtual Worlds apart from challenges that also can exist with regard to other digital markets, such as the need for technical expertise, investment costs, missing standards or connectivity issues.

Main drivers of competition

Important drivers of competition in Industrial Virtual Worlds are access to data (and the ability to process the data), real-time connectivity and access to powerful communication infrastructure and computing capabilities (5G/6G); cybersecurity; open APIs that allow to connect assets, products and software from different vendors to the Virtual World; access to skills; access to hardware resources (own or outsourced). Cooperations and ecosystems also play an important role to promote innovation, investment, and knowledge sharing.

Summary

BDI does currently neither see a need to sharpen the existing EU legal antitrust concepts nor to introduce new regulation. Everything is in flux and there are huge opportunities for European companies. There is also no need to build up additional investigation tools and practices. The current antitrust regime is adequate and flexible enough to also respond to the situation of emerging Generative AI systems or Virtual Worlds and to guarantee effective competition in the market. Moreover, at the moment there is a lot of competition at various levels, but also a need for further cooperation in this highly innovative, dynamic, and competitive market environment. The Commission needs to stay vigilant and react if the market conditions change and anticompetitive problems arise and also take the fast-evolving nature of the markets into account.

In any case, the EU Commission should strive to build up sufficient technical means and develop a deep understanding of the sector in order to be able to respond promptly to any negative developments.

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