

The European Commission
Directorate-General for Competition
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Call for contributions on Competition in Generative AI

To the attention of the European Commission

On behalf of Novo Nordisk, a global healthcare company, we are writing to contribute to the European Commission's call for input on the topic of generative artificial intelligence (AI). As an organization deeply invested in the advancement of medical science and the betterment of patient care through innovative technologies, we recognize the transformative potential of generative AI in the pharmaceutical industry and the broader healthcare sector.

The emergence of generative AI has signaled a paradigm shift in how digital technologies can be leveraged to not only enhance research and development productivity but also to personalize patient care and streamline operations. Novo Nordisk is committed to staying at the forefront of this evolution, ensuring that the benefits of AI-driven innovation are realized in a manner that is both competitive and conducive to the public good.

In alignment with the European Union's approach to artificial intelligence, which emphasizes excellence and trust, we aim to contribute insights that reflect our dedication to fostering a competitive environment that upholds safety and fundamental rights. Our response will specifically address the competition aspects related to generative AI systems, drawing on our extensive experience in the healthcare industry and our ongoing engagement with AI technologies.

It is key that we balance regulation with ability to innovate in EU. On one hand, we do fully acknowledge the importance and necessity to regulate AI, including Generative AI. On the other hand, over-regulation will move AI innovation even further out of EU, which by all accounts is not to the benefit for EU – neither our citizens, nor our industry. We have a unique opportunity to drive trustworthy and ethical AI deployment in EU. Let us make sure we make this our hallmark.

We will highlight in the sections below our response to some of the questions posed by the commission.

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 development of generative AI requires multiple main components, each serving a distinct yet interrelated function within the AI ecosystem. These components encompass **Data**, which provides the raw material for learning and pattern recognition; **Algorithms and Models**, which constitute the intellectual core that processes data and generates outcomes; **Robust Infrastructure**, which underpins the operational environment for AI systems; **Expertise**, which is the human intellectual capital driving innovation and overseeing AI development; and **Computing Power & Energy**, where in order to execute these complex algorithms at scale, intensive energy consumption is required to power and cool large computational facilities with high-performance GPUs.

While each of these elements plays a vital role in the AI value chain, our response will concentrate primarily on two of these components: **Data**, and **Algorithms and Models**. These facets are not only foundational to the functionality of generative AI systems but also carry significant implications for the competitive dynamics within the AI industry.

A- Data: The foundation of any AI system is data. High-quality, diverse, and extensive datasets are crucial for training AI models to recognize patterns, make predictions, and generate novel outputs. In the context of healthcare, patient data, clinical trial results, and genomic sequences are examples of the types of data that can train AI to generate insights that may lead to breakthroughs in treatment and care.

Data Exclusivity and Monopolization: When entities hold exclusive rights to vast, unique, or particularly valuable non-competitive open-source and public datasets, they may gain an unfair competitive advantage. For example, access to all the internet content, github code samples and other non-competitive datasets. This exclusivity can create barriers to entry for other companies, especially startups and smaller firms that may not have the same level of access to such data. This concentration of public data ownership can lead to monopolistic control over certain AI applications, stifling innovation, and competition in the market. Competition should on the other hand remain for data generated internally by companies and differentiating them from each other.

Data Privacy and Regulation: The stringent requirements of data protection laws, such as the GDPR, can impact the availability of data for AI training. While these regulations are crucial for protecting personal information, they can also limit the datasets that companies can use, potentially creating competitive disadvantages for firms that are less equipped to navigate these regulatory landscapes or that rely heavily on personal data for their AI models.

Data Bias and Quality: The competitive effectiveness of generative AI systems is also dependent on the quality and representativeness of the training data. If a company has access to more comprehensive and unbiased data, its AI models are likely to be more accurate and effective, giving it a competitive edge. Conversely, companies with access to limited or biased datasets may produce inferior AI models, which can negatively affect their market position.

Data Sharing and Collaboration: The competitive dynamics can also be influenced by the willingness and ability of organizations to share data. Data sharing agreements and collaborations can help mitigate the risks of data monopolization, but they require careful antitrust consideration to ensure that they do not inadvertently lead to anti-competitive practices.

B- Algorithms and Models: The core of generative AI lies in its algorithms, and several factors need to be considered from a competition perspective:

Intellectual Property Rights (IPR): IPR serve as a critical mechanism to foster innovation by providing inventors with the necessary incentives to invest in research and development. The strategic application of IPR to protect algorithms ensures that companies can safeguard their investments and maintain a competitive edge in the market. It is important to recognize, however, that while IPR is instrumental in promoting a robust and dynamic competitive environment, it is equally essential to balance these protections in a manner that does not unduly impede the entry of new market participants. This equilibrium is vital for sustaining an ecosystem where innovation can flourish and where a diverse array of competitors can contribute to technological progress.

Algorithm Transparency and Explainability: In industries where trust and accountability are of utmost importance, the capacity to articulate the decision-making process of AI models becomes a significant competitive consideration. While the intricate nature of complex models may preclude full explainability, companies that implement robust frameworks for responsible AI use, ensuring that the rationale behind AI-involved decisions is clear and justifiable, can secure a competitive advantage. It is the commitment to responsible AI practices and the ability to provide insight into the AI's decision-making principles that are essential for maintaining user trust and upholding industry standards.

Access to Advanced Algorithms: The availability of cutting-edge algorithms to a wide range of companies, including SMEs, can foster a competitive environment. Conversely, if advanced algorithms are only accessible to large corporations with significant resources, this could lead to market concentration and reduced competition.

Standardization and Interoperability: The development of industry standards for AI models can facilitate interoperability and compatibility, which can lower entry barriers and enable smaller players to compete more effectively.

Collaborative Development: Open-source models and collaborative AI research initiatives can democratize access to advanced AI technologies, fostering competition and innovation across the industry.

Algorithmic Bias: Ensuring that AI models are free from bias is not only an ethical imperative but also a competitive one. Biased algorithms can result in unfair competitive practices and potentially lead to legal and reputational risks.

Customization and Specialization: The ability to customize or specialize algorithms for specific tasks or industries can be a significant competitive differentiator, allowing companies to address niche markets effectively.

Speed of Innovation: The pace at which companies can improve and evolve their AI models can be a key competitive factor, with rapid innovation cycles potentially leading to market leadership.

2. **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.**

Algorithmic Dominance: Proprietary algorithms that are superior in performance may lead to a competitive imbalance if they are not accessible to other market players. This relates to the algorithms and models component.

Interoperability Challenges: The absence of well-defined interoperability standards can result in vendor lock-in, where customers become heavily dependent on a single provider for AI services and integration. This issue pertains to the integration capabilities of AI systems. Without standardized interfaces and protocols, customers may face difficulties in switching between different AI providers or integrating AI components from multiple vendors, ultimately limiting their choices and flexibility.

Intellectual Property Disputes: As AI models become more complex, the potential for intellectual property disputes increases, which can hinder innovation and competition. This is related to the algorithms and models component.

Bias and Ethical Concerns: AI systems that exhibit bias or unethical behavior can distort competition by unfairly disadvantaging certain groups or individuals. This relates to the data and algorithms used in AI systems.

Regulatory Compliance: Differing regulatory standards across regions can create uneven playing fields, where companies operating in more stringent regulatory environments may face higher compliance costs. This issue is associated with the regulatory compliance component.

Access to Computing Resources: Smaller firms may struggle to compete due to the high costs of computational power required to train and run AI models, which relates to the computing power component.

Talent Acquisition Wars: Competition for skilled AI professionals can lead to talent shortages and wage inflation, impacting the ability of smaller firms to compete. This relates to the expertise component.

4. 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 their components, including AI models, could potentially necessitate adaptations to EU legal antitrust concepts for several reasons:

Data as a Competitive Asset: Given the critical role of data in training and operating AI systems, antitrust concepts may need to evolve to address issues related to data accumulation, access, and control.

Dynamic Market Analysis: The fast-paced nature of AI innovation requires antitrust frameworks that can rapidly adapt to technological advancements and market changes.

Market Power Assessment: The traditional methods of assessing market power may not be sufficient for AI-driven markets, where control over algorithms and data can be more indicative of market dominance than market share.

IPR and Innovation Balance: Antitrust concepts may need to strike a new balance between protecting intellectual property rights to incentivize innovation and preventing anti-competitive practices that could arise from the misuse of those rights.

Interoperability and Standardization: The importance of interoperability in AI systems may lead to a reevaluation of how antitrust laws view standard-setting and integration across platforms and services.

Consumer Welfare Standard: The definition of consumer welfare could expand beyond price effects to include considerations of choice, quality, and innovation specific to AI technologies.

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

Generative AI systems and their components, including AI models, present a multitude of monetization opportunities that are likely to evolve as the technology matures. One prevalent model is the provision of AI-powered tools and platforms through subscription services, a trend that is already well-established in the current market. This approach offers a steady revenue stream and ensures that users have continuous access to the latest updates and improvements.

Another significant avenue for monetization is the development of custom solutions tailored to the specific needs of businesses and industries. These bespoke systems can command premium pricing, particularly when they significantly enhance operational efficiency or enable new capabilities for clients.

The data and insights generated by AI systems represent a valuable commodity in themselves. Companies can monetize this aspect by selling data or derived insights to third parties, which can be particularly lucrative in sectors where data is scarce or of high strategic value.

Advertising is another domain where generative AI can have a profound impact. By enhancing the effectiveness of advertising through improved targeting and content creation, AI can add value to marketing efforts, and companies can monetize these advancements by offering AI-enhanced advertising services.

Lastly, there is a growing trend of Big Tech companies integrating generative AI capabilities into their cloud services. This integration can lead to a form of vendor lock-in, where clients

become reliant on a particular cloud provider's ecosystem. As generative AI capabilities become more deeply embedded into cloud services, providers may increase the pricing of these services, capturing additional value from the AI enhancements offered.

In terms of which components are likely to capture most of the monetization, it is reasonable to anticipate that platforms and services that offer unique, scalable, and hard-to-replicate AI functionalities will be particularly profitable. This includes proprietary algorithms and models that provide a competitive edge, as well as the cloud infrastructure that enables the deployment and scaling of AI solutions. As generative AI continues to advance, the ability to offer comprehensive, end-to-end solutions that combine ease of use with powerful capabilities will likely be a key driver of monetization in this space.

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.

Proprietary systems (or rather generative AI systems training on proprietary data such as YouTube, Reddit, and other closed communities), will offer advanced features, support, and integration services that can be critical for commercial applications.

However, open-source generative AI systems can drive innovation and competition by lowering entry barriers and allowing broader access to state-of-the-art technology through broad democratization to both private and public entities and to society at large. Here are some ways they could effectively compete with proprietary systems:

Innovation and Collaboration: Open-source models encourage collaborative development, which can lead to rapid innovation as a diverse community of developers contributes improvements and new features.

Cost-Effectiveness: Open-source AI systems are often free to use, which can lower the barriers to entry for startups and smaller companies that may not have the resources to invest in proprietary solutions.

Transparency and Trust: The transparent nature of open-source AI allows for greater scrutiny of the algorithms, which can build trust among users and developers, particularly in sectors where accountability is crucial.

Customization: Users have the flexibility to modify and tailor open-source AI systems to their specific needs, which can be a significant advantage over proprietary systems that may be more rigid.

Avoidance of Vendor Lock-in: Open-source AI systems provide an alternative to proprietary systems that may lead to vendor lock-in, giving users more control over their technological infrastructure.

However, there are also challenges that open-source AI systems face in competing with proprietary systems:

Support and Maintenance: Proprietary systems often come with professional support and maintenance services, which can be a deciding factor for businesses that require reliability and accountability.

Integration and Compatibility: Proprietary systems may offer better integration with other products and services, especially if they are part of a larger ecosystem offered by a single vendor.

Performance and Features: Proprietary AI systems may have access to more resources for development, potentially leading to more advanced features and better performance compared to open-source alternatives.

Transparency, auditability and explainability: The inherent need to keep parts of a proprietary system/design protected leads to ineffective benchmarking and comparison for any open-source development to compete effectively and prove an advantage or equivalence.

In summary, while open-source generative AI systems offer several competitive advantages, such as cost savings, transparency, and collaborative innovation, they also face challenges in terms of support, integration, and commercialization. The effectiveness of competition between open-source and proprietary AI systems often depends on the specific use case and the needs of the users.

7. 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 plays a critical role in the provision of generative AI systems and components, including AI models, for several reasons:

Facilitates Integration: Interoperability allows for the seamless integration of AI components from different providers into existing systems and workflows, which can lower costs and reduce complexity for users.

Promotes Competition: By enabling different systems and components to work together, interoperability prevents vendor lock-in and allows users to choose the best solutions from multiple providers, thus fostering a competitive market.

Encourages Innovation: An interoperable ecosystem can accelerate innovation as developers can build upon each other's work, combine different technologies, and create novel solutions without compatibility barriers.

Expands Market Access: Interoperability standards can help small and medium-sized enterprises (SMEs) access larger markets by ensuring that their solutions are compatible with those of established players.

Enhances User Experience: Users benefit from interoperability through increased choice, better functionality, and the ability to customize their AI solutions according to their specific needs.

The lack of interoperability between components can on the other hand pose a risk to effective competition:

Market Fragmentation: Without interoperability, the market may become fragmented with isolated systems that cannot communicate or work with one another, limiting user choice and hindering the adoption of AI technologies.

Barriers to Entry: New entrants may find it difficult to compete if they cannot ensure that their components will function within the existing infrastructure, which is often dominated by larger players with proprietary systems.

Innovation Stifling: A lack of interoperability can stifle innovation by preventing the combination of different technologies and ideas, which is often where breakthroughs occur.

Increased Costs: Users may face higher costs due to the need to commit to a single vendor's ecosystem or invest in custom solutions to ensure compatibility between disparate systems.

In summary, interoperability is essential for creating a dynamic and competitive market for generative AI systems. It enables integration, promotes competition, encourages innovation, expands market access, and enhances the overall user experience. Conversely, a lack of interoperability can lead to market fragmentation, create barriers to entry, stifle innovation, and increase costs, all of which can negatively impact competition.

We appreciate the opportunity to participate in this important discussion and look forward to providing our perspective on how generative AI can shape a competitive and dynamic market, ultimately leading to improved health outcomes for patients across Europe and around the world.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Thomas Senderovitz', with a stylized, cursive script.

Thomas Senderovitz, M.D.

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