

## Use of LLM for SMEs, opportunities and challenges

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### ABSTRACT

AI (Artificial Intelligence) and large language models such as GPT (Generative Pre-trained Transformer) have brought rapid and profound changes in the field of companies and the economy. These technologies offer new opportunities in automation, data-driven decision making, and customer service that can have a significant impact on companies' competitiveness and economic growth. At the same time, it is important to understand that the general application of GPT and AI alone does not guarantee a company's competitive advantage. There are many factors to consider, and the pros and cons must be weighed carefully. Ethical and legal issues such as data protection and non-discrimination are critical. In addition, adapting to technological development and a changing environment is key to long-term success. In this paper, the importance of corporate application of GPT and MI, advantages and disadvantages, ethical and legal aspects, challenges of regulation and development, as well as the importance of cooperation and training are reviewed. Pursuing reasonable and responsible use can enable companies and the economy to improve competitiveness while protecting society and the rights of individuals. The first part of this paper introduces the Generative Pre-Trained Transformer (GPT) and some key concepts related to ChatGPT. In the second part, the effects, opportunities, and limitations of GPT on businesses follow.

## 1. Introduction

Before discussing this topic, some key concepts about ChatGPT should be clarified.

**Chatbot:** a computer program designed to simulate a conversation with human users, especially over the Internet (King, 2022).

**Generative Model:** a type of model that creates new data, not only classifies, or predicts based on the input data (Pavlik, 2023).

**Generative Pre-Trained Transformer (GPT):** is a machine-learning model that uses unsupervised and supervised learning techniques to understand and generate human-like language (Radford et al., 2018).

**Language Model:** a type of artificial intelligence model that is trained to generate text that resembles human language (MacNeil et al., 2022).

**Natural Language Processing (NLP):** NLP is an area of artificial intelligence that involves the use of algorithms to analyze human language, such as text and speech, to extract meaning and useful information (Manning & Schütze, 1999).

**Neural Network:** a machine learning model consisting of connected processing nodes trained on data to perform a specific task based on the connections between them (Bishop, 1994).

**Supervised Fine-Tuning:** a machine learning technique in which a pre-trained model is further trained on a smaller, labeled data set to improve its performance on a specific task (Lee et al., 2018).

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**Transfer Learning:** the ability of tools like ChatGPT to use the knowledge gained from one task to improve performance in another, related task (Lee et al., 2018).

**Unsupervised Pre-Training:** a machine learning technique in which a model is trained on a large dataset without labeled examples, allowing it to learn the underlying structure and patterns in the data (Lee et al., 2018).

### Research questions

In this paper, LLM is taken as a possible support tool, and we are looking for the answer to what factors and drivers are important for SME's. The following issues could be examined here:

- What about the GPT, ChatGPT?
- What about the security challenges of GPT?
- What is the impact of LLMs on economic growth and competitiveness?
- Expected effects of the Big Language Models on SMEs
- What new skills may be needed in businesses?

### Methodology

To answer the previously asked questions, the following three key methodologies were used in our research: case analysis, secondary analysis of specialist-related interviews, and literature review. In **Case Analysis** we studied specific LLM-related cases or examples, highly based on real-life situations.

In the **Secondary Analysis of Specialist-Related Interviews**, we used topic-related interviews to use the relevant parts to answer our research question. In this case, we received valuable insights from experts in the field. In the **Literature Review**, we examined the existing scholarly works, articles, books, and other sources that are relevant to our research. Hopefully, this triangulation of methods can enhance the robustness of our findings and contribute to a more well-rounded research study.

#### 1.1. GPT and ChatGPT

ChatGPT is a public tool developed by OpenAI and based on the GPT language model technology (Kirmani, 2022). It is a highly advanced chatbot capable of answering simple questions as well as generating customized textual content (Liu et al., 2021).

OpenAI is a research laboratory founded in 2015 (Brockman et al., 2016). This laboratory has achieved results in the development of AI technologies and has released several machine learning products to the public, including DALL-E and ChatGPT (Devlin et al., 2018). DALL-E can generate images using artificial neural networks (Cherian et al., 2022).

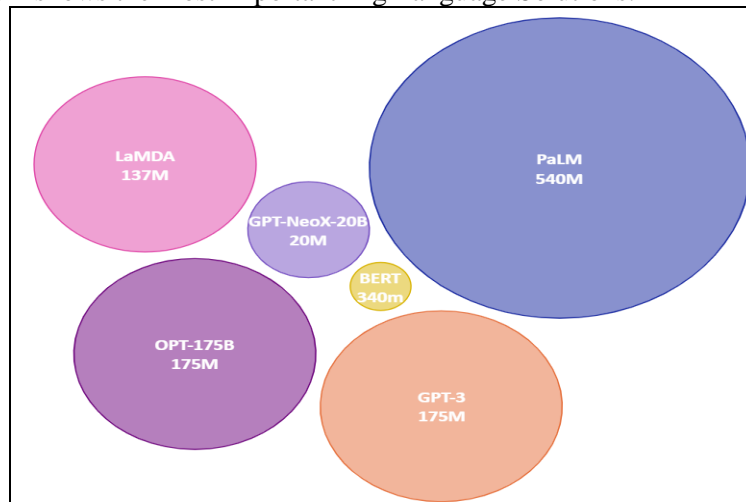
ChatGPT, as well as other models such as Google BERT (Bidirectional Encoder Representations from Transformers) and leading language models developed by Microsoft (XLNet) are all based on the GPT-3 architecture. BERT and XLNet, on the other hand, focus primarily on understanding the underlying meaning of the text. One of the main advantages of GPT-3 and ChatGPT is the generation of high-quality text, while BERT and XLNet perform exceptionally well in understanding and analyzing text (Dale, 2021).

LaMDA was introduced in 2020 as a successor to Google Meena. The first generation LaMDA was announced at Google I/O 2021, and the second generation was introduced in 2022. This model was designed to engage in open-ended conversations, making it unique in the field of conversational AI (DataCamp, 2023a).

The technology behind LaMDA is the Transformer architecture, a neural network model developed and open-sourced by Google Research in 2017. This architecture allows the model to read and understand the relationships between words in a sentence or paragraph and predict the next words (DataCamp, 2023a).

Currently, the best-performing language model for Hungarian is huBERT. The PULI name was given to the models available in Hungarian using the 6.7 billion parameter GPT-3, GPT-2 and a BERT-Large model (PULI GPT-3SX, PULI GPT-2 and PULI BERT-Large) (Yang et al., 2023).

GPT technology is a powerful tool for natural language processing tasks, but it has some limitations. One is that GPT models are based on a statistical approach that learns patterns from large textual datasets that are affected by biases and stereotypes in the source text (Dale, 2017; Lucy & Bamman, 2021). This means that the model may sometimes create offensive or harmful content. In addition, GPT models cannot fully understand the context and meaning of the generated text and do not perform well in tasks that require the application of logical inference, which is not found in the data that forms the basis of learning (Strubell et al., 2019). In addition, GPT models are computationally intensive to learn and require large amounts of data and computational resources (Zhou et al., 2021). Therefore, it is important to be aware of these limitations and use GPT technology responsibly. Figure 1 shows the most important Big Language Solutions.



**Figure 1.** Size comparison of more important Large Language Modeling solutions (M-billion, m-million), (source: lifearchitect.ai/models/ based on own editing)

## 1.2. Security challenges of GPT-4

Although GPT-4 shows increased performance in areas such as reasoning, knowledge retention, and encoding compared to earlier models such as GPT-2 (Radford et al., 2019) and GPT-3, but during its development based on the analyses carried out, specific risks can be observed (OpenAI 2023).

**Hallucination:** GPT-4 is prone to "hallucinating," i.e., "producing meaningless or untrue content from certain sources." This can be particularly harmful as users increasingly trust the information provided by the model (Azamfirei et al., 2023).

**Harmful content, biased content:** Language models can create different types of harmful content. These may be content that may violate development guidelines and may cause harm on an individual or social level. Language models can amplify biases and perpetuate stereotypes (Murgia et al., 2023).

**Disinformation and (user) influencing activities:** GPT-4 can create believable, realistic, and targeted content, including news articles, messages, conversations, and emails (Yang et al., 2023).

**Data protection:** GPT-4 learned from several previously established and publicly available data sources that may contain publicly available personal data. Because of the above, the model can know people who are highly present on public Internet interfaces (Paul et al, 2023).

**Cyber security:** In the case of vulnerability discovery and exploitation, external cyber security experts tested whether GPT-4 can help discover, assess, and exploit vulnerabilities in computer systems. They found that GPT-4 can explain certain vulnerabilities, but it no longer performs well when exploiting known vulnerabilities (Dwivedi et al., 2023).

## 2. What is the impact of LLMs on economic growth and competitiveness?

The question can be answered with two approaches: from the side of opportunities and challenges.

## 2.1. Economic opportunities provided by the Great Language Models

Regarding the possibilities, the following can be established:

**The rise of corporate solutions:** It enables faster application of LLM solutions, which include automated processing and analysis of information. Automation can make work processes more efficient, reduce costs, and increase productivity, which can contribute to economic growth. Personalized customer service can be used to improve customer satisfaction. Increasingly advanced chatbots and virtual assistants can answer customer questions quickly and efficiently, which can improve the customer experience for businesses.

It's worth using AI to generate questions for different purposes, but you should always check the information it provides. AI products can also generate links that appear plausible, but fact-checking is always paramount (DataFramed, 2023a). GPT products help you develop your chatbot solutions. If the application needs to answer questions that can be asked in different ways, then the question can be asked in different ways using ChatGPT. By testing questions, you can discover potential errors in your own code (DataFramed, 2023b). In case of possible self-development, it is necessary to make sure before the development whether all necessary elements are available for the solution. Questions such as (DataFramed, 2023c) must be answered: Do we have all the components? Have all the intermediate issues been resolved yet? Which components should we use? How should the components be connected?

**The rise of open-source code:** Faster innovation and the wider application of generative artificial intelligence reinforce each other. In the case of program codes, their functionality must first be thoroughly tested before being used in a live corporate environment (DataFramed, 2023a). When implementing a GPT, the most important aspects include prioritizing security and data protection. You must not release personally identifiable information to AI products that are not adequately protected. Generative AI can significantly reduce programming time, allowing developers to create new, more advanced tools and AI models faster and more efficiently (DataCamp, 2023c).

**Democratization of knowledge:** Removing interface barriers to data transfer decision-making using an AI-assisted application. Learning how to use visualization and engaging in learning activities is vital. (DataCamp 2023c). LLM solutions provide access to extensive information and learning opportunities (Lund and Wang, 2023). Economic actors such as companies, researchers, and entrepreneurs can use these tools to analyze market information, generate new ideas, and conduct research that can drive more efficient businesses and innovations. Language models can automatically translate texts into different languages. This can facilitate international relations and business, allowing companies to easily communicate and do business in other countries (DataCamp 2023c).

## 2.2. Economic challenges presented by the Great Language Models

**Organizational culture:** Due to the importance of the leadership role, the manager must know about the technology to use the LLM effectively. At the process level, it is worth thinking about using GPT for the entire process and not just for one specific task (DataFramed, 2023c). Analytical skills and expertise in human review and feedback can be well combined when using generative tools (DataCamp 2023a). AI developers and users must act responsibly concerning the operation and decision-making of AI systems. The role of transparency and publicity is important to understand how AI systems work and how they make decisions (DataFramed, 2023a). AI and automation can bring changes to the labor market. It is important to prepare workers and workplaces for these changes, for example through training and retraining (DataFramed, 2023a). It is the manager's job to ensure that AI is used safely and appropriately in the team. It is important to consider the consequences of using AI, security, protection of personal data, and respect for intellectual property. At the same time, these systems are becoming increasingly important in administrative tasks (DataFramed, 2023a). The use of automation and artificial intelligence is important at the corporate level because otherwise it would be at a competitive disadvantage. Currently, there is still a large gap between companies that use AI and those that do not, but over time, a company that does not use this technology will be very rare (DataCamp 2023e).

**Risk of data protection abuse:** The use of AI is not without ethical, legal, and social issues that must be carefully addressed. Some principles and considerations for AI-related decisions should be highlighted. Data security and ethics: large language models face significant data protection and ethical challenges. Without proper handling of data protection and ethical issues, instead of economic growth, they can cause negative effects, such as data loss or human rights violations (DataFramed, 2023a). To promote economic development, the use of such tools efficiently and sustainably is crucial. It is important to consider data protection, ethical and legal aspects, as well as the inequalities that may arise from the use of such technologies. Education and training are also key to preparing people to use such technologies and understand their effects on the economy and society (DataFramed, 2023a).

**Putting artificial intelligence to work is more difficult than expected:** The future of AI may not lie in one big language model that can do everything, but rather in the cooperation of several specialized models. Each model must be designed in such a way that it can perform specific tasks, and their combined results can lead to more accurate and efficient results (DataCamp, 2023f). To take full advantage of ChatGPT, it must be used as it was originally intended, as a conversational partner. When asking questions, care must be taken to use the appropriate context and avoid overcomplication (DataFramed, 2023b).

When teaching AI, data cleaning and data quality are of prime importance. A large and unclean data set can often lead to inaccurate results. When using GPT, data quality (preferring a smaller but better data set over a larger but inaccurate one) is of prime importance (DataCamp, 2023b). Data labeling cannot be omitted. After property-based tagging (e.g. location data), access to data must consider the tag as well as predefined guidelines. This approach improves data management and simplifies the machine learning workflow (DataCamp, 2023b). Legal gray areas, especially copyright and intellectual property issues, determine the available databases (DataCamp, 2023c).

When inserting generative AI, the work process must be changed and customized to the given organization. It is advisable to make a compromise between business efficiency and customer satisfaction. GPT-based customer service can result in more efficient work processes and more satisfied customers (DataFramed, 2023c). We are still in the early stages of generative AI, which means there is still a lot of untapped potential in the use of generative AI (DataCamp, 2023c). AI and automation are increasingly not optional for businesses, but a necessity (DataCamp 2023d). When introducing AI, it is essential to understand the organization's capabilities, human resources, and the potential of AI application areas. It is worthwhile to proceed gradually and then introduce more and more AI capabilities (DataCamp 2023d).

### 2.3. Expected effects of the Large Language Models on SMEs

AI, including technologies similar to GPT, will have a significant impact on SMEs (small and medium-sized enterprises) and the business environment soon (DataCamp 2023a).

**Automate repetitive tasks:** AI, including GPT, can automate routine and repetitive tasks. This enables SMEs to streamline their operations, reduce manual labor costs, and increase efficiency. For example, AI-powered chatbots can handle customer inquiries, freeing up workers for more complex tasks (Qureshi et al, 2023).

**Data analysis and decision preparation:** AI can analyze large amounts of data quickly and accurately. SMEs can use AI to extract valuable information from their data, helping them make data-driven decisions such as marketing, sales forecasting, and inventory management (Frederico, 2023).

**Personalization:** AI can analyze customer data to provide personalized recommendations and experiences. SMEs can use this information to tailor their products and services to individual customer preferences, increasing customer loyalty and sales (Paul et al, 2023).

**Content generation:** GPT and similar AI models can generate content such as blog posts, product reviews, and marketing materials. This can save SMEs time and resources while maintaining a consistent online presence (Lo, 2023).

## What should a business pay attention to if the application or introduction of GPT arises?

To learn and prepare, we must use personalized learning opportunities. These include Adaptive Learning Platforms, which are educational systems that take into account the prior knowledge and performance of the workforce and customize the curriculum and tasks (Desaire, 2023). It is important to use the right tools and applications, which can be smartphones, tablets, and computers. Educational apps and platforms offer many interactive tools and content to help students learn. Nowadays, online teaching materials and courses are becoming more and more important. During the preparation, participants in the online training can progress at their own pace and choose relevant topics. Online courses are typically flexible and allow trainees to study according to their own schedules. The benefits of personalized learning include improving individual performance, increasing motivation, and enhancing the learning experience.

### 2.4. What new skills may be needed in businesses?

**Prompt design and prompt engineering:** Prompts are input instructions or questions that we give to AI systems to generate responses. Prompts are critical because they determine what results you get. For GPT or other language models to provide accurate and useful answers, it is important to create appropriate prompts. Prompt engineering (Lo, 2023) is the process of creating questions or instructions that help the model achieve the desired results. In prompt engineering, users must learn how to create efficient and accurate prompts so that the model provides the desired results. This is key to the application of AI, as good questions can be critical to success (Medium.com 2023a).

**Knowing and using MI art:** GPT and similar models can also be used in creative fields, such as art and design. DALL-E, for example, is a model that generates images based on textual descriptions. Proficiency in AI art enables the creation of new and exciting works (Medium.com 2023a).

**Acquiring programming basics:** Although it is not necessary to be a professional programmer when it comes to using GPT and other AI models, basic programming knowledge can be an advantage. These skills allow us to customize and integrate the models into our applications or projects. For example, if a company is developing its GPT-based chatbot, programming fundamentals can help fine-tune how the chatbot works (Medium.com 2023b).

**API (Programming Interface) use:** APIs allow applications to communicate with other services and systems. There are a growing number of APIs in the field of AI that allow developers and companies to easily access AI systems and integrate them into their applications. For example, an e-commerce company can use APIs to offer customized recommendations and a personalized shopping experience to its customers, increasing purchase conversion (Medium.com 2023c).

These skills and approaches can help companies take advantage of the opportunities offered by AI and large language models. AI is an increasingly widespread technology, and those who properly prepare and apply it can gain a competitive advantage in the age of digitization and automation.

## Conclusion

Large language models can have a significant impact on economic growth and competitiveness, but it is important to note that this impact depends on many factors and is not always clear-cut or exclusively positive. Before using GPT in your company, you need to weigh the pros and cons and consider what your specific goals are for using the technology. Ethical and legal aspects must be considered. During the development of the model, it is essential to properly train and supervise the model. The use and regulation of AI must be balanced to reap its benefits while protecting society and the rights of individuals. In addition, regulation must adapt to technological developments and new challenges. Cooperation and open dialogue between technology developers, regulators, and society is essential for successful AI application and regulation.

GPT solutions help transform SMEs and the business environment with automation, data-based information, improved customer relations, and cost-saving opportunities. SMEs that consciously adopt AI technologies are likely to gain a competitive advantage and succeed in the changing business

environment. Based on the literature and personal experience, it can be stated that GPT technology is of great importance, but one must be aware of its advantages and disadvantages. Due to competitiveness, knowledge of technology cannot be dispensed with at the business level, employees must be continuously trained. At the same time, due to the still unclear issues (ethics, law), the use and application of the possible GPT system must be carefully considered and, if possible, kept under control.

Overall, GPT and other large language models have real potential to promote economic growth and competitiveness, but both these benefits and risks must be recognized and used responsibly to protect the interests of society and individuals.

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