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THEORETICAL FOUNDATIONS FOR DEVELOPING ARTIFICIAL INTELLIGENCE MARKET

Today, the advancement of AI technologies is driving a significant shift in the economic system, often called the Fourth Industrial Revolution. This shift necessitates new research into how market dynamics are evolving with the advent of products and services based on AI technologies. Therefore, this chapter presents a study that explores the nature of the emerging AI market.

In selecting the study topic, the question arises regarding the extent to which legal or quasi-level frameworks are essential for the AI market. Introducing new technologies and the freedom of developers or suppliers to negotiate with possible users will likely promote establishing a free market guided by the balance of supply and demand. Additionally, legal constraints have the potential to impede technological advancements. However, these advancements could significantly enhance people's lives and well-being, particularly in the healthcare industry.

Recent tendencies highlight that the AI market should have certain limitations. The legal sphere must not overlook the domain of AI, as it poses potential dangers to society. These dangers are not just theoretical («we call on all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4»¹). They have already materialized through violations of human rights, manipulations and biases. As a result, high-level international agreements emphasize the importance of ensuring the safety and reliability of AI systems (Bletchley Declaration²).

1 Future of Life Institute (2023). Pause Giant AI Experiments: An Open Letter. URL: <https://futureoflife.org/open-letter/pause-giant-ai-experiments/> (15.09.24).

2 AI Safety Summit (2023). AI Safety Summit, hosted by the UK, 1-2 November 2023 at Bletchley Park. URL: <https://www.aisafetysummit.gov.uk/> (15.09.24).

Is there a distinct market for AI technologies, or are they considered a part of other markets, such as the information market?

The information market encompasses legal, economic, and organizational aspects of trading information resources, technologies, and commercial services³. In the past, it may have seemed impractical to separate the AI market from the information market in a broad sense. However, today, there are all the necessary conditions for this, some of which will be discussed in this chapter. Our stance on this separation is backed by statistical data, such as AI's vast global market share, estimated to be \$196 billion US dollars⁴.

Technology development in the AI and other related information markets has outpaced the enhancement of associated laws. This creates a risk of unregulated interactions among participants. Current legal acts are not fully equipped to address these challenges, making it essential to consider general legal approaches and principles from various fields of law. Additionally, soft law acts providing non-binding recommendations are becoming increasingly important. Several foreign countries, such as Japan, have been successfully implementing them towards the AI market⁵.

When considering the development of the AI market, we shall address the following issues.

1. Defining the types of goods that form the basis of interactions between market participants, and understanding the corresponding rights involved.
2. Organizing the AI market by classifying its components.
3. Identifying participants, similar to sellers and buyers in the market for tangible goods.
4. Establishing the legal framework for the AI market, including the fundamentals for participant interactions.

Resolving these issues is essential for advancing the legal framework and achieving a harmonious balance between technological progress, human rights, and social stability. A better understanding of the AI market and its nature as an economic phenomenon is critical today.

3 Velykorodna, D. (2010). Content and Structure of Information Products and Services Market [Zmist ta struktura rynku informatsiynykh produktiv ta posluh]. Herald of the Economy, Transport and Industry, 29, 72-76. P. 75.

4 Howarth, J. (2024). 57 NEW Artificial Intelligence Statistics (May 2024). Exploding Topics. URL: <https://exploding-topics.com/blog/ai-statistics> (15.09.24).

5 Hachkevych A. (2024). Sphere of AI in the Japanese Soft Law Acts. Part 1: Overview of Sources and Tendencies [Sfera shturnoho intelektu v miakomu pravi Yaponii. Chastyna 1. Ohliad dzherel ta tendentsii]. European Perspectives, 2, 232-243. DOI: <https://doi.org/10.32782/ep.2024.2.36>

1. Products and services featuring AI are an integral part of the AI market, where participants engage with one another.

A product represents the outcome of human intellectual or physical activity and can be intended for market exchange (goods), consumption, or use in production. The distinctiveness of a service lies in the fact that it does not satisfy the consumer's need with a specific material object but rather through the actions of the service provider or their result.

The core of products and services based on AI technologies is a software system that typically uses machine learning and can imitate human cognition to carry out various tasks across almost all areas. This software system may be offered as a product – a digital copy that requires installation. Meanwhile, services employing AI technologies, delivered online, are increasingly prevalent nowadays. Examples such as Dall-E 2, Midjourney, Stable Diffusion, and others have already gained significant popularity.

In addition, the AI market may involve complicated AI systems such as industrial robots, medical devices equipped with AI, automated assistants, etc. Providing maintenance for these systems can be considered one more example of AI services when programmed with AI functionality is considered.

In academic literature and scientific papers, the terms «AI model» and «AI technology» are also commonly used, and they bear similarities to the concepts previously discussed.

However, there is still no generally accepted resolution to terminological issues, including achieving a unified understanding of these concepts. One may frequently encounter the concept of AI, even in this chapter. It effectively summarizes all relevant technologies, models, technologies and systems.

Additionally, the AI market is closely linked to datasets as goods. They are the essential fuel that enables AI to self-learn and allows its algorithms to discover the necessary patterns.

2. The multisided structuring of the AI market is still debated, but technologies are typically categorized as traditional or generative according to the understanding of their possibilities (classification I).

Generative AI, such as ChatGPT and similar services, is designed to produce new digital content, including text, images, audio, video, and program code, for use in various applications and user interfaces⁶. Traditional AI is sometimes

⁶ OECD iLibrary (2023). G7 Hiroshima Process on Generative Artificial Intelligence. URL: https://www.oecd-ilibrary.org/science-and-technology/g7-hiroshima-process-on-generative-artificial-intelligence-ai_bf3c0c60-en (15.09.24). P. 6.

explained as logic because it aims to follow predefined rules. Although traditional AI is sometimes called narrow, the prevailing view is that all existing AI systems today are classified as narrow (or weak).

Classifying these technologies might be challenging, although helpful, based on the implementation sphere (classification II). AI technologies are often used in different ones. Spheres are divided into components that describe the potential uses of AI. For example, the AI market in the information sphere can be roughly divided into the following sectors: business information (stock exchange, financial, and statistical information), information for specialists (legal, medical, scientific, and technical), consumer information (news, music, films, fiction), educational information, and information and communication technologies⁷.

Structuring the market is particularly important within the legal framework to develop general provisions and specific rules. The approval of industry-specific frameworks for healthcare and finance in Singapore is the example of the latter⁸. Recent G7 discussions also suggest that the AI market may include software for the public sector, distinct from the private sector (classification III).

Another suggestion is to classify AI technologies depending on the tasks they perform (classification IV).

The fifth classification, described in Fig. 1, is based on data from the Statista company regarding AI. It considers the areas of software development and is closely related to the classification by tasks.

3. The market of AI is driven by the voluntary actions of entities offering products and services featuring AI, as well as those seeking to purchase and utilize AI technologies to meet their needs or achieve desired results.

A subject of legal relations in this market is defined as a participant in market interactions having rights and responsibilities connected with the development and use of AI systems and technologies. In the following section, we will explore the legal and ethical norms that impact the scope of legal personality.

7 Kononova, Z. (2017). Overview of lectures on «Economics of Information» for full-time and part-time students (specialty 051 Economics)] onspekt lektsii z dystsypliny [«Ekonomika informatsii» dlia studentiv spetsialnosti 051 «Ekonomika» dennoi ta zaochnoi form navchannia]. NTU «KHP». P. 123.

8 Hachkevych, A. (2024). Organizational and Legal Support for the Introduction of Artificial Intelligence in Singapore. Analytical and Comparative Jurisprudence, 2, 418-428. P. 423-425. URL : <https://doi.org/10.24144/2788-6018.2024.02.71>

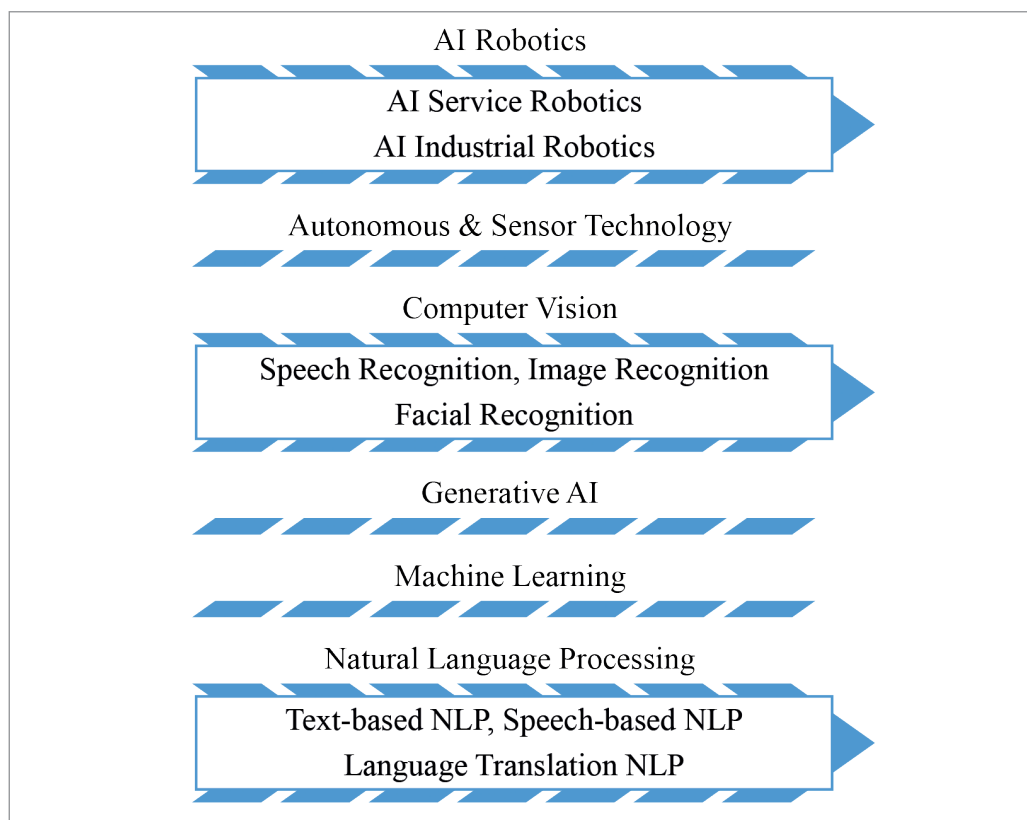


Figure 1. The structure of the AI market (created by the author using Statista data⁹)

The growth of the AI market is intricately linked to the AI life cycle. Its clarification goes beyond the typical stages of development and utilization. However, these processes enable us to distinguish between two primary participant groups: developers and users. Enlarging these groups from a legal point of view, we can further categorize product vendors (sometimes a vendor and a developer are the same entity) and service providers, alongside product consumers and service purchasers (see also¹⁰). The AI market entails more complicated patterns of interaction beyond the conventional «developer-user»dynamic. An illustration of this complication can be observed in the participation of AI system suppliers in the market.

The AI market heavily depends on information to facilitate transactions among participants. The roles related to information can be broadly considered

⁹ Statista (2024). Artificial Intelligence – Worldwide. Statista Market Forecast. URL: <https://www.statista.com/outlook/tmo/artificial-intelligence/worldwide> (15.09.24).

¹⁰ OECD Guidelines for Multinational Enterprises (2024). Artificial Intelligence & Responsible Business Conduct. URL: <https://mneguidelines.oecd.org/RBC-and-artificial-intelligence.pdf> (15.09.24). P. 3.

as the following ones: creating information (e.g., preparing data sets for machine learning, such as data about patients with a specific disease), utilizing information (uploading a prepared report for further analysis), storing information (maintaining records of operations conducted with the help of AI), and disseminating information (sharing images generated by AI on a website). These roles determine the responsibilities of the involved entities and persons. For instance, if a developer transfers the rights to use the system to a supplier, and the supplier sells them to a user, the first two remain accountable for the proper functioning of an AI system.

4. The development of the legal framework for the AI market, encompassing the principles and typical rights and obligations for participants, presents a particularly complex challenge.

Given the global reach of the AI market, establishing uniform standards is a challenging priority. States that have already placed limitations on AI activities, such as EU members, may encounter new risks stemming from the influence of technologies utilized outside the EU and the provision of AI services online to their own citizens by entities in other, more lenient jurisdictions.

International organizations should focus on establishing uniform standards for artificial intelligence on a conceptual level. This includes defining principles for AI being accountable, dependable, unbiased, and precise. The OECD and G7 have prepared relevant documents, and the Council of Europe is finalizing its work in this area¹¹. The willingness of all stakeholders, particularly developers, to adhere to these principles shall determine public safety perspectives and the protection of human rights as AI becomes more widely used.

Additionally, area-specific frameworks or regulatory measures are recognized to govern the conduct of entities operating within specific areas like healthcare, finance, education, energy, and others. Compliance with these regulations is essential when integrating AI technologies within these regulated areas or their related components.

AI technologies are susceptible to personal data and intellectual property rights. AI algorithms depend on datasets that may contain personal information, which is governed by laws such as the Law of Ukraine on the Protection of Personal Data. The components of AI systems are considered intangible intellectual

¹¹ Council of Europe (2024). Council of Europe adopts first international treaty on artificial intelligence. URL: <https://www.coe.int/en/web/portal/-/council-of-europe-adopts-first-international-treaty-on-artificial-intelligence> (15.09.24).

property rights. However, developers are more likely to release them as open-source software more often.

Another important aspect is related to the laws governing the conclusion and fulfillment of contracts. When the legal provisions concerning liability are unclear, contracts for the utilization of AI are expected. AI systems are subject to the same general legal restrictions as other software. They must not be utilized for manipulation, fraud, or other harmful activities that negatively impact people.

Thus, this chapter consolidates research findings on theoretical foundations for the development of the AI market, considering its components and participants with the clarification of their rights and duties by the legal framework and the types of goods forming the basis of interactions (Fig. 2).

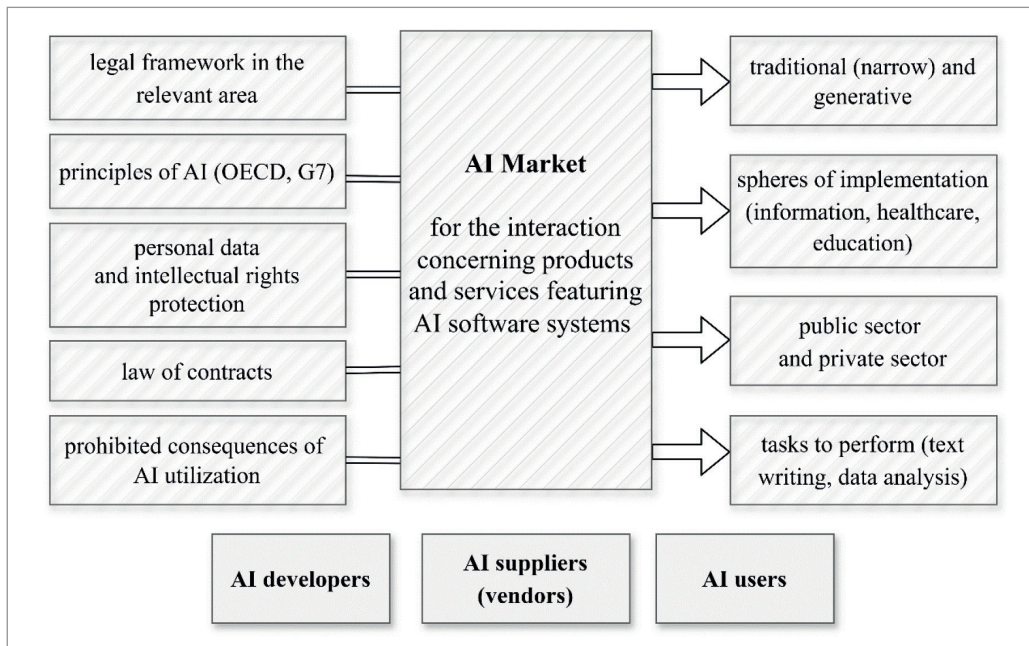


Figure 2. Nature of developing AI market

The research findings suggest that the development of the AI market is contingent upon enhancing the legal frameworks and the more robust implementation of state policy governing the implementation of AI. While the market exhibits a degree of self-regulation due to its primarily informational nature, legal mechanisms are strongly expected to be in place to ensure the safety and reliability of AI technologies for society's benefit (e.g., the forbidden use of unacceptable risk AI systems).

Additionally, legal and quasi-legal regulations should aim to clarify the rights and responsibilities of all participants, thereby contributing to the overall support and advancement of the AI market.

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ПОПЕРЕДЖЕННЯ СЛУЖБОЮ БЕЗПЕКИ УКРАЇНИ КРИМІНАЛЬНИХ ПРАВОПОРУШЕНЬ НА ОБ'ЄКТАХ КРИТИЧНОЇ ІНФРАСТРУКТУРИ ЯК СКЛАДОВИЙ ЕЛЕМЕНТ СИСТЕМИ ЗАХОДІВ З ПРОТИДІЇ

Анотація. Статтю присвячено дослідженню системи заходів попередження Службою безпеки України кримінальних правопорушень на об'єктах критичної інфраструктури, як складового елементу системи заходів з протидії зазначеним протиправним посяганням. Розглянуто правові засади діяльності Служби безпеки України щодо попередження кримінальних правопорушень на об'єктах критичної інфраструктури, зокрема положення законів України «Про національну безпеку України», «Про Службу безпеки України», «Про критичну інфраструктуру» та інших актів законодавства. Визначено основні завдання діяльності спецслужби щодо попередження кримінальним правопорушенням на об'єктах критичної інфраструктури, серед яких: проведення наукових досліджень з метою вирішення проблем попередження кримінальних правопорушень; організація впровадження в практику передового досвіду попередження кримінальних правопорушень; забезпечення організації, координації, контролю, організаційно-методичної та практичної допомоги в системі органів Служби безпеки України; забезпечення організації та проведення заходів загального й індивідуального попередження кримінальних правопорушень; підготовка та реалізація положень стратегій, загальнодер-