



Article

Artificial Intelligence in Contemporary Societies: Legal Status and Definition, Implementation in Public Sector across Various Countries

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Abstract: The article aims to provide a comparative analysis of determining the legal status of artificial intelligence, as well as strategic planning of its implementation in the public sector in the countries of the Romano-Germanic, Anglo-Saxon, socialist, religious, and traditional systems of law. The study replies to the research questions regarding statutory definition of AI, state authorities responsible for AI, national government strategy in the field of AI and targets set therein, and action plans of AI with reference to countries with the highest Global Talent Competitiveness Index in reference to the mentioned legal systems. The research is of qualitative and applied nature; theoretical analysis of academic sources provides the groundwork for ICT-facilitated thematic content analysis of legal and administrative documents of the mentioned countries. The findings reveal common and specific trends regarding the data under study, and allow the author to suggest a revision of AI definition and to specify legislative and doctrinal issues that seem to be relevant and promising in the further strategic development and implementation of AI in the public sphere across countries.

Keywords: artificial intelligence; AI administrative practices; OECD; e-government; AI public authority



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1. Introduction

The Artificial Intelligence (AI) phenomenon was first defined by J. McCarthy in 1956.

In 1956, the basic focus in defining AI came from the starting point of human thinking, but this also created a kind of controversy regarding the very definition of thinking and intelligence. At the same time, technological progress in the field of ICT and the Internet has formed a starting point in the further legal and practical definition and application of AI.

Today, AI is a broad concept that includes a large number of more specific definitions, for instance, neural networks, computer vision, machine learning, etc. Some examples are provided in the following paragraph to show the existing angles and specifics.

Chandrasekaran (1987) noted that the uncertainty surrounding AI extends to its definitions. “[Despite] what I consider to be significant advances in AI . . . a not-so-well-kept secret is that within AI there is a paradigmatic mess. In fact, there is no broad agreement on the essential nature of AI or the formal basis of intelligence and the proper theoretical basis for it” (ibid., p. 14). This thesis finds its practical reflection through various definitions that emerged in the field under study over the last three decades. It should be mentioned that scholars tried to be concrete in their understanding of AI as a system, machine, or technology with the ability to perform intellectual activities. Rich and Knight (1991) suggest that the study of AI means the study of how to get computers to do things that humans are currently better at doing. Albus (1991) specifies that AI means the ability of a system to act appropriately in an uncertain environment, where the appropriate action is that which increases the likelihood of success, and success is the achievement of behavioral subgoals that support the ultimate goal of the system. Omohundro emphasizes that AI is a system that “has goals that it tries to achieve by acting in the world.” (Omohundro 2008, p. 483). Poole and Mackworth (2010) consider AI as a field that studies the synthesis and analysis of

computational agents acting intelligently. [Kurzweil \(2013\)](#) follows the trend for the reference to the human and suggests that AI is a machine that implements functions that require the presence of intellectual abilities when used by a person. [Russel and Norvig \(2013\)](#) view AI as technology that can think humanly, act humanly, think rationally, or act rationally. [Noyes \(2016\)](#) understands AI as a wide range of methods, algorithms, and technologies that make software “smart” in a way that may seem human to an outside observer. [Scherer \(2016\)](#) views AI as machines capable of performing tasks that, if performed by humans, would require intelligence.

However, in the 21st century a need to provide a summarizing and a more comprehensive approach has become clear. Therefore, some scholars suggested a doctrinal approach on the basis of the three following features and defined AI as a feature possessed by an individual agent when it interacts with its environment or environments; a feature that refers to an agent’s ability to succeed or make a profit in relation to some goal or task; and a feature that depends on how the agent is able to adapt to different goals and conditions ([Legg and Hutter 2007](#)).

Nonetheless, the above definition provides a general conceptual framework and paves the way for further developments of the AI definition from the angle of integrating technology and human capacity. Meanwhile, to our minds, a comprehensive legal status and definition of AI are required for systemic development of nation-wide legislation, policy, and strategy for AI integration into the state and society’s sustainable development.

Following this approach, we consider it relevant to mention the definition of OECD AI platform, which views AI system as AI system: an AI system is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy ([OECD/LEGAL/0449 2019](#)). This document also specifies that AI uses machine and/or human-based data and inputs to (i) perceive real and/or virtual environments; (ii) abstract these perceptions into models through analysis in an automated manner (e.g., with machine learning), or manually; and (iii) use model inference to formulate options for outcomes. AI systems are designed to operate with varying levels of autonomy (*ibid.*).

To make headway beyond a purely technological domain, we consider it possible to refer to Russian experience. In the field of Russian legal science, it is necessary to note the definitions that attempt to enforce the comprehensive approach to the AI definition with the focus on its activities and capacities beyond pure technology domains. Thus, [Ponkin and Redkina \(2018\)](#) set forth the definition of AI through such AI features as its subjectivity (autonomy of an intelligent agent, its independence, self-reference in self-learning, development, and decision-making), as well as cognitive, adaptive autonomy (including spatial-kinetic autonomy, autonomy of program-energy management, including independence in self-sufficiency, on-off-restart, and the capacity to prevent external shutdown), and energy autonomy. Furthermore, the postdoctoral research of the Russian lawyer [Morhat \(2018\)](#) intends to enhance the AI definition through legalizing its relations with the surrounding reality and its possible activities. Artificial intelligence is an autonomous complex of software or software and hardware (unit) with a human-computer interface; it is a virtual computing system, or it is equipped by means of “technical” vision (perception of influences or signals on sensory electronic analogues of the sense organs) and by means of direct independent interaction with physical reality (actuators) and with digital reality. It is a cyber-physical system with technical software and mathematically emulated and provided abilities (capabilities) of biosimilar cognitive and anthropomorphic-intellectual speech mental actions (functions), learning and self-learning, self-organization and self-testing, and creative (heuristic) activities, including those based on accumulated and “historical” data and monitoring data (*ibid.*, pp. 350–53).

The present research also admits that artificial intelligence is actively penetrating into various spheres of life of modern society at the national and international levels. Accordingly, the issues of AI regulation, governance, and practical applications are some

of the topical areas in the field of research in modern society, the current level of human interaction, and information technology. It should be noted that by now there is a large number of academic publications on the identified issues, as well as a set of empirical articles on concrete national practices of individual countries and comparative practices of different countries. Currently, academia has reached a considerable number of publications that explore AI application in a particular sphere, including marketing (Kopalle et al. 2022), healthcare (Čartolovni et al. 2022), education (Qu et al. 2022), agriculture (Sood et al. 2022), energy (Abbas et al. 2022), as well as other numerous sectors.

Furthermore, there is a consistent trend in comparative research regarding varied aspects of the AI phenomenon across countries; the respective research considers the types of states with regard to their role in AI development (Djeffal et al. 2022), explores narratives of national AI strategies in different countries (China, the United States, France, and Germany are provided as examples, Bareis and Katzenbach 2022), identifies AI ethical principles for its governance in different continents and regions, namely in China, EU, and the USA (the research is conducted on the basis of three major documents, Dixon 2022), as well as other comparative studies within a particular area of AI use in various countries.

However, bearing in mind specific comparative research trends with reference to a particular angle of AI use, researchers acknowledge there is a need for a comprehensive research of AI legal status and definition as applied to various spheres of its application (Smuha 2021). Scholars agree that such a definition should go beyond a particular region and sphere of its application to serve the level of statutory definition (Achar 2019; Wu and Liu 2021).

In our opinion, it is important to develop a general picture of a comparative study of the situation across various regions and continents of the world for further practices and trends in the global phenomenon of artificial intelligence. To implement such a trend, we consider it critical to take into account a number of issues. While exploring the AI phenomenon across various countries in contemporary societies, it is important to take into account if the AI legal status is explicitly determined in the national legislation in which some statutory definition of the phenomenon is expected. We mention this point as the administrative legal science consistently highlights the importance of statutory definition of a phenomenon that further operates as a constituent component and instrument of the state policy and the country's development. Furthermore, while considering this point, it is important to bear in mind that across the world there are states with different legal systems. In addition, if the research explores the AI phenomenon in modern societies, the issues of governance should highlight the relevant national strategies of AI implementation in the societal contexts, respective targets, and plans, as well as the national authorities and bodies that are responsible for the mentioned activities.

The research goal is to conduct a comparative analysis to determine the legal status of artificial intelligence, as well as strategic planning of its implementation in the public sector in the countries of the Romano-Germanic, Anglo-Saxon, socialist, religious, and traditional systems of law.

The designated goal involves the consideration of a number of research questions in the aspects of legislation and law enforcement regarding AI:

RQ1: Does the country have a statutory definition of AI?

RQ2: Has the responsible authority been identified in the country?

RQ3: Is there a national government strategy in the field of AI?

RQ4: Are targets set regarding AI implementation in the public sector?

RQ5: What are the plans of AI in terms of implementation in the public sphere?

2. Literature Review

This section provides a brief review of major trends in academic research on the topic under study.

It is relevant in this section to mention general tracks of studies at the individual level and at the national institutional level, as well.

As far as the individual research is concerned, scholars specify the need for a legal status of AI as being fixed statutory in legislation and consider AI application with reference to a particular issue.

While using Google Scholar database for the identification of major research topics in publications, we can say that currently research papers consider the above-mentioned issues with regard to a particular field and different regulations within one and the same country; for instance, see research on US patent law (Heon 2022), US regulations on AI in medicine (Vidal et al. 2023), and US regulations on literary and artistic productions of AI machines (Gervais 2022). At the same time, the research on AI-related regulations can be found with reference to a particular field and a particular state or organization; for example, see studies on regulations of the AI-facilitated legislation in force in India (Paul et al. 2022), investigations of statutory issues in relation to AI for public administration in Canada (Daly and Orct 2022), the analysis of AI statute for the administration of justice within the EU (Busacca and Monaca 2022), and general trends of AI use in the pretrial and court proceedings with the use of concrete cases from different countries (Villata et al. 2022).

At the level of systematic academic research presented by scientific organizations, we consider it relevant to use the analytics provided by the OECD AI observatory (OECD, General¹).

The research area of the Technical University of Munich covers a wide range of applications of AI, both in the technical (TUMa²) and legal sectors. At the same time, in the context of legal issues, the need to apply the best world practices in AI regulation (transition from strategy and ethics to comprehensive legal regulation) (ITU 2021) and consideration of issues of standardization of AI products and data protection is considered a priority (TUMb³).

On the official Internet page for The Rhine-Westphalian Technical University of Aachen, the need to improve legislation in the field of information protection and confidentiality is mentioned (Rafiei 2021a, 2021b).

The Massachusetts Institute of Technology also conducts an in-depth analysis on the formation of the necessary tools for the formation of a separate regulation for robotics and AI (Huq and Cuéllar 2022). Thus, representatives of the scientific community substantiate the practical need for the introduction of artificial-intellectual regulation (AIR) in the United States, taking into account the already established practice of using AI in the public sphere.

The Harvard Scientific School develops similar comprehensive approaches covering the issues of AI regulation in various fields—the definition of effective structures for the allocation of legal personality (Scherer 2016), the impact and risks of AI on the legal profession (Donahue 2018), and ethical and legal aspects (Raso et al. 2018; Bavitz et al. 2019).

As the central scientific institution (OECD, China⁴) in China dealing with AI technology, the Chinese Academy of Sciences also actively works on the legal nature of AI and the complexities of human interaction. This issue is considered at the stage of the research itself (Jia 2020), the participation of AI in Internet communication (Mao and Shi-Kupfer 2021), and at the level of analysis and implementation of the national strategy in the field of AI (Zhang et al. 2021), as well as reflecting these approaches at the national level by issuing a separate code of ethics. Also noteworthy is interdisciplinary research on the evaluation of the intelligence quotient of artificial intelligence for the interpretation of the concepts of intelligence, wisdom, consciousness, life, and non-life (Liu and Shi 2020). Tsinghua University holds an annual International Forum on Computing Law (since 2018), where issues related to the legal nature of AI and the complexities of fundamental and applied legal science are discussed in detail. The general focus is on addressing ethical issues in the medical field and the judiciary (Sixth Session 2022), as well as potential AI bias (Advancing AI Trustworthiness 2022). A similar question is shared by colleagues from Shanghai's Zhao Tong University (SJTU 2022).

As the leading public scientific institution in France, the National Center for Scientific Research takes an active part in scientific issues and research in the field of AI (OECD, France⁵), while in the legal field the primary task is determined by the need for a correct

and balanced position on the levels of access to AI information (correct sampling without impurities of the human factor) and maintaining responsibility for the actions of AI for a person in an imperative manner without regard to the level of technology readiness (Zeitoun 2018).

The INRIA National Research Institute in the field of legal regulation of AI notes the need to specify the administrative response measures (control and supervisory functions) in relation to AI technology (INRIA 2021). The question is raised regarding the distribution of responsibility between the participants (state, private sector, and civil society), including the question of the integrity of the use of AI (in violation of privacy rights) by commercial organizations, as well as the necessary preventive response measures.

As one of the leading UK research institutions (OECD, UK⁶), Oxford University considers AI issues in the context of extracting the positive and negative aspects of AI regulation in the EU in relation to the UK (Dufour et al. 2021; McFadden et al. 2021), as well as the possibility of forming and adapting legislation to highlight a separate regulation in relation to AI (Mik 2021; Taeihagh 2021), including individual sub-sectors of the economy (Bountra et al. 2019). A similar approach to the formation and adaptation of legislation regulating the activities of AI is shared by the University of Cambridge, which systematically publishes collections that consider certain issues of general regulation in the field of AI (DiMatteo et al. 2022).

The above landscape of academic research trends run by scientific organizations in the field under study substantiates the relevance of a systematic comparative analysis in the field of theoretical and practical application of AI in the legal sphere, including the need to formulate unified approaches to the regulation of AI at the local and global levels. At the level of scientific and applied research, at the moment, there is no comprehensive study of the nature of AI in the context of various legal cultures with a comparison of identical and different features in the definition of AI, its functioning, and areas of application. Furthermore, given the potential technological danger of this technology, and the admission of AI to the sphere of public relations, the above-suggested systematic comparative analysis will minimize the social, legal, economic, and other risks related to AI implementation into the public sector.

On the whole, the above review of academic publications confirms the current importance of the theme of the present studies. Both individual and institutional academic research data reveal that academia of national states consistently explores theoretical and practical application of AI in state activities, governance, and regulation thereof. Such research activities pave the way for the state strategy, policies, and practices in the field under study. These issues are the subject of our research focus whose goal and research questions have been specified in the Introduction section.

3. Materials and Methods

The research material integrates academic publications on the issues under study and aggregates legislative, administrative, and regulating documents of international and national administrative and legal institutions.

As far as the academic sources are concerned, they were selected from the Google Scholar database, following the search through the key words *AI definitions*, *AI comparative analysis*, and *AI use in society*. Such a search resulted in about 5,230,000 items within 0.19 s. However, we have decided to use the AI definitions of the most known scholars in the field: first, to take as examples the most cited definitions from the period of three decades; second, to further focus on the data on comparative and nation- focused studies on AI use in society during 2022–2023 as the data changes quickly. The search with the respective key word combinations provided about 16,800 results in 0.08 s. The Google Scholar list of the publications' headlines and brief annotations on the topic under study was organized as a text corpus. Furthermore, QDA Miner Lite tool "URL: <https://qda-miner-lite.software.informer.com/1.2/> (accessed on 1 March 2023)" was used for a computer-based automated search to identify the list of the most frequent word combinations as the thematic codes in

the whole corpus. We should mention that the QDA Miner Lite tool for themes and country cluster function has shown that the data duplicate each other in a considerable way as it refers to a limited number of countries where research on AI use is conducted (coinciding with the OECD list of top nations that enforce their AI-related legislation and nation-wide activities, “URL: <https://oecd.ai/en/> (accessed on 1 March 2023)”, and a limited number of areas (industries), namely law, medicine, the military sphere, finance, heavy industry, and arts as the top fields of AI applications. In total, over 1100 unique sources were studied over the course of the entire amount of research. The present paper cites over 60 studies as those that provide the most explicit evidence of the author’s statements, arguments, and conclusions.

The data regarding national institutional research trends, national strategies, and policies in the field of AI were analyzed according to the data of the OECD Artificial Intelligence Policy Observatory “URL: <https://oecd.ai/en/> (accessed on 1 March 2023)” which is acknowledged worldwide as reliable and the most comprehensive source on AI development across the world’s countries “URL: <https://oecd.ai/en/> (accessed on 1 March 2023)”, along with the Global Talent Competitiveness Index (GTCI) rating, which captures the microeconomic and macroeconomic foundations of national competitiveness, including AI-related issues “URL: <https://www.insead.edu/> (accessed on 1 March 2023)”.

The countries with the highest Global Talent Competitiveness Index (GTCI) rating (INSEAD 2020) were selected for the analysis. Each country belongs to a certain system of law: Romano-Germanic, Anglo-Saxon, religious, socialist, and customary (traditional).

According to the GTCI rating, the author selected the following countries belonging to the Romano-Germanic (continental) system of law: Japan, Germany, France, the Netherlands, the Russian Federation, and Estonia.

In the field of the Anglo-Saxon system of law, the author considers such countries as the United States of America, Great Britain, New Zealand, Canada, and Singapore, and in the field of the religious legal system, Israel, the United Arab Emirates, and Saudi Arabia are considered. The socialist system of law in this review will be represented by China, and the customary or traditional system of law will be represented by the Republic of South Africa; the choice of this country is justified by the fact that South Africa is one of the few states that belongs to this legal family and in the GTCI ranking occupies a higher position than other countries in this respective legal family. The factual data were taken from the official sites of the national governments of the countries that are subjects for the study in this paper. The data refer to the end period of the legislation comparative analysis (December 2022). After the exclusion of the duplicating documents, the total number of sources that were subjects of analysis were limited to 369 items; 86 of them are included in the reference list as those providing the most explicit evidence on the issues within the research framework.

The documents’ contents were analyzed in terms of their topics as related to the themes mentioned in the research questions. Furthermore, the documents were organized as a text corpus. The corpus used the QDA Miner Lite tool to keep each document affiliation to a particular country. The thematic codes were specified in line with the research questions (statutory definition of AI; responsible authority; national AI strategy; set targets; AI implementation in public sphere). Furthermore, QDA Miner Lite tool “URL: <https://qda-miner-lite.software.informer.com/1.2/> (accessed on 1 March 2023)” was used for a computer-based automated search to match the documents and their reference to the thematic codes in the whole corpus.

The research methodology rests on the qualitative paradigm that has a long-standing tradition as a research vector for legal studies (Horack 1930; Mitchell 2023). Qualitative data analysis focuses on the study of content and framework analysis of the textual data.

The research is of an applied nature and has been accepted when referred to the legal sources’ analytics as implementation of theoretical doctrinal considerations of the issues under study (Bhat 2019; Sloan 2021).

Within the framework of this study, the comparative legal analysis of the approaches and regulation of AI that various states implement in the public sphere is used as the driving tool for research. This method opens up the possibility of identifying both common, coinciding, and similar in understanding approaches to the regulation of AI in the public sphere, as well as special features inherent in different systems of law.

Additional emphasis within the framework of the study is made on the basis of the hermeneutic method in the framework of the study of legal approaches in the regulation of AI in the context of private and public legal relations. The method allows the author to take into account both legislative acts and, in the case of the Anglo-Saxon system of law, the study of judicial acts in relation to AI.

Furthermore, the general scientific dialectical method made it possible to consider the position of AI in the legal field from the point of view of the variability of regulations and trends in the subsequent development of the regulation of this technology, as well as to substantiate the advantages and disadvantages of various approaches regarding current solutions and promising practices.

Due to the application of the formal legal method, as well as methods of formal logic, such as description, comparison, classification, analysis, and synthesis, the author provides the interpretation of the results of a comparative legal analysis of the essence of AI and suggests the revisited definition of AI in the public sphere.

4. Results

This section includes three parts that offer the study findings in the context of previously posed research questions in relation to the countries of the Romano-Germanic (Section 4.1), Anglo-Saxon (Section 4.2), socialist, religious, and traditional systems of law (Section 4.3).

4.1. Legal Status of Artificial Intelligence, Strategic Planning of Its Implementation in the Public Sector across Countries of the Romano-Germanic Legal System

As mentioned earlier, according to the GTCI rating, the author selected the following countries belonging to the Romano-Germanic (continental) system of law: Japan, Germany, France, the Netherlands, the Russian Federation, and Estonia. The results of the comparative studies formulated as replies to the research questions are presented in Table 1; countries are listed in alphabetical order

Table 1. Comparative analysis of national strategies in the field of AI in the leading countries of the Romano-Germanic legal system (compiled by the author).

State	RQ1 Statutory Definition of AI	RQ2 Responsible Authority	RQ3 National AI Strategy	RQ4 Set Targets	RQ5 Plans of/AI Implementation in Public Sphere
Estonia	Yes, EU norms (European Commission 2021a, 2021b) and local initiatives (Estonia's National AI Strategy 2019)	Yes (OECD 2019; Bürokratt 2021)	Yes (OECD 2019; Bürokratt 2021)	Yes (OECD 2019; Bürokratt 2021; Grigoryan 2019)	Yes, focus on the provision of public services to the population and business (Grigoryan 2019; FRA 2020)
France	Yes, EU norms (European Commission 2021a, 2021b) and local initiatives (Villani 2018)	Yes (Décret n° 2022-1062 ⁷)	Yes (Loi n° 2016-1321 ⁸)	No	Yes, focus on the field of administrative proceedings

Table 1. Cont.

State	RQ1 Statutory Definition of AI	RQ2 Responsible Authority	RQ3 National AI Strategy	RQ4 Set Targets	RQ5 Plans of/AI Implementation in Public Sphere
Germany	Yes, EU norms (European Commission 2021a, 2021b), and local initiatives (Innovationsstrategie Baden-Württemberg 2020; Digitalstrategie für Hamburg 2020)	Yes (Bundesministerium für Digitales und Verkehr 2022)	Yes (Germany: Artificial Intelligence Strategy 2018)	No	Yes, in the federal constituent entities and in the context of concrete authorities (Innovationsstrategie Baden-Württemberg 2020; Digitalstrategie für Hamburg 2020; Die Strategie Niedersachsens zur Künstlichen Intelligenz ⁹ , KI-Strategie für den Freistaat Sachsen 2021; Digitalstrategie Hessen Wo Zukunft zuhause ist ¹⁰)
Japan	Yes (Council for Science, Technology, and Innovation Japan n.d.)	No (functions of the Council under the Cabinet of Ministers.)	Yes (AI Research and Development Goals and Industrialization Roadmap 2017)	No	Yes, focus on adapting AI for logistics and implementation in commercial companies (PRISM 2017; Eriko and Nobuhisa 2020)
The Netherlands	Yes, EU norms (European Commission 2021a, 2021b)	No, functions are distributed among several bodies	Yes (Strategic Action Plan for Artificial Intelligence the Netherland 2019)	No	Yes, at the level city authorities (OECD, The Netherlands ¹¹ , CiSAI n.d.)
Russia	Yes (Federal Law No. 123-FZ of 24 April 2020, GOST R 60.0.0.4-2019/ISO 8373:2012 ¹²)	Yes (Decree of the President of the Russian Federation of 10 October 2019, N 490 ¹³)	Yes (Decree of the President of the Russian Federation of 10 October 2019 N 490, Decree of the Government of the Russian Federation of 19 August 2020 N 2129-r)	Yes, with reservations (Decree of the Government of the Russian Federation of 19 August 2020 N 2129-r) ¹⁴	Yes, comprehensively in the context of all applicable areas for AI (Federal Law No. 123-FZ of April 24 ¹⁵ , Decree of the Government of the Russian Federation of 19 August 2020 N 2129-r)

The results of the analysis allow us to formulate the following assumptions. The European countries under study define the strategy in general terms (without specific metrics other than monetary costs) and in most cases define a specific segment of the application of AI in the public sphere without proper detail or, on the contrary, choose highly specialized segments.

In Russia, most of the aspects are specified within the framework of one document and supplemented by a consolidated position at the level of the federal government. This approach allows the country leadership to specify where AI is in demand and what specific public functions can be assigned to it, while taking into account potential legal risks.

The results of the analysis also allow us to highlight some general features and specifics of the legally fixed definition of AI in the national legislations that are subject to research. The data are presented in Table 2; countries are listed in alphabetical order.

Table 2. Comparative analysis of fixed legislative approaches in the leading countries of the Romano-Germanic legal system regarding the AI definition (compiled by the author).

State	Statutory (Fixed in the National Legislation) Definition of AI
Estonia France Germany	AI as a system—software that is developed using one or more methods and approaches (presented below) and can, for a given set of human-defined goals, generate output such as content, forecasts, recommendations, or decisions that affect the environment, with which they interact.
The Netherlands	Approaches to AI conceptual definition: -Approaches cover machine learning, including supervised, unsupervised and reinforcement learning, using a wide variety of methods, including deep learning; -Approaches based on logic and knowledge, including knowledge representation, inductive (logical) programming, knowledge bases, logical and deductive mechanisms, (symbolic) reasoning, and expert systems. -Statistical approaches, Bayesian estimation, search, and optimization methods. (European Commission 2021a, 2021b ; national and local initiatives in Estonia’s National AI Strategy 2019 ; Villani 2018 ; Innovationsstrategie Baden-Württemberg 2020 ; Digitalstrategie für Hamburg 2020 ; Die Strategie Niedersachsens zur Künstlichen Intelligenz, KI-Strategie für den Freistaat Sachsen 2021 ; Digitalstrategie Hessen Wo Zukunft zuhause ist).
Japan	AI technology is designed to perform the following functions: judgment and inference, learning, which are implemented through artificial means, and the application of the corresponding functions, implemented using artificial means (Council for Science, Technology, and Innovation Japan n.d.).
Russia	AI is a set of technological solutions that allows simulating human cognitive functions (including self-learning and searching for solutions without a predetermined algorithm) and obtaining results when performing specific tasks that are at least comparable to the results of human intellectual activity. The complex of technological solutions includes information and communication infrastructure (including information systems, information and telecommunication networks, other technical means of information processing), software (including that which uses machine learning methods), processes, and services for data processing and search for solutions (Federal Law No. 123-FZ of 24 April Decree of the Government of the Russian Federation of 19 August 2020 N 2129-r).

The data of Section 4.1 makes it possible to note common approaches for the EU countries in terms of the definition of AI (due to the supranational approach). In the context of the primarily legislative definition of AI for the Romano-Germanic group, we see the following generalizing areas of emphasis, namely:

AI refers to either software, or technology, or a set of technological solutions.

AI uses approaches that are identical or similar to human cognitive functions of thinking (self-learning, inference, judgment, logical tools, etc.).

As part of the implementation of these approaches, information and communication infrastructure, processors, data processing and solution search services, machine learning, and statistical approaches are used.

4.2. Legal Status of Artificial Intelligence, Strategic Planning of Its Implementation in the Public Sector across Countries of the Anglo-Saxon Legal System

As mentioned earlier, according to the GTCI rating, the author considers such countries as the United States of America, Great Britain, New Zealand, Canada, and Singapore with regard to the field of the Anglo-Saxon system of law.

The results of a comparative analysis allow us to highlight the main characteristics for the countries of the leaders of the Anglo-Saxon group, which are presented in Table 3;

the data are structured as replies to the research questions, and the countries are listed in alphabetical order.

Table 3. Comparative analysis of national strategies in the field of AI of the leading countries of the Anglo-Saxon legal system (compiled by the author).

State	RQ1 Statutory Definition of AI	RQ2 Responsible Authority	RQ3 National AI Strategy	RQ4 Set Targets	RQ5 Plans of/AI Implementation in Public Sphere
Canada	Yes (Directive on Automated Decision-Making 2021 , a new bill in the 1st reading BILL C-27 2022)	Yes (Terms of Reference of the Government of Canada Advisory Council on Artificial Intelligence 2022)	Yes (CIFAR n.d.)	No (annual report on results (Accenture and CIFAR 2020))	Yes, focus on risk reduction, with algorithmic analysis by bodies and agencies (OECD, Canada ¹⁶)
New Zealand	No	No	Yes (Strategy for a Digital Public Service New Zealand 2020)	No	Yes, under implementation (Gavighan et al. 2019)
Singapore	No	Yes (Govtech Singapore¹⁷ , Government Technology Agency¹⁸)	Yes (National AI Strategy Smart Nation Singapore 2019)	Yes	Yes, focus on data protection (Three Pillars of a Smart Nation ¹⁹ , EDB Singapore 2018)
UK	Yes (The National Security and Investment Act 2021²⁰ ; UK Industrial Strategy White Paper 2017)	Yes (Guidance. National AI Strategy 2021 ; Office for Artificial Intelligence²¹)	Yes (Guidance. National AI Strategy 2021 ; Office for Artificial Intelligence)	Yes (Office for Artificial Intelligence, OGL 2022)	Yes (OECD UK)
USA	Yes (U.S. Code Title 15 CHAPTER 119 § 9401 ²²)	Yes (AI in Government Act of 2020 n.d. ; National artificial intelligence initiative act of 2020²³)	Yes (National artificial intelligence initiative act of 2020, U.S. National AI strategy documents and U.S. federal agency AI strategy documents ²⁴ , National AI R&D Strategy 2019²⁵)	No (annual report on budget implementation and results)	Yes, with detailed consideration regarding concrete agencies (U.S. Leadership in AI 2019 ; U.S. Department of Defense 2022 ; U.S. Department of Health and Human Services 2021 ; Artificial Intelligence Strategy for the U.S. Department of Justice 2020)

Despite the diversity of its legal systems, there are common features of the Anglo-Saxon legal family (case law). Today, the key task of regulating artificial intelligence systems in these countries is to preserve case law, taking into account such issues as the unification of regulatory issues in relation to AI, the legal liability of subjects concerning the introduction of robots into legal relations, a single concept of participants in public relations, as well as the formation of a legal policy that would reflect the point of view of the government of each state in which cyber-physical systems participate.

Based on the generalized data presented in Table 3, it can be concluded that not all countries have a legal definition of AI, but at the same time, in the absolute majority, responsible authorities in the field of AI have been identified. Most of the respective bodies either monitor the implementation of the AI strategy or provide advisory functions to other authorities. The experience of the United States and Canada is noteworthy, for they do not directly fix the final (quantitative and qualitative) goal in the framework of the strategy, but they systematically monitor the results achieved in the field of AI at the level of authorities. The UK approach is interesting in terms of concrete results in the field of AI regulation being determined at the stages of short–medium and long-term planning. Furthermore, the situation in New Zealand stands out, for they do not have an AI strategy and a separate authority in this area (at the time of preparation of the study).

It should also be noted that countries under study take into account the experience of the EU and individual countries in the field of AI regulation. The professional community also focuses on the inadmissibility of equalizing AI in rights to a person (and a lawyer) and proposes the development of additional ethical requirements for AI.

The results of the analysis allow us to identify a number of positions in relation to the legally fixed status of AI; they are presented in Table 4, and countries are listed in alphabetical order. Within the framework of the above table, it is possible to formulate a general trend of the need to regulate the activities of AI, including those in the context of its application in the public sphere on the basis of a flexible approach (taking into account the readiness of technology and long-term planning of regulation).

Table 4. Comparative analysis of fixed legislative approaches in the leading countries of the Anglo-Saxon legal system regarding the AI definition (compiled by the author).

State	Statutory (Fixed in the National Legislation) Definition of AI
Canada	Artificial intelligence means information technology that performs tasks that would ordinarily require neural networks and biological brainpower to accomplish, such as making sense of spoken language, learning varied kinds of behavior, or solving problems (Directive on Automated Decision-Making 2021 ; BILL C-27 2022).
New Zealand	No
Singapore	No
UK	AI is a technology that allows devices or software to be programmed or taught to perceive the environment with the help of data, to interpret data using automated processing designed to approximate cognitive abilities, as well as to make recommendations, forecasts, or solutions (The National Security and Investment Act 2021 ; UK Industrial Strategy White Paper 2017). The term “artificial intelligence” means a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments.
USA	Artificial intelligence systems use machine and human-based inputs to—(A) perceive real and virtual environments; (B) abstract such perceptions into models through analysis in an automated manner; and (C) use model inference to formulate options for information or action.

In the context of the legislative definition of AI for the Anglo-Saxon group, we see the following generalizing areas of emphasis, namely:

1. AI refers to either a technology or a system.
2. AI uses approaches identical or similar to the cognitive functions of a person, such as the functions of thinking (self-learning, comprehension, interpretation, etc.).

It is noteworthy that the question of why AI is needed is given in the US and UK definitions (for rational actions, including an intelligent software agent, and for making recommendations, forecasts, or decisions).

The issue of infrastructure access (technical shell and access to information) in the framework of legislative initiatives was raised only at the level in the state of Nevada.

4.3. *Legal Status of Artificial Intelligence, Strategic Planning of Its Implementation in the Public Sector across Countries of Socialist, Religious, and Customary Legal Systems*

As mentioned earlier, the paper explores the socialist system of law in this review as represented by China, as well as the customary or traditional system of law as set forth by the Republic of South Africa, and the field of the religious legal system, through the examples of Israel, the United Arab Emirates, and Saudi Arabia. The results of the comparative studies formulated as replies to the research questions are presented in Table 5, and countries are listed in alphabetical order.

Table 5. Comparative analysis of national strategies in the field of AI of countries representing socialist, religious, and customary legal systems (compiled by the author).

State	RQ1 Statutory Definition of AI	RQ2 Responsible Authority	RQ3 National AI Strategy	RQ4 Set Targets	RQ5 Plans of/AI Implementation in Public Sphere
China	Yes (NDRC 2016; Xu 2017; Shenzhen Special Economic Zone Artificial Intelligence Industry Promotion Regulations 2022)	Several bodies (i.e., CESI 2021; The State Council on Printing and Distributing Notice of the New Generation Artificial Intelligence Development Plan 2017)	Yes (The State Council on Printing and Distributing Notice of the New Generation Artificial Intelligence Development Plan 2017)	No	Yes, no concretization (OECD China.)
Israel	No	Yes (Ben-Israel et al. 2020; For the First Time in Israel: The Principles of the Policy for the Responsible Development of the Field of Artificial Intelligence Were Published for Public Comment 2022; Regulatory and Ethics Policy Document in the Field of Artificial Intelligence in Israel 2022)	Yes; however, with reference to a specific field (military) (Ben-Israel et al. 2020; For the First Time in Israel: The Principles of the Policy for the Responsible Development of the Field of Artificial Intelligence Were Published for Public Comment 2022; Regulatory and Ethics Policy Document in the Field of Artificial Intelligence in Israel 2022)	Yes; however, with reference to a specific field (military) (Ben-Israel et al. 2020; For the First Time in Israel: The Principles of the Policy for the Responsible Development of the Field of Artificial Intelligence Were Published for Public Comment 2022; Regulatory and Ethics Policy Document in the Field of Artificial Intelligence in Israel 2022)	Yes, focus on the military field (Ben-Israel et al. 2020; For the First Time in Israel: The Principles of the Policy for the Responsible Development of the Field of Artificial Intelligence Were Published for Public Comment 2022; Regulatory and Ethics Policy Document in the Field of Artificial Intelligence in Israel 2022)

Table 5. Cont.

State	RQ1 Statutory Definition of AI	RQ2 Responsible Authority	RQ3 National AI Strategy	RQ4 Set Targets	RQ5 Plans of/AI Implementation in Public Sphere
Kingdom of Saudi Arabia	No	Yes (OECD, Saudi Arabia ²⁶)	Yes (OECD, Saudi Arabia, NSDAI 2020)	Yes (Elzenary et al. 2018)	Yes (Elzenary et al. 2018; Al-Barakati 2021)
South African Republic	No	Yes (Constitutional Mandate of DCDT 2019)	Yes (Minister Khumbudzo Ntshavheni: Artificial Intelligence Regulation While Encouraging Innovation 2021)	No	Yes, no concretization (OECD South Africa ²⁷)
United Arab Emirates	No	Yes (UAE Strategy for Artificial Intelligence ²⁸)	Yes (UAE Strategy for Artificial Intelligence, StepFeed 2018)	No	Yes, focus on logistics, medicine, energy, tourism, measures to recruit IT specialists in the country (Zacharias 2018)

As we can see from the presented generalized table, most countries have identified relevant authorities that implement or develop a strategy in the field of AI, while in most cases they do not resort to strict legislative consolidation of the definition of AI and the definition of specific targets based on the results of the implementation of the strategy (with the exception of KSA).

Considering the issues of the legislatively fixed definition of AI, we must note the difference in situations in the national jurisdictions of the countries under consideration. The respective data are presented in Table 6; countries are listed in alphabetical order.

Table 6. Comparative analysis of fixed legislative approaches in countries representing socialist, religious, and customary legal systems regarding the AI definition (compiled by the author).

State	Statutory (Fixed in the National Legislation) Definition of AI
China	Artificial intelligence is the simulation or extension of human intelligence through the use of computers or equipment controlled by them for environmental perception, knowledge acquisition, deduction, induction, and other methods (Shenzhen Special Economic Zone Artificial Intelligence Industry Promotion Regulations 2022)
Israel	conditionally yes (Ben-Israel et al. 2020)
Kingdom of Saudi Arabia	No
South African Republic	No
United Arab Emirates	No

Within the framework of this table, we see the general perception of AI as a kind of technology or software that uses a computer or equipment as its shell that uses the principles and functions associated with human intelligence or ways of perceiving the surrounding space by a person.

5. Discussion

The empirical research laid grounds for comparative analysis regarding such countries as Estonia, France, Germany, The Netherlands, Japan, Russia (Romano-Germanic system of law), Canada, New Zealand, Singapore, UK, USA (Anglo-Saxon system of law), China (socialist system), Israel, Kingdom of Saudi Arabia, United Arab Emirates (religious system of law), and South African Republic (customary law). The respective study findings make it possible to elaborate on several issues.

Today, in the modern conditions of the development of artificial intelligence in different states around the world, there is no unified approach to determine the legal status of artificial intelligence. In this regard, it should be noted that the identified issues are the subject of systemic expert discussions among representatives of the academic community (Alarie et al. 2018; Stern 2018; Delacroix and Wagner 2021; Tanel et al. 2020). Some experts from different countries consider the status of artificial intelligence as a mixed type of subject and object of law (Mulgan 2019; Scherer 2016), while others insist on the need to form a special concept of an electronic personality for artificial intelligence (Bensamoun and Loiseau 2017; Mik 2021; Taihagh 2021; Szollosy 2017), and there are also those who insist that it is impossible to assign the status of a legal subject to artificial intelligence (Binet 2017; Bryson et al. 2017). In Russia, the issues of using AI in the public sphere are still open, although legislative issues arising from the essence of the use of AI in this area are reflected in documents issued by the legislative and executive powers of the country.

Proceeding from a comparative study in the field of AI definitions in various countries, the author considers it possible to determine the following positions in the field of legal definitions of AI.

Most legal definitions focus on the granularity of AI in terms of technical sophistication and complexity. This enumeration can be endless, taking into account technological development and inappropriate updates (due to the need for constant updating of tools). The emphasis on the technological nature (the result of human thought framed in software or hardware) of AI is a key and necessary identifying factor, since a number of countries propose to interpret AI as a program, system, and digital technology; this approach potentially narrows the horizon of perception in contrast to technologies.

Most countries do not seek to single out the final result generated by AI in the legal definition, but describe the process of achieving the goal by using the way and principles of thinking inherent in the human brain and/or human science. In a number of countries, there is no statutory fixed definition of AI, which creates difficulties in the field of legal regulation of AI in the public sphere. With regard to the question of the responsible authority, it can be said that such an authority has been identified in most of the countries in the sample. In a number of countries, regulatory functions are distributed among several executive authorities. In our opinion, this can create a certain obstacle at the stage of implementation of the state strategy in the field of AI (if it exists in the country) if the functions are not distributed in detail among the actors. Accordingly, it is necessary to clearly fix specific targets. In turn, in the absence of a unified planning, control, and support body for the development of AI, there may be difficulties in terms of clearly planned specific tracks for the use of AI in the public sphere in the present and future.

Thus, in the context of approaches to national regulation of AI at the level of strategic documents of the states, it should be noted that not all countries formulate a specific applied task in the field of AI application in the public sphere and its regulation, as well as the targets achieved by this technology both for the state and for society. At the same time, in order to formulate a strategy and tactics for improving regulatory approaches to the actual introduction of AI into the public sphere, it seems to us necessary to define the specific concept of AI for the state as a user. In this case, we propose to make a detailed emphasis on the results obtained by the recipients. Accordingly, the results of AI activity can be recognized by a person, a legal entity, and the state represented by its authorities. In certain cases, it is possible to allocate this design for the animal world. Meanwhile, the result itself should be at the basic level and not contrary to the constitutional rights of society.

Determining a way of thinking that is identical for all limits the horizon of data processing and interpretation by AI technology in advance. However, it can be a starting point for the definition of AI autonomy, where the result offered by AI should be comparable to or better than the performance of human intelligence.

Bearing in mind the above deliberations, the author of the present article proposes a broader interpretation than the approach which was previously suggested by RUDN University Professor [Yastrebov \(2018\)](#) as follows:

An electronic person is an AI technology created by a person, which is understood as a system that uses human cognitive functions (or other functions that exceed the capabilities of human intelligence) and provides a result comparable to the result implemented by the human brain within the timeframe required by the user of the AI technology. The result is understood as recommendations, forecasts, or decisions, as well as actions performed by AI as an agent of the user's will, which do not contradict the basic constitutional rights of society and the safety of the user or addressee of actions implemented by AI as an agent of the user's will, or autonomously as part of the fulfillment of tasks that indirectly affect the implementation of a user's key task.

It should be understood that this definition is provided in line with the current level of technological readiness of AI and does not imply the creation of technology beyond AI and the generation of its own developments in the field of AI in the next 3–5 years.

Within the framework of this approach, it is proposed to specify that an electronic person of public law is understood as an electronic person using AI technology, where the user is a government body, an official, and another person endowed with public authority, using it for the purpose of performing public functions that do not contradict the law and other regulatory legal documents.

6. Concluding Remarks

The current findings and their interpretation imply a more detailed further analysis of legislative and doctrinal issues; among them, the following seem to be relevant and promising:

- detailed study of approaches in the field of standardization and certification of AI, taking into account AI reliability and safety for society, as well as the adaptation of legal approaches to the implementation of these procedures in relation to AI;
- consideration of issues of determining the status of AI as a separate subject of law (study of possible structures through a legal entity, individual, or other person);
- consideration of issues in the application of AI in public authorities;
- consideration by authorities of issues of copyright protection in relation to AI, as well as removal of administrative barriers for access to information and analysis of the experience of various countries in the context of patenting;
- consideration of the ethical applications of AI technology.

Within the framework of the listed systemically interrelated positions, the need for their detailed study is viewed as promising to determine the public law nature of AI and approaches to its balanced regulation.

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Notes

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