LAW OF NEW TECHNOLOGIES

Artificial Intelligence – A Possible Key For Better Results On Tackling Climate Change[1]

Claudia Elena Marinică[2]

Abstract

The article aims to analyse the effects/influence of artificial intelligence in combating climate change, for the protection of the environment and humanity as a whole. Climate change, artificial intelligence, sustainable development are some of the concepts addressed in this research, starting from the worldwide impact that artificial intelligence demonstrates today, continuing with the two sides it can present - one of combating the effects of climate change or, and the second one being contrary, i.e. aggravating or at most neutralizing them. For this reason, the article analyses artificial intelligence as it is currently perceived, how it is implemented in the fight against climate change, the results of its application, emphasizing the positive effects, but also highlighting possible negative effects. The article also seeks to discuss the need for good practice and policies that support the global commitment of all actors involved (organizations, states, citizens) in this matter. To achieve its proposed objective, the research mainly followed the relevant doctrine, legislative measures adopted at international, regional and national level to highlight what are the immediate and future effects of climate change and how they can be influenced, especially in a positive way by artificial intelligence. Based on these aspects, we see both the proactive reaction and the moral and legal obligation of all of us to contribute by tackling the climate change crisis facing humanity, having social repercussions and a significant negative economic impact while taking into account the respect for human rights. The phenomenon of climate change, appreciated as a global, persistent problem, and also an exponential one stresses the need for a global climate policy which requires continued global cooperation in regards to tackling climate change so as to achieve visible results. If these factors are not met, we will witness an increasingly obvious deterioration of the environment resulting in endangering the well-being, safety and non-observance of people's rights.

Keywords: *artificial intelligence, sustainable development, climate policies, mixed impact, human rights.*

JEL Classification: [K3 Other Substantive Areas of Law]

1. Introduction

Protecting the environment and humanity is a key issue that needs to be addressed positively and pro-actively at an increasing pace, one of the current threats being climate change and its effects. In this context, the global impact of artificial intelligence is also reflected in the fight against climate change and in the actions taken in this regard. Artificial intelligence (hereinafter referred to as „AI") is a tool in the fight against climate change; it also implies responsibility for its use, as well as a mixed role that it can play in combating the effects of climate change or, on the contrary, in aggravating or at most neutralizing them.

What are the effects of AI on climate change? (e.g. the carbon footprint of AI), as well as the need for good practices and policies to support the global commitment of all actors involved (organizations, states, citizens) to this issue.

Equally relevant is the proactive response and the moral and legal obligation of each actor involved to contribute, by virtue of respect for human rights and freedoms, to tackling the issue of climate change, a global and rather persistent phenomenon that gives rise to the idea of global climate policy, respectively, of global cooperation in trying to solve climate change related concerns.

Starting from a series of concepts such as climate change, artificial intelligence, sustainable development, in the following we will address the evolution of the most important legislative measures at international and regional level in the field of climate change, continuing with the way AI interacts with climate change, supported by the need for good practices and appropriate policies. The effects of climate change are imminent, they are certain/definite and will be extremely visible, affecting the whole globe, giving rise to intense debates about their specific causes and consequences, but also offering solutions to neutralize, mitigate or even eliminate them, otherwise sustainable development will be severely affected and limited.

2. Artificial Intelligence and Climate Change

Climate change, one of the most pressing problems facing humanity, having a predictable and foreseeable impact , poses a number of challenges for today's society on how to manage its effects on humanity in general, and on every individual. Based on the definition of climate change in the United Nations Framework Convention on Climate Change of 5 June 1992, it is considered

„climate change that is directly or indirectly attributed to human activity that alters the composition of the atmosphere globally and adds to the variability of the climate of the observed climate over comparable periods"; in this section we will focus on the brief presentation of the issues related to climate change, the perceptions surrounding them and the concrete measures of global management that were adopted.

The greenhouse effect caused by gas emissions is just one example that shows the effects of climate change, causing, in a cascade, as a direct consequence, the increase of the global average temperature, changes in the volume of precipitation, sea level rising, extreme weather phenomena, etc. One of the causes of climate change is the massive atmospheric emission of greenhouse gases, mainly caused by man, through its (industrial) activities. The global character is easy to understand and observe, this phenomenon affecting all regions of the globe, to a greater or lesser extent. This global character is doubled by the constant character, which indicates that despite the debates, legislative measures and practical solutions identified, the phenomenon is still present and extremely visible, its effects will exist for a long time despite its elimination.

In this context, the twentieth and twenty-first centuries mark a growing international awareness of the dangers and negative effects of climate change, the need to adopt legislative measures and implement practical solutions to combat and prevent climate change, but also to disseminate information to the public for it to be aware of what climate change entails.

Some important steps were taken in 1988, when the Intergovernmental Panel on Climate Change was set up to draw attention to the risks posed by climate change, which resulted in the United Nations Framework Convention on Climate Change. The 1997 Kyoto Protocol (entered into force in 2005), the direct consequence of the United Nations Framework Convention on Climate Change and one of the most important international legal instruments in the fight against binding climate change is based on the principles of the Convention emphasising the agreement of the states on the commitment to reduce greenhouse gas emissions, aiming to reduce them by at least 5% by 2012 compared to 1990. Of course, this is where each state's own policies regarding pursuing reduction, in other cases neutralization, and another category wanting to limit their growth. Unfortunately, the US withdrawal in 2001 significantly jeopardized confidence in the Protocol, especially since the United States is still the world's largest producer of greenhouse gases.

Having the Kyoto protocol as a guide, the European Union has joined the UN's efforts and committed itself to collectively reducing emissions by 8% throughout 2008-2012[3] for Member States that became members before 2004 and

---

[3] Based on criteria such as gross domestic product and the population of each Member State of the Union.

those that joined the Union after that date - committed to reducing their emissions by 8%, except Poland, Hungary (which decided on 6%), Malta and Cyprus (which are not included in the annex to the document). The direct consequence of these decisions is that „the EU has succeeded in achieving the targets set in the Kyoto Protocol for the period 2008-2012, and has subsequently decided on a 20% reduction in greenhouse gas emissions compared to 1990 levels, until 2020"[1].

The Copenhagen Accord is a continuation of talks on climate change, constituting another international legal instrument adopted in this regard, but its impact has not been very powerful, the main reason being that it had no binding legal force in terms of climate change reduction of gas emissions. However, the Agreement recognized the need to limit global warming to 2° C and to establish a maximum threshold for gaseous emissions.

The meetings in Durban, Doha, Warsaw represent small but decisive steps in reaching a global agreement on climate change, and the meeting in Paris (the climate summit at COP 21[4]) resulted in the adoption of the Paris Agreement that could only take effect after at least 55 states, responsible for at least 55% of total global emissions, would ratify it. In 2016, the European Union (hereinafter referred to as „the EU")[5] signs, ratifies and submits the instruments of ratification of the Paris Agreement to the UN, and on November 4, 2016, the Paris Agreement enters into force. The agreement aims to keep global average temperature growth below 2° C, even limiting this increase to 1.5° C, increasing the adaptability of developed countries and strengthening resilience while also allocating appropriate financial resources (annual allocation of $ 100 billion dollars for measures taken to prevent climate change). Although the US withdrawal from the agreement is a sensitive issue in its evolution, it „remains a cornerstone of global efforts to effectively combat climate change and cannot be renegotiated", reaffirming the EU's commitment to swiftly and fully implement the Paris Agreement on Climate Change, including its objectives for financing the fight against climate change, and to be at the forefront of the global transition to clean energy"[6]. The efforts of each Member State of the European Union have been broken down by country, based on the principle of economic solidarity; so that, depending on the GDP per capita, whether it is low or high, the level of increase or decrease in emissions is adjusted accordingly.

In 2019, the European Union's stated goal of achieving climate neutrality by 2050 would begin to materialize the next year, through the adoption in 2020 of a

---

[4] Conferences of States Parties to the United Nations Framework Convention on Climate Change; a total of 196 states plus the European Union.

[5] EU greenhouse gas emissions account for 12% of global emissions.

[6] For more details see https://www.consilium.europa.eu/en/policies/climate-change/paris-agreement/#, accessed on 23.11.2020.

long-term development strategy for the European Union on achieving a low level of greenhouse gas emissions, including reducing greenhouse gas emissions by at least 55% by 2030.

The European Green Deal is for the European Union a new legal and political framework representative of the European Commission under Ursula von der Leyen, with multiple effects on the European economy. The European Green Deal aims to find a more ambitious and cost-effective way to achieve climate neutrality by 2050, „to help reduce greenhouse gas emissions, limit global warming to 1.5° C, and determine creating green jobs"[7]. This legal instrument is based on the Paris Agreement, being presented on December 11, 2019, and then, on March 4, 2020, the European Commission's proposal for a European Climate Law (confirmed by the European Parliament) would follow. On July 21, 2020, the resumption of climate talks and the adoption of the budget allocated for it by the 27 Member States, and in December 2020, at the level of the European Union, the acceleration of de-carbonisation plans was approved, so that by 2030 gas emissions of greenhouse gases should be reduced by 55%, compared to values registered in the 1990s. Indeed, this target is quite realistic, with a chance of achieving the proposed objectives, and Member States will have to adapt to it before 2023. States such as Finland and Sweden have reported that 2035 and 2045, respectively, have been decided so as to achieve climate neutrality. A 2020 United Nations report - Emissions Gap Report 2020[8] states that, „despite a slight decline in carbon dioxide emissions as a result of the COVID-19 pandemic, the world is still heading for a rise in temperature over 3° C in this century - well above the goals of the Paris Agreement". „However, recovery measures after a low-carbon pandemic could reduce greenhouse gas emissions by 25% by 2030, based on pre-COVID-19 policies".

On 14 July 2021, the „Fit for 55" legislative package is presented, consisting of twelve legislative proposals that will contribute to achieving the goal of reducing carbon emissions by 55% before 2030, compared to 1990. The European Climate Law aims to achieving the European Union's goal of climate neutrality by 2050, to contribute „to the implementation of the Paris Agreement on climate change, including its long-term goal of keeping global warming well below 2^0 C above pre-industrial levels and to continue efforts to keep this temperature below 1.5° C", also „to contribute to the implementation of the Sustainable Development Goals"[9].

---

[7] 2030 Climate Target Plan, https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_ro, accessed on 24.11.2021.

[8] Available at https://www.unep.org/emissions-gap-report-2020, accessed on 08.11.2021.

[9] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law) Law p.3, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080, accessed on 24.11.2020.

In August 2021, the sixth report of the Intergovernmental Panel on Climate was released, which, according to the pessimistic scenario, predicts „greenhouse gas emissions at the highest level" and „average heating above 4.5° C in 2100", based on the current rising temperature trend of more than 2.5° C[2].

The COP26 meeting was recently held in Glasgow, Scotland, from 31 October to 12 November 2021[10], being considered a „turning point for humanity", where world leaders met to fight climate change, but it also brought together people and representatives of civil society, especially since five years have passed since the entry into force of the Paris Agreement. According to the Agreement, the signatory states must report their own climate targets, review them every five years, and as the first five years have passed, it is easy to understand the particular importance of this meeting. During the meeting, the topics discussed were the contribution of each state to the overall reduction of greenhouse gas emissions, the regulation of carbon markets and financial support to developing countries. We believe that the imposition of/commitment to the objectives proposed on this occasion, namely those on the global reduction of greenhouse gas emissions, the regulation of carbon markets and the financial support provided to developing countries will determine the success of COP26. Closely related to the imposition of these goals must be the issue of human rights, especially of those affected by climate change, such as climate migrants [3], of organizations dealing with the displacement of labour caused by climate change, etc.

According to a national analysis[11] it was revealed that over a quarter of respondents to an interview consider climate change to be the single most serious problem facing the world as a whole in Sweden (43%), Denmark (35%), the Netherlands (34%), Ireland (31%) and Germany (28%) and at the opposite pole in Bulgaria (5%), Romania (7%) and Italy (7%), Hungary (8%) and Croatia (9%). „It is a striking result in the context of the corona virus pandemic, showing the high level of concern around climate change despite the most serious world health crisis in decades". Moreover „more than half of respondents believe national governments (63%), business and industry (58%), and the EU (57%) are responsible for tackling climate change within Europe". „Finally, the report looks into opinions on the responsibilities of national governments and the EU for tackling climate change. Three quarters of Europeans think that their national government is not currently doing enough to tackle climate change"[12].

In the case of Romania, according to the interviews, there are no changes compared to 2019, climate change occupying the fourth place in Romanians'

---

[10] 196 states and the European Union participate.

[11] The European Commission, *Special Eurobarometer 513, Climate Change,* Report Fieldwork: March - April 2021, available at https://europa.eu/eurobarometer/surveys/detail/2273, accessed on 08.11.2021.

[12] *Ibidem*, p.96.

concerns, being considered to be a very serious problem,the citizens consider responsible for combating climate change the European Union (52%, compared to the average 57%) and national governments (51%, compared to the EU average of 63%). However, on the whole, it is unfortunate that respondents in Romania are generally unwilling to take any action to combat climate change, taking some measures that are aimed at insulating the house and reducing energy consumption, but consider it important that national government (83% in relation to the EU average of 88%) and EU (79%, compared to 87%, the EU average) identify large-scale targets that will contribute to increasing the amount of renewable energy used by 2030[13].

It is noted that the legislative measures taken to combat this phenomenon are not immediate (some coming into force years later), that the identified solutions to eliminate the effects of climate change require long periods of time (involving identification and implementation) and maintaining the objectives is a continuous challenge. All this is based on effective environmental policies tailored to each state, the effectiveness of which remains to be analysed individually and globally.

AI, present in our daily lives, involves the development of computer systems that perform tasks that normally require human intelligence. At the same time, it is becoming increasingly difficult to ignore the problems caused by climate change. In this context, *the question of whether and how Artificial Intelligence can support the fight against climate change has become inevitable*. The answer to this question came up before long, and AI was able to support the conservation of natural resources by optimizing protection measures and committing to sustainable development. Next, *we might ask what role does AI play in tackling climate change?*

Therefore, in this section we will try to identify some answers to the above questions, in the context where the effects of climate change became more and more visible starting with the onset of the pandemic generated by COVID-19, especially in 2019 when the highest CO2 emissions in history were registered and the awareness was clearly raised.

Addressing climate change through AI is expected to be successful at first glance; if we look at tracking the evolution of greenhouse gas emissions, as well as improving the energy efficiency of industrial plants and processes, managing demand and reducing food waste, the production of new building materials to replace cement and steel that are influencing climate change, etc. In the latest report from the Capgemini Research Institute – Climate AI: How artificial

---

[13] See the European Commission for more details, *Special Eurobarometer 513, Climate Change,* Report Fieldwork: March - April 2021, Report for Romania, available at https://europa.eu/ eurobarometer/surveys/detail/2273, accessed on 08.11.2021.

intelligence can power your climate action strategy – it was found that, „in the past two years, AI-enabled use cases have already helped organisations reduce GHG emissions by 13% and improve power efficiency by 11%. Using the expertise of right based on science the report estimates that, by 2030, AI-enabled use cases have the potential to help organisations fulfil 11–45% of the "Economic Emission Intensity" targets of the Paris Agreement, depending on the scale of AI adoption across sectors. For instance, for the automotive sector, AI-enabled use cases have the potential to deliver 8 percentage points of the 37% reduction (nearly one-fifth) required by 2030, as per the Paris Agreement goals"[4].

There are also aspects that need to be developed and taken into account, so it is necessary to develop and implement educational policies on combating the effects of climate change, in order to raise awareness of the importance of climate action.

Of course, combating the negative impact of AI on the climate also plays an important role, as it can be seen as a double-edged sword, and it is crucial to use AI in such a way as to produce positive and desires effects, if it is possible, less negative ones[5]. For example, „artificial intelligence training is an energy intensive process. New estimates suggest that the carbon footprint of training a single AI is as much as 284 tons of carbon dioxide equivalent - five times the lifetime emissions of an average car"[6].

Increasing the carbon footprint by using AI has a negative impact on the entire planet, with the consequence that it adds to other general negative effects of AI such as intentional misuse of AI, but also the threat of confidentiality, transparency and sharing of personal data. The responsibility for using AI in a way that benefits human beings comes from the fact that „AI has potential benefits in public health, public policies on climate change, public management, decision-making, disaster prevention and response, improving government - citizen interaction, personalization of services, interoperability, analysing large amounts of data, detecting abnormalities and patterns, and discovering new solutions through dynamic models and simulation in real time"[7].

As urban areas are high consumers of AI and resources, the implementation of AI automatically gives rise to opportunities to use AI in the fight against climate change in cities, favouring the concept of smart city. Smart city „involves in addition to the use of information and communication technology to improve the quality of life of cities and innovation and sustainability; we are thus witnessing the development of today's cities and their transformation into responsible cities, a key element for a sustainable society; these cities have an efficient, permanently optimized management, with an infrastructure that comes to guarantee, on the one hand, a better participation of the citizens in the life of the city and, on the other hand, a significant increase of the quality of life for its citizens"[8].

In shaping the image of a smart city, AI has a significant contribution, especially since globally states are facing both population growth in urban areas and inequality, discrimination or increasing greenhouse gas emissions. Therefore, investing in low-carbon AI in order to achieve the proposed target of a decrease of 2° C or even 1.5^o C involves a drastic reduction in energy demand and consumption. In order to increase the effectiveness of AI in the fight against climate change, appropriate legislation must be ensured, in conjunction with ethics and appropriate human rights. At the same time, „deep transformations are needed to de-carbonise buildings, ensuring that the construction sector contributes to efforts to limit temperature rise to 1.5^oC"[9]. The motivation is easy to understand, with houses and buildings being the main culprits of the climate crisis, more precisely they represent "about 40% of all energy consumed and 36% of energy-related greenhouse gas emissions in the EU"[10].

We appreciate that the impact of AI on the environment is not yet known, but this new use of energy and its size[14] are worrying issues at the moment, with a clear negative impact on climate change. Practically, energy savings are needed, and cannot be achieved by keeping all current consumers on the same level as before, to which the increasing use of AI would be added .

The development of smart cities, the installation of renewable energy sources, the development of higher capacity batteries for storing energy and powering electric vehicles, increasing the number of autonomous vehicles, etc., can all contribute to reducing carbon emissions. Considered to be small but important steps, these measures should contribute to the long-term development of future-oriented research projects, and AI will be a key factor in their implementation.

AI can also be used to manage climate migration, one example would be the African continent, one of the continents greatly affected by forced climate migration, that can successfully use artificial intelligence support to reduce climate migration.

3. Conclusions

We fully agree with the statement of former French President Jacques Chirac at the Fourth Earth Summit in 2002, who declared: „We cannot say we do not know. Let us be careful that the 21st century does not become for the next generations the century of a crime of humanity against life"[11]. We consider this article emphasizes that there are options for adapting to climate change, that rigorous climate change mitigation and mitigation activities are being identified, developed and implemented in order to remain at a controllable level, so as to

---

[14] Energy generation and electricity consumption account for 25% of all greenhouse gas emissions.

create a clearer future that is more durable. At the same time, the prevention of a possible climate disaster requires the experimentation of new technologies equipped with AI, and whether or not these are sufficient, we can only be optimistic, considering that there is a very high chance that the EU will be able to succeed in achieving the proposed goal of climate neutrality by 2050.

Analysed from an economic and social point of view, climate change must be seen as a basic condition in the development of sustainable public policies, a mission that is not exactly easy, but necessary, the repercussions being more and more significant. If until recently, the measures regarding climate change were mainly aimed at de-carbonising, eliminating fossil fuels and reducing or even stopping emissions into the atmosphere, from now on the target is even braver, zero emissions by 2050, regarding this matter we refrain from showing an optimistic view, perhaps a dose of skepticism is more appropriate in relation to the difficulty of achieving it.

Finally, we appreciate that AI can contribute to the fight against climate change and the consolidation of climate forecasts, but at the same time it also involves costs for the planet, which can be offset or even reduced if a better understanding of the carbon footprint is considered while using AI.

References

[1] Marinică C.E., The European Union climate neutrality and climate migrants, International Law Review, no. 2/2021, pp. 2-13.

[2] Tobelem B., Climat: quels sont les enjeux de la COP26?, 29.10.2021, disponibil la https://www.touteleurope.eu/environnement/climat-quels-sont-les-enjeux-de-la-cop26/, accesat la data de 04.11.2021.

[3] Marinică C.E., The European Union climate neutrality and climate migrants, International Law Review, no. 2/2021, pp. 2-13.

[4] Capgemini Research Institute, The heat is on to turn down climate change – AI can help, available at https://www.capgemini.com/gb-en/research/climate-ai/?utm_source=pr&utm_medium=referral&utm_content=performai_none_link_pressrelease_none&utm_campaign=performai_cri_climate_change, accessed on 08.11.2021.Information accessed on https://c2e2.unepdtu.org/kms_object/how-artificial-intelligence-can-power-your-climate-action-strategy/ of The Copenhagen Centre on Energy Efficiency (Copenhagen Centre) on 15.11.2021.

[5] Annette Ekin, AI can help us fight climate change. But it has an energy problem, too in Horinzon, The EU Research &Innovation Magazine, 12 september 2019, available at https://ec.europa.eu/research-and-innovation/en/horizon-magazine/ai-can-help-us-fight-climate-change-it-has-energy-problem-too, accessed at 15.11.2021.

[6] Donna Lu, Creating an AI can be five times worse for the planet than a car, available at https://www.newscientist.com/article/2205779-creating-an-ai-can-be-five-times-worse-for-the-planet-than-a-car/, accessed on 08.11.2021.

[7] David Valle-Cruz, Edgar Alejandro Ruvalcaba-Gomez, Rodrigo Sandoval-Almazan, and J. Ignacio Criado. 2019. A Review of Artificial Intelligence in Government and its Potential from a Public Policy Perspective. In Proceedings of the 20th Annual International Conference on Digital Government Research (dg.o 2019). Association for Computing Machinery, New York, NY, USA, 91–99. DOI: https://doi.org/10.1145/3325112.3325242.

[8] Moroianu Zlătescu I., Marinică C.E., Good governance and happiness of citizens, Fiat Justitia, nr.1/2020, pp. 199-207.

[9] Edoardo Concari Coppola, Buildings key to achieving Europe's climate goals, available at https://socialeurope.eu/buildings-key-to-achieving-europes-climate-goals, accessed on 22.12.2021.

[10] Ibidem.

[11] Tobelem B., Climat: quels sont les enjeux de la COP26?, 29.10.2021, disponibil la https://www.touteleurope.eu/environnement/climat-quels-sont-les-enjeux-de-la-cop26/, accesat la data de 04.11.2021.