The Lawfulness of Space Mining for Commercial Exploitation

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Abstract

Developed countries are now more interested in using and mining outer space for commercial purposes, and have therefore enacted legislation to regulate their activities in this regard. The factor that has prompted the major powers is the presence of valuable natural resources; thus, they are working to mine those resources and bring them to the Earth. Although it is stated in international space agreements that "government or private entities cannot possess outer space (such as the moon and other celestial bodies)", these resources are not mentioned. Additionally, outer space must be used for the benefit of all mankind. In recent years, developed countries and private entities have been seeking investment in outer space, but they may face significant obstacles in terms of the absence of legal protection for property rights and sovereignty problems in outer space. The article is an analytical study that describes international treaties and national laws regarding the lawfulness of space mining for commercial purposes. The study analyses the extent to which these national laws that allow the commercial use of outer space are compatible with international space agreements currently available as well as the legal impact of the lack of sovereignty on property rights in outer space. The study's main findings are the necessity to amend the international space agreements so that they are harmonious with technological developments and mankind's ambitions, to exert efforts to remove ambiguities in the existing international agreements regarding the commercial exploitation of outer space, as well as to invite countries around the world to draft the texts of new international outer space agreements or to review existing outer space treaties in a way that gives an opportunity to the countries of the world to access outer space without discrimination and increases cooperation between them in this regard.

Keywords: Space Mining, Outer Space, international space treaties, commercial exploitation, national laws

1. Introduction

The economic and commercial exploitation of outer space is a new ambition of mankind. The utilization of outer space has undergone major changes due to the escalation of discourse in developed countries regarding the existence of natural materials in outer space that can be exploited like platinum, Helium -3, titanium, and solar energy, the value of which is estimated to be in the trillions of dollars. Access to these natural materials in outer space may alter economic theory and human life on Earth (Sarnacki, 2014). The world of technology continues to expand, and is turning science fiction into a scientific reality (Pachankis, 2022a). Space mining is an interesting example of this phenomenon, as space scientists have realized that celestial bodies may contain valuable minerals and other natural resources (Lee, 2012). The dynamic advancement of knowledge, new technologies, resources, and the establishment of the basics of artificial intelligence will enable humanity to mine space and access the valuable minerals (Bernat, 2019). Additionally, a number of countries and private companies are hoping to extract resources and return them to Earth, which raises the issues of property rights and sovereignty, as well as who can acquire such natural resources from space. The absence of legal codes to regulate the conduct of private companies and individuals in outer space may lead to the creation of space wars, which would inevitably result from the redistribution of such objects and the failure to resolve the issue of private property of space bodies, which will prevent fair capture of such bodies by those without the legal authority to do so (Halunko and Didenko, 2019). The lack of regulation of the rights and duties of the countries and private sectors may create fears over the existence of humanity and the health of the people residing on Earth, and could have a harmful impact on the environment, which may lead to political and legal struggles between countries or private sectors (Fouad Sahraoui, Hadid and Huang, 2020).

However, many countries are unable to participate in outer space activities, particularly developing and least-developed countries. Although legislation has been enacted by some countries with regard to the regulation of their activities in outer space such as the US (United States), UAE (United Arab Emirates), Luxemburg, among others, there is a need for legislative uniformity regarding how outer space is used and commercial activities are undertaken by nations.

In addition, one of the most important problems facing the countries of the world is how to resolve disputes associated with the utilization of outer space, as well as the difficulty of accessing outer space to investigate the issue and the cost of such investigations (Nnadozie and Sule, 2022). Therefore, establishing a mechanism for settling disputes related to outer space so that its decisions are binding certainly provides more opportunities to carry out more activities in outer space without fear. Certainly, solving outer space problems necessitates the generation of a new agreement or the revision of international space agreements that are currently available.

1.1 Significance of the Study:

The desire of several nations to access outer space and advance space technology is causing global space activity to continually increase. Some of these nations have enacted national legislation to control their space activities and permit space mining and exploration for commercial purposes such as the US, Luxemburg, and UAE. They assert that international space treaties are followed in their space legislation and operations. Therefore, this research is concerned with analyzing the provisions of the outer space agreements and national laws pertaining to the use of outer space for commercial purposes on the one hand, and the extent to which those national laws are compatible with the international space agreements on the other.

1.2 Research Problem:

There are ambiguities in international space treaties about commercial space mining or the use of outer space for commercial purposes as they do not take clearly into account the interests of humanity as a whole, which could be problematic in the future. However, space technology is developing rapidly, and the private sector contributes greatly to outer space activities, allocating large sums of money for their space activities. Despite the vagueness of international space agreements, several nations have taken legislative measures to control and safeguard outer space activities including the space operations and activities of their massive enterprises. However, the extent to which such legislation complies with international standards and outer space agreements is questionable. Another problem is related to the fact that not all countries can participate in outer space activities.

1.3 Research Questions:

- Why do some governments support private companies in accessing outer space more than others? If damage is caused in space because of a private companies' actions, who will be held responsible internationally?
- Is a private company able to invest in outer space according to the current international space treaties? Do commercial mining activities in outer space comply with the current provisions of international space law?
- Can a mining zone in outer space be claimed as sovereign or private property ?
- Is the issuance of national legislation by the countries of the world to regulate outer space activities, including commercial activities, compatible with the currently available outer space agreements?
- How can the legislation of countries regarding the use of outer space be unified?

The above-mentioned questions will be answered throughout this paper.

1.4 Research Objectives:

The goal in selecting this topic is to shed light on the legal ambiguities surrounding the commercial practice of outer space in accordance with the current international space agreements. The study also aims to identify a mechanism that will allow all countries of the world to participate in outer space activities.

In addition, the research objective is to evaluate international space agreements connected to the use of outer space by countries of the world and private sectors for economic and commercial gain as well as to analyze their provisions and terms regarding space mining, the concept of the common heritage of mankind, and other issues.

Additionally, trying to find a mechanism to unify national legislation in the world with regard to the use of outer space, whether commercially or for other purposes, is another objective of the study.

1.5 Methodology:

The research methodology is based on the descriptive, analytical, and critical approach by presenting international laws, national laws, references, and previous studies connected to the utilization of outer space and the legality of space mining for economic and commercial purposes. Additionally, observations and data will be collected regarding the impact of the lack of sovereignty on the operations of governments and private companies and the protection of their property rights in outer space, which will subsequently be analyzed to make recommendations and suggestions at the end of the research. The study endeavors to

analyze the position of the national laws and international treaties related to the use and mining of outer space. The study is based on a qualitative method for describing national laws and international space treaty texts. In addition, the study adopts a comparative study approach to make a comparison between the international space agreements and the national space laws of the countries of the world in order to show the extent to which national laws are compatible with the current international space agreements.

2 .Space mining and resource sharing

Initially, commercial space activities generally focused on satellite communications, especially telephone and television infrastructures. However, modern business activities have focused on aerial and geological assessment, remote sensing, launch, and universal positioning (Pachankis, 2022b). The launch of the Telstar satellite to transmit television signals across the Atlantic Ocean in 1962 was the first commercial activity in outer space (Aksel, 2022). The Moon and asteroids are celestial bodies that contain metals. Space-faring nations are preparing to extract these materials for financial gain. The dream of using space resources has become a reality and interest in outer space is continually increasing due to the progress of technology in the field of space and human awareness of the importance of outer space (Anderson, Christensen and LaManna, 2018). More than sixty countries around the world now enjoy outer space activities, including Arab countries (worldpopulation-review.com, 2023). The first space agency in the Arab world was established in the UAE under the name of the Emirates Space Agency, which launched the first Arab Misbar mission to Mars in 2020 under the name of Misbar Al-Amal (Kim, 2022). This study will analyze outer space mining and the sharing of mineral resources with the countries of the world for the benefit of all human beings.

2.1 Space mining

The world is now aspiring to mine asteroids and other celestial bodies close to the Earth, in addition to space transportation and tourism. Meanwhile, countries around the world are turning to private companies and providing satellite and launch capabilities. While commercial space activity in the private sector is growing at a rapid pace, governmental activity is decreasing (Dempsey, 2016). The correct use and mining of outer space can ensure the sustained development of mankind, offer continued energy sources, help realize the role and status of humankind in the world, and grow the scientific knowledge of people globally (Yang, 2022). There are several reasons for space mining such as industrial progress, private profit, and scientific and social advantages (Meyer, 2010).

A question that can be asked is why private entities and governments are seeking to mine space. Limited resources on the surface of the Earth and the certainty that asteroids have a profusion of these natural resources have directed scientists to assume that many valuable minerals such as titanium, platinum, Helium -3, and solar energy, in addition to gases like hydrogen, nitrogen, and ammonia, can be discovered in abundance in such asteroids and extracting these natural resources from outer space can add to all resources accessible for use; for example, one asteroid may contain more platinum than the entire amount collected on Earth (Sarnacki, 2014). Space mining will change human life on the Earth for the better, as declared by Chris Lewicki, president of a space mining company (Leon, 2018).

The question is why some governments are supporting their private sectors in accessing outer space more than others. Economic deterioration may be one of the reasons, and sharing expenditures of failure between several private and public agencies could be another reason, as launching a rocket into outer space is not always successful and requires huge capital (Powell, 2019). Therefore, the main goal of these countries that are trying to engage private companies to access outer space is to protect their economy from deterioration. For example,

due to the explosion of Elon Musk's SpaceX "Starship Rocket" a few minutes after its launch in April 2023, which was been described as the most powerful space rocket in the world (Skipper and Gorman, 2023). As a result of the explosion of the SpaceX rocket, Elon Musk's lost billions of dollars in a single day (Wion, 2023), and this was a key factor in his development of a rocket ship to take humans to the Moon and Mars (CNN, 2023b).

Before the Cold War, countries had few or no space abilities. However, they now have the economic and technological capability to improve space manufacturing (Pachankis, 2022b). Ultimately, the necessity to preclude ownership rights and state appropriation has been reduced; therefore, the limitations should be avoided to support commercial development in outer space (Pastorius, 2013). However, there are still economic and legal problems confronting the utilization of outer space; for example, despite the development of technology (Saleem et al., 2022), the cost of reaching outer space remains high, which requires huge capital, and no private corporation can conduct activities in space without the support, funding and legal regulation at of least one of the states as provided in all of the treaties on which governments have agreed; the government will ultimately bear the responsibility for the actions of its citizens (Hertzfeld and Von, 2005). This means that a country that supports private entities to access space and gives them permission to do so must also be held responsible for all the work these private companies do. For example, according to Article (VI) of the liability convention, the applicant state can demand compensation for damages caused by the launching state whether such damages are caused by private sectors or governmental entities (1972). Nevertheless, there is no International Tribunal for Space Affairs to determine damages or amounts for damage. However, due to governments' obligations under international space treaties, inadequately developed international norms on space mining, and the lack of an effective international authority (international organization) controlling space mining operations, it may lead to unilateral decision-making, which could result in conflicts in outer space. The important point that should be considered is that the international space agreements only provide for international dialogue, not a legally binding settlement, of disputes arising in space. For example, according to Article IX, a claim for damage reimbursement must be delivered to a launching state via diplomatic channels. A state may ask another state to advocate its interests or make its claim to the concerned launching state on its behalf if it does not have diplomatic relations with that launching state. In addition, if both the claiming state and the launching state are UN (United Nations) members, it may also submit its claim through the Secretary-General of the organization (Liability Convention, 1972).

2.2 Resource Sharing

Another issue related to sharing resources with the entire world is that mining minerals from outer space can help as a substitute for those resources that may become exhausted on Earth, or whose economic value has become very high (Kułaga, 2018). With regard to the sharing of space resources and their usage for the advantage of mankind, Article (I) of the Use of Outer Space Treaty provides that space is for all mankind and the use of space should only be for the advantage of humanity, which remains the core principle in international space agreements (1967). The treaty imposes a legal obligation on member states, which in turn provides a general obligation to access those natural resources in realistic circumstances for all countries (Kaiser, 2017). In addition, the Committee on the Peaceful Uses of Outer Space (COPUOS), which is one of the largest committees of the UN with 102 member states that overseas five agreements related to outer space, maintains that outer space must be used constantly for the benefit of all human beings and peaceful purposes (Kendall and Brachet, 2023).

Additionally, Article (II) of the Outer Space Treaty clarifies that states cannot seize outer space on the grounds of sovereignty, occupation, use, or for any other reason. The treaty stipulates that the utilization and exploration of outer space must be conducted by countries according to international law provisions and in the interest of strengthening international collaboration and there must be unrestricted access to all areas of space objects (Use of Outer Space Treaty, 1967). The international space law recognizes that the Moon and asteroids cannot be subjected to private property just like the oceans, but what they contain can be subject to private property, just like fish and treasures that sink to the ocean floor, which allows private companies to invest in space and to obtain the valuable minerals without having the right to own the asteroids (Leister, 2010).

The Moon Agreement, which is the most recent outer space treaty, goes further by providing that "The Moon is the common heritage of mankind". According to the Moon Agreement, if one country or its citizens take advantage of lunar resources, it must be shared with the entire world (Al Ali, 2021). The Moon Agreement has unfortunately only been ratified by a small number of states, and non-signatory nations are not bound by the pact (Nelson, 2010).

As mentioned under Article (I) of the Outer Space Treaty, exploration of outer space shall be done for the advantage of all nations, regardless of their degree of scientific or economic progress, and shall be the province of humanity. However, thus far, the exploration of outer space by developed countries and private entities has been undertaken for economic and military interests, and largely not for the benefit of humanity. Although significant progress has been made in technology related to space, it is still used for economic, military, and political rivalry purposes (De Zwart and Stephens, 2019). The outer space agreement that was concluded more than 55 years ago is not consistent with the current state of technological development, so it needs to be amended in order to reconcile with the aspirations of humanity to reach outer space and achieve rapid technological development. The potential for commercial space mining was not taken seriously taken into consideration when the Outer Space Treaty was signed more than half a century ago.

Outer space activities could soon be economically feasible, and launch fees may drop due to technology enhancement, as the participation of an increased number of space companies in space activities has led to intense competition (Reinstein, 1999). Additionally, the United Nations (UN) General Assembly has urged UN members to set and implement national laws allowing and arranging continuous oversight of activities of private sector organizations in outer space (Dempsey, 2016).

3 .The legality of the use of outer space for Commercial Purposes

According to the agreements concluded, outer space and celestial bodies cannot be owned by any country or their commercial companies, although the natural resources contained in it are not mentioned. The question that arises here is, what is the future of the work of these countries and giant commercial companies in the field of outer space? Who spends millions of dollars in order to access and benefit from outer space ?

The legality of mining space by some countries and private companies, investing in outer space, and international liability, are problems that may be faced by the international community. According to Article II of the Outer Space Treaty, no government can claim outer space or any celestial objects as its own (Outer Space Treaty, 1967). Additionally, the right to use outer space must be guaranteed for all humanity: as stated in the preamble to the Treaty, the benefit of all humanity shall be the primary goal of space exploration and utilization (Outer Space Treaty, 1967). The rationale behind the inclusion of this article in the Treaty is the fear of exploitation and use of outer space by space-faring countries that reach outer space before other countries because of their advanced technologies and to prevent space resources from being used by those countries only for their own benefit. This is also

emphasized by the preamble of the Liability Convention, which stipulates that the usage and exploration of outer space must be promoted for peaceful purposes and in the common interest of all mankind (1972). In this sense, the countries of the world are permitted to use outer space, but there is a limitation on this freedom, as its use must be for the advantage of all mankind or all nations of the world.

No country can claim ownership of outer space and celestial bodies as they are beyond the scope of the country's territorial sovereignty (Padden, 2022). According to international law and international norms, all independent states enjoy full sovereignty and control over their airspace, terrestrial territory, and territorial waters (Kraska, 2022). However, outer space does not come under the control of the world nations, because of their distance. The lack of sovereignty in outer space is one of the primary risks in terms of the ability of countries and private companies to benefit from their investment in space (Nnadozie and Sule, 2022). However, for most property rights that currently exist in outer space, the lack of sovereignty has not made problems for them. In particular, "Major Powers" such as Russia and US are increasingly concerned with the commercial and economic exploitation of natural resources in outer space, and consequently, legislation has been enacted by those countries to regulate their work and the work of their private companies in the field of outer space, particularly in light of the lack of clarity in international rules governing investment in outer space (Pekkanen, 2019).

One of the things that come to mind is the true meaning of Article II, is it clear or does it carry more than one interpretation? As opposed to terrestrial lands that may be the target of national appropriation claims, outer space is prohibited from being appropriated by use or occupation under Article II. Nonetheless, Article I explicitly supports states' rights to the "exploration and utilization" of space. However, the ambiguity that exists in Article II is, does this article apply to private companies or not? Article VI answers this ambiguity, as it assigns states international responsibility for their non-governmental players, and Article II expands this to include private actors (Outer Space Treaty, 1967). This implies that a state is responsible for exercising control over all private actors. Hence, the area of activity that a state can regulate without taking possession of space or celestial bodies is where the actual ambiguity lies. Furthermore, the connection between appropriation and resource extraction is a contentious issue (Ferreira-Snyman, 2014). The appropriation and extraction of natural resources are not prohibited under Article II. Since celestial bodies such as the Moon and other celestial objects are not subject to national appropriation through claims of sovereignty, use or occupation, or through any other means, it follows that the intent of Article II is clear that states have no right to claim that space as their property (Outer Space Treaty, 1967). For instance, Dmitry Rogozin, the head of Roscosmos, declared Venus to be a Russian planet. The announcement was made the day after researchers announced that they had found evidence of the Earthly gas phosphine in Venus' atmosphere (CNN, 2023a). However, at the same time, the space treaties forbid states to claim ownership of celestial bodies. Meanwhile, Russia has also ratified that agreement, which means that the ink on the paper of the agreement does not actually have much of an impact.

Therefore, the existence of national laws for space mining is necessary. As stated in Article VI of the Outer Space Treaty, before private companies engage in space activities, they must obtain permission from their government or country (1967). Therefore, on the one hand, the development of laws and the issuance of laws by states, especially space-faring countries, to regulate this matter is necessary. On the other hand, technological development in the field of outer space has become a reality, and many countries and private companies are seeking access to outer space, which requires legal regulation that necessitates the issuance of the National Space Law to define the rights and duties of those countries and private entities who

seek access to outer space despite the murkiness of the international laws governing commercial activities and investment in outer space.

4 .National Laws and Outer Space Activities

As mentioned above, it is necessary to have national laws for mining in space, but a question that arises is, are these laws compatible with outer space agreements or not? With the passage of the National Outer Space Regulatory Act in the US on November 25, 2015, the US became the first country to adopt a national law to regulate space mining activities (peacepalacelibrary.nl, 2023). The US law allows the commercial exploitation of outer space: according to Title 51 Section (51302b) of the law, private companies must obtain permission from the government before conducting their activities in outer space (U.S. Commercial Space Launch Competitiveness Act, 2015), which is consistent with Article VI of the Outer Space Treaty. However, according to Chapter 513 Section (''§ 51303) of the same law, any space resource or asteroid resource recovered for commercial purposes must belong to the citizen of the US who is engaged in the recovery of such resource, including the right to hold, transport, own, sell and use any space or asteroids resources acquired in compliance with all applicable legal requirements, including any commitments the US may have on the global scale (U.S. Commercial Space Launch Competitiveness Act, 2015). This means that resources taken from extra-terrestrial bodies by US citizens are legally protected as commercial property. Here, the ambiguity in international space agreements regarding the appropriation of space resources is evident, as mentioned before in Article II of the Outer Space Treaty, which affirms that the Moon and other celestial bodies are not subject to national appropriation through assertions of sovereignty, use and occupation, or in any other way without mentioning outer space resources. On the other hand, outer space must be used for the benefit of all mankind in accordance with international space law, but here the citizens of the US have the right to own space resources, sell and use them for their private benefit. The question that arises here is, does the US act regarding the use of outer space take into account the interests of all mankind? Of course, the answer is no, as it cares more about the interests of US citizens. The US Space Act of 1984 constituted legal scopes permitting commercial companies to progress, launch, and operate space vehicles and orbital satellites; however, the Commercial Space Launch Competitiveness law of 2015 goes much further than the Commercial Space act of 1984 by permitting the vision that asteroid mining is lawful (Blanchette-Seguin, 2016), and it allows US citizens to become involved in exploration for commercial purposes and to recover resources from outer space (Heise, 2018).

Moreover, Luxembourg created the second national law in the world and the first in Europe regarding the use of space (Law on the Exploration and Use of Space Resources, 2017). Luxembourg passed a law governing the use of space resources that acknowledges the possibility of private enterprises owning those resources (space-agency.public.lu, 2023).

Additionally, in the Arab world, the UAE law was issued as the first Arab space law, where Article 4 of the UAE legislation on regulating outer space clearly permits the use and commercial exploitation of space resources (Federal Law on the Regulation of the Space Sector, 2019). Additionally, Article 18 of the same law also allows the Council of Ministers to issue a decision to set conditions and instructions to regulate matters related to the extraction, use, ownership, sale, or purchase of space materials (Federal Law on the Regulation of the Space Sector, 2019). The US, Luxembourg, and UAE have passed national legislation offering legal protection to those who wish to acquire, transport, utilize, and sell materials mined from space.

However, countries like Canada, Australia, Italy, Japan, the UK, Brazil, and Ukraine have various laws governing space operations but do not have any specific national regulations on the utilization and extraction of space resources, in contrast to the US, Luxembourg and the

UAE (Chernykh and Gugunskiy, 2022). There are also countries that do not have laws related to outer space but do carry out space activities. For example, while Italy does not have legislation regarding outer space, the Italian Space Agency does exist (Chernykh and Gugunskiy, 2022).

It is believed that in order to unify the position of national legislation on the use of outer space and to check the compatibility of national legislation of the countries of the world with international space law, there should be a council within the framework of a globally independent organization under the name of the World Outer Space Organization or within the framework of the UN. The Council which can be created by either concluding a new space agreement or reviewing available international space treaties, monitors the national legislation of the countries of the world regarding the use of outer space, whether commercially or for other purposes, and the Council should verify the compatibility of the national legislation of the countries with international standards and agreements. The Outer Space Council should have the power to identify deficiencies in the national legislation of countries of the world and to identify provisions that are not in line with international space law. Also, the Council shall have the power to impose a penalty on countries whose national legislation is not in line with the Outer Space Agreements, after notifying them to reform their legislation within a reasonable period specified by the Council.

Additionally, the "American Space Renaissance Act" proposed by Jim Bridenstine aims to reform the country's space infrastructure through the establishment of a "Commercial Space Transport Office" and by setting performance-based regulations (Wrench, 2019). Bridenstine was recently appointed by US President Donald Trump as the 13th administrator of NASA in 2018. NASA's aim under Bridenstine comprised cooperation between public and private sectors, far-reaching settlement plans, and stable infrastructure for launches (Wrench, 2019). Also, NASA has set a new goal for itself to build a strong economy that depends on space colonies, as it requested 12 companies operating in the field of space trips, including Blue Origin and Boeing, to study the future of space travel, including the establishment of a strong economy that relies on flights to Earth's orbit without government funding (blogs.nasa.gov, 2019). This news should be taken seriously considering that behind most of these schemes are three of the world's richest businesspeople, namely Elon Musk, Jeff Bezos, and Richard Branson, the creators of Tesla Motors, Amazon, and the Virgin Group, respectively (Hoque, 2023). Jeff Bezos founded his corporation "Blue Oregon" with the intention of visiting the moon by 2023, and Elon Musk, through his company "SpaceX", wants to transport travellers to Mars in 2024, while Richard Branson is also striving to be an important player in this field (Ferreira-Snyman and Ferreira, 2019). In addition, the FAA (Federal Aviation Administration) allowed the first private lunar operation in August 2016. It has given permission for MoonEx, a private American company, to move outside the Earth's orbit, then land and move on the Moon's surface (Blanchette-Seguin, 2016). MoonEx victoriously claimed that this decision marks the beginning of a "new era of a continuous lunar commercial discovery, opening up the vast potential of valuable lunar resources" (Blanchette-Seguin, 2016). This permission given by the FAA was the first stage in permitting the MoonEx company to fulfil its objective of conducting space mining for valuable resources and recovering them to the Earth .

The emergency of space mining as a feasible trade opportunity may raise questions about the legality of space mining, private property rights, and sovereignty issues. The outer space treaty prohibits "national appropriation" and provides that the takeover of outer space by any nation, whether by a claim of sovereignty, occupation, use or other method, is prohibited (1967). Additionally, as mentioned above, according to Article VI of the Outer Space Treaty, everything that is launched into outer space is considered to be possessed by the launching

country, and the possessor is responsible for damage caused by these objects (1967). Therefore, if there is a responsibility, why does sovereignty not exist ?

The Outer Space Treaty does not directly explain private property rights in outer space. However, there is still an argument that property rights are forbidden by the Outer Space Treaty; as mentioned above, according to the treaty provided in Article (I), the exploration and use of outer space shall be "for the advantage and in the benefit of all"; nevertheless, there is still an argument in favour of property rights including the private exploitation of outer space natural resources (United Nations Institute for Disarmament Research (UNIDIR), 2007). The word "use" mentioned in Article (I) can be interpreted as including economic and non-economic use (United Nations Institute for Disarmament Research (UNIDIR), 2007). However, the provisions on prohibiting nations from claiming sovereignty over space objects do not preclude the extraction of resources in outer space by private sectors. The principle of non-appropriation can be explained as prohibiting ownership and permitting extraction (Marino and Cheney, 2022). Consequently, it is a flexible principle through which the international community is free to formulate unique laws governing the extraction of outer space natural resources, and at the same time, the principle needs to be further clarified in the future by reviewing existing international space agreements or concluding new space agreements.

Conversely, Article 11 (1) of the Moon Agreement provides that “the Moon and its resources are the common heritage of mankind” (Agreement governing the Activities of States on the Moon and Other Celestial Bodies, 1979), and Article 11 (3) interestingly states that existing natural resources cannot become "the property of any nations, intergovernmental or non-governmental organization, the national organization, non-governmental agency, or any natural person" (1979). Here, it is clear that the Moon Agreement, unlike the Outer Space Treaty, clearly states that the natural resources of the Moon may not be owned by any governmental or non-governmental organization, even natural persons. The Moon Agreement is somewhat more restrictive. However, the Moon Agreement has only been ratified by a few countries thus far as only 18 countries have ratified the agreement compared with the Outer Space Treaty that has so far obtained more than 104 ratifications (Genta, 2014). The most important point is that the US has thus far not ratified the Moon Agreement, so it is absolutely not bound by the agreement, and therefore, it only follows the legal system of the Outer Space Treaty (1967), which does not impose strict restrictions on space mining, which can be considered a significant problem for the Moon convention.

In our belief, in order for all human beings to benefit from outer space in terms of trade or any other issue, the world needs to generate a new agreement based on the participation of all countries in the world in outer space activities, as limiting outer space activities to a few countries in the world should be prohibited. As for how all countries of the world participate in outer space activities, the countries of the world should be divided into a number of groups, so that each group is headed by one of the technologically advanced countries in terms of access to outer space. For example, 45 countries should be placed with China to participate and supervise outer space activities, and others with Japan, the US, Russia, etc. and these groups must change their status every four years; for example, these 45 countries that were with China would be transferred to the US for another four years, and in this way, all countries can participate in outer space activities and all countries in the world can benefit from outer space. Subsequently, these countries, over a specific period of time, will acquire considerable information and good experience about outer space and how to exploit it. In addition, the new agreement should establish a binding mechanism on how the benefits of outer space will be divided among all countries .

Conclusions:

- In recent years, there has been an increase in outer space activities by states and the private sector, and the number of countries that practice these activities and aspire to reach outer space has increased, including Arab countries such as the UAE.
- The study concluded that the absence of a council within the scope of the independent world organization or within the scope of the UN has caused the incompatibility of national space laws with international space agreements, a difference in the position of the national legislation of the countries of the world regarding the use of outer space and the failure to unify the position of the legislation of the countries of the world in this regard.
- Space mining is expected to solve the universal economic issues of mankind and the self-interests of the private sectors that invest in space mining. Therefore, countries and private space companies must not disrupt the interests of all mankind, other nations, the legal interests of the other private sectors, and environmental standards.
- According to the Outer Space Treaty, private entities have the right to carry out activities in outer space, as stated in Article VI: the countries responsible for the work of non-governmental entities in the field of outer space. The countries of the world seek the participation of the private sector with them in outer space activities because sending astronauts to space is not always successful, and it incurs very high costs; at the same time, it is very difficult for commercial companies to reach outer space without the support of their countries. Additionally, private companies must conduct outer space activities in all cases under the control of their state because the state ultimately bears responsibility for all actions carried out by these companies according to Article VI of the liability convention as mentioned above.
- International conventions on outer space, with the exception of the Moon Agreement, recognize that the Moon and asteroids cannot be subject to private ownership, but there is ambiguity about what they contain. Can it be subject to private ownership? Is it permissible for private companies to invest in outer space and obtain precious metals without having the right to own asteroids and the moon? However, there are private companies that are making considerable efforts to undertake outer space activities.
- The establishment of a mechanism dedicated to solving outer space issues such as the establishment of an international court specializing in outer space cases will help to increasingly protect the public interests of humanity and prevent global space wars. The establishment of a mechanism for the settlement of outer space disputes reduces the fear of using outer space commercially or for any other purpose and the problem of ownership and lack of sovereignty, and it will certainly increase outer space activities. This can be achieved by either revising existing outer space agreements or concluding a new agreement on the resolution of outer space disputes
- The establishment of an international organization for the use of outer space may lead to space problems being solved and deficiencies that exist in current international agreements on the use of outer space being fixed.
- An environment conducive to international cooperation linked to the use of outer space should be created, such as by encouraging space-faring countries to help developing or least-developed countries in the field of space mining, which will enable the participation of most countries around the world in space activities, and allow outer space to be used for the interests of mankind.
- Existing space agreements must be reviewed or a new outer space agreement concluded to allow all countries of the world to participate in outer space activities, whether commercial or otherwise, by establishing a mechanism in this regard.

- The outer space conventions should be revised so that the nations of the world are allowed to enact national legislation on the commercial or other use of outer space and to define how and within what framework outer space is used. In addition, it should not be left to the freedom of countries in the world to enact laws according to their point of view, and a mechanism should be established to investigate the local legislation of countries and their compatibility with outer space agreements.

Recommendations:

- The study recommends that developed countries should be encouraged to assist developing and least developed countries in the field of space mining and establish an international organization for the use of outer space to protect space and use it for fulfilling peaceful, commercial, and scientific purposes to serve humankind as a whole and to solve legal problems that have not been addressed by existing international space agreements .
- The study proposes the establishment of a council within the scope of an independent global organization or the UN to unify the position of the legislation of countries regarding the use of outer space and check their compatibility with international space law like the TRIPS Council within the framework of the World Trade Organization, which investigates the compatibility of the intellectual property laws of the member states of the World Trade Organization with the TRIPS Agreement, and the council can request member states to disclose their intellectual property law and make their intellectual property laws compatible with the TRIPS agreement.
- According to Article (I) of the Outer Space Treaty, the states who are party to the treaty are obligated to share the benefits generated by space exploration and use. Unfortunately, the agreement fails to specify how the benefits of outer space should be divided between the countries of the world and does not define a mechanism for dividing those benefits. Therefore, the study suggests that a mechanism be developed and legal rules established for the division of joint benefits in international space treaties.
- It is necessary to amend the international treaties related to outer space such that they are compatible with technological developments and to invite all countries around the world to participate in drafting the texts of the new international space agreements. In conclusion, the countries of the world, especially the developing and least developed countries, should unify their positions to lay down international legal rules for determining the scope of the commercial and economic exploitation of outer space and encourage investors in this field by providing government support and enacting national legislation.
- The study proposes the enactment of domestic legislation by states to define the rights and duties of a private entity that conducts commercial activities in outer space. The study also recommends that Iraq and Arab countries. which do not have a major role in the exploitation of outer space, enact laws consistent with international standards and agreements on space on how to use outer space.
- The position of the Moon Agreement is clearer than the position of other agreements regarding the use of outer space. Therefore, the study suggests that more countries be encouraged to sign this agreement.
- The study suggests that the issue of using outer space for the benefit of all mankind be resolved and all ambiguities in this regard in international agreements related to outer space should be removed. The study prefers to adopt the position of the Moon Agreement, which states that the Moon and the Moon's natural resources shall be used for the benefit of mankind.

- The study proposes the establishment of a binding mechanism that obliges developed countries to allow other countries to participate with them in outer space activities by reviewing the outer space agreements currently available or concluding a new agreement to establish this mechanism and proposing a way to do so.
- To increase the implementation of outer space activities without fear and reduce anxiety about the future ownership or lack of sovereignty in outer space, the study proposes the development of a binding international mechanism for the resolution of outer space disputes by reviewing the international space agreements currently available or through concluding a new agreement on the resolution of outer space disputes.
- As a final word, the study suggests that outer space agreements are reviewed or a new agreement should be concluded in this regard so that the countries of the world are allowed to regulate all kinds of outer space activities from their national legislation while setting conditions and defining the framework for outer space use and how to take into account the interests of all mankind and establish a mechanism to investigate the legislation of those countries and the extent of their commitment to international standards and outer space agreements.

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ڕەوایەتی دەرهێنانی کانزا لە بۆشایی ئاسمان بۆ مەبەستی بەکارخستنی (بەسودهێنانی) بازرگانی

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پوختە

.....وڵاتانی پێشکەوتوو لە ئێستادا گرنگی دەدەن بە دەرهێنانی کانزا لە ئاسمانی دەرەکی بۆ مەبەستی بەکارخستنی بازرگانی. هەر بۆیەشە دەبینین هەستاون بە دەرکردنی یاسا بۆ ڕێکخستنی چالاکیەکانیان لەم بوارەدا. ئەو هۆکارانەی کە بۆنەتە پاڵنەر بۆ سەر وڵاتانی زلهێز و پێشکەوتوو بۆ گەیشتن بە ئاسامانی دەرەکی بوونی سەرچاوەی سروشتی گران بەهایە. بۆیە بەردەوام لە هەوڵدان بۆ دەرهێنانی ئەو سەرچاوە سروشتیانە و لە هەوڵدان بیانهێنن بۆ سەر زەوی بە مەبەستی سوودبینین لێیانەوە. لەگەڵ ئەوەشدا ئەو ڕێکەوتنامە نێودەوڵەتیانەی کە تایبەتن بە ئاسمانی دەرەکی دەقیان لەسەر ئەوە داوە کە هیچ کیانێکی حکومی یان ناحکومی (تایبەت) ناتوانن ببن بە خاوەنی ئاسمانی دەرەکی (وەک ئەستێرە و تەنە ئاسمانیەکانی تر) بەبێ ئەوەی باسی ئەو سەرچاوە سروشتیانە بکاتن کە لە ناویدایە، هەروەها پێویستە ئاسمانی دەرەکی بەکاربهێنرێت بۆ بەرژەوەندی سەرجەم مرۆڤایەتی. لەگەڵ ئەوەشدا بەم دواییانە ئەوەی تێبینی دەکرا ئەوەبوو کە ووڵاتانی پێشکەوتوو و کیانی تایبەت لە هەوڵدان کە وەبەرهێنان بکەن لە ئاسمانی دەرەکیدا، بەڵام لێرەدا ڕەنگە ڕووبەرووی کێشەیەکی گەورە ببنەوە ئەویش خۆی دەبینێتەوە لە نەبوونی پارێزبەندی یاسای لە بۆ مافی خاوەندارییەتی و نەبوونی سەروەری لە ئاسمانی دەرەکیدا. ئەم توێژینەوەیە کە بەردەستە توێژینەوەیەکی شیکارییە هەوڵدەدات بۆ شیکردنەوەی ڕێکەوتنامە و پەیمانامە نێودەوڵەتیەکان و یاسایی ناوخۆی ووڵاتان سەبارەت بە یاسایی بوونی دەرهێنانی کانزا و بەکارهێنانی ئاسمانی دەرەکی بۆ مەبەستی بازرگانی، هەروەها ئەم توێژینەوەیە هەڵدەستێت بە شیکردنەوەی ئەوەی تا چەند ئەو یاسا نیشتیمانیانەی کە ڕێگا دەدەن بە بەکارهێنانی ئاسمانی دەرەکی بۆ

مەبەستی بازرگانی رێکن لەگەل ڕێککەوتنامە نێودەوڵەتیەکانی تایبەت بە ئاسمانی دەرەکی. هەروەها ئەم توێژینەوەیە هەڵدەستێت بە شیکردنەوەی شوێنەوارە یاساییەکانی نەبوونی سەروەری لەسەر خاوەندارییەتی لە ئاسمانی دەرەکیدا. لەو دەرئانجامە گرنگانەی کە ئەم توێژینەوەیە پێی گەیشتووە بریتیە لە پێویست بوونی هەموارکردنەوەی ڕێککەوتنامە نێودەوڵەتیەکانی تایبەت بە ئاسمانی دەرەکی بە شێوەیەک کە بگونجێ لەگەڵ پێشکەوتنی سەردەم و ئارەزووەکانی مرۆڤایەتی، ونەهێشتنی ناروونی لەو ڕێککەوتنامە نێودەوڵەتیانەی بوونیان هەیە سەبارەت بە بەکارهێنانی ئاسمانی دەرەکی بۆ مەبەستی بازرگانی، و ئەم توێژینەوەیە داوا دەکات کە وولاتانی دنیا هەوڵی دارشتنی ڕێککەوتنێکی نوێ بدەن سەبارەت بە ئاسمانی دەرەکی، بە شێوەیەک هەوڵبدرێت دەرفەت برەخسێنرێت بۆ وولاتان بێ جیاوازی بۆ گەیشتن بە ئاسمانی دەرەکی و هاریکاری پێویست لە نێوانیان هەبێت.

ووشە سەرەتاییەکان: دەرهێنانی کانزا، ئاسمانی دەرەکی، ڕێککەوتنامەی ئاسمانی نێودەوڵەتی، بەکارخستنی بازرگانی، یاسای نیشتیمانی

مشروعية تعدين الفضاء للاستغلال التجاري

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ملخص

تهتم البلدان المتقدمة الآن أكثر باستخدام وبتعدين الفضاء الخارجي للمقاصد التجارية ، ولذلك فقد سنت تشريعات لتنظيم أنشطتها في هذا الصدد. من بين العوامل التي تقود القوى العظمى هي وجود الموارد الطبيعية الثمينة. وبالتالي ، فهم يعملون على استخراج تلك الموارد وإحضارها إلى الأرض. على الرغم من أن اتفاقيات الفضاء الدولية تنص على أنه "لا يمكن تملك الفضاء الخارجي (كالاقماروالاجرام السماويه الاخرى) من قبل هيئات حكومية أو خاصة" دون ذكر هذه الموارد الطبيعيه. بالإضافة إلى ذلك، يجب استخدام الفضاء الخارجي لمنفعة البشرية جمعاء. في السنوات الأخيرة ، سعت البلدان المتقدمة

والكيانات الخاصة إلى الاستثمار في الفضاء الخارجي ، لكنها قد يواجهون عقبة كبيرة من حيث الافتقار إلى الحماية القانونية لحقوق الملكية ومشاكل السيادة في الفضاء الخارجي. البحث هو عبارة عن دراسة تحليلية تصف المعاهدات الدولية والقوانين الوطنية المتعلقة بشرعية التعدين التجاري في الفضاء. تحلل الدراسة مدى توافق هذه القوانين الوطنية التي تسمح بالاستخدام التجاري للفضاء الخارجي مع اتفاقيات الفضاء الدولية المتاحة حاليًا. وكذلك تحلل الدراسة الأثر القانوني لانعدام السيادة على حقوق الملكية في الفضاء الخارجي. أهم ما توصلت إليه الدراسة هو ضرورة تعديل الاتفاقيات الفضائية الدولية المتاحه حاليا بما يتماشى مع التطورات التكنولوجية وتطلعات الإنسان ، مع بذل الجهود لإزالة الغموض في الاتفاقيات الدولية القائمة بشأن الاستغلال التجاري للفضاء الخارجي ، ودعوة دول العالم لصياغة نصوص الاتفاقيات الدولية الجديدة المتعلقة بالفضاء الخارجي أو مراجعة معاهدات الفضاء الخارجي القائمة ، مما يتيح لدول العالم الوصول إلى الفضاء الخارجي دون تمييز ، وزيادة التعاون فيما بينها في هذا الصدد.

الكلمات المفتاحية :التعدين الفضاء، الفضاء الخارجي، المعاهدات الفضاء الدولية، الاستغلال التجاري, القوانين الوطنية