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Use for the Benefit of All? The Double-Edged Implications of Commercial Activities under the Outer Space Treaty

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Abstract : *The 1967 Outer Space Treaty was drafted in the Cold War era, when States were the primary actors in outer space activities. Consequently, Article I's concept of "use" referred mainly to peaceful and scientific exploration by States. In the New Space Era, however, private actors such as SpaceX and Blue Origin have shifted space activities toward profit-driven commercialization. This development creates normative tension with the Treaty's principle that outer space shall be used "for the benefit of all countries," as commercial practices risk deepening inequality, enabling technological monopolies, and increasing environmental threats, particularly space debris. This research employs a normative juridical method through library-based analysis of international legal instruments, national regulations, and academic doctrines, complemented by comparison with other global commons regimes, notably the United Nations Convention on the Law of the Sea. The findings show that the current interpretation of "use" is inadequate for regulating multi-actor commercial activities. Therefore, an ius constituendum is required to redefine and limit "use" through fair benefit-sharing, proportional responsibility, and sustainable protection of the outer space environment, drawing inspiration from institutional models such as the International Seabed Authority.*

Keywords : *Benefit; Outer Space Treaty; Space Commercialization; Global Commons; UNCLOS*

Abstrak : Perumusan Outer Space Treaty 1967 dilakukan dalam konteks Perang Dingin ketika negara merupakan satu-satunya aktor yang memiliki kapasitas teknologi dan finansial untuk melakukan kegiatan antariksa. Dalam konteks tersebut, istilah "pemanfaatan" (use) dalam Pasal I dipahami terutama sebagai penggunaan ruang angkasa untuk tujuan damai dan ilmiah oleh negara. Memasuki New Space Era, munculnya aktor non-negara seperti SpaceX, Blue Origin, dan perusahaan swasta lain menggeser orientasi pemanfaatan ruang angkasa menjadi semakin komersial dan berorientasi keuntungan. Pergeseran ini menimbulkan ketegangan normatif antara prinsip "for the benefit of all countries" dan praktik komersialisasi yang justru memperdalam ketimpangan ekonomi, memunculkan risiko monopoli teknologi, serta meningkatkan

ancaman kerusakan lingkungan ruang angkasa melalui space debris. Penelitian ini merupakan penelitian yuridis normatif dengan pendekatan studi kepustakaan yang menganalisis instrumen hukum internasional, peraturan nasional, dan doktrin akademik, serta melakukan komparasi dengan rezim global commons lain, khususnya UNCLOS 1982. Hasil penelitian menunjukkan bahwa makna "pemanfaatan" dalam Outer Space Treaty tidak lagi memadai untuk mengatur aktivitas komersial ruang angkasa yang bersifat multiaktor, sehingga diperlukan ius constituendum yang menegaskan pembatasan pemanfaatan melalui mekanisme pembagian manfaat yang adil, tanggung jawab yang proporsional, dan perlindungan keberlanjutan lingkungan ruang angkasa dengan mencontoh model kelembagaan seperti International Seabed Authority dalam rezim dasar laut internasional.

Kata kunci : Keuntungan; Perjanjian Ruang Angkasa; Komersil Antariksa; Global Commons; UNCLOS

Introduction

Early space exploration during the Cold War constituted a manifestation of state-dominated geopolitical competition, as evidenced by the Soviet Union's successful launch of Sputnik 1 in 1957 and the Apollo lunar landings by the United States.[1] Space activities in this period were entirely dominated by states and were not oriented solely toward scientific interests, but also pursued strategic objectives related to the reinforcement of ideological imagery, the enhancement of defense capabilities through mastery of rocket technology and ballistic launch systems, and the demonstration of political and economic superiority on the international stage. This historical context significantly influenced the formulation of the 1967 Outer Space Treaty, which conceptualized outer space as a common domain (the "province of all mankind") with a peaceful and non-commercial orientation. However, advances in launch technology and the emergence of reusable rocket concepts have significantly reduced the cost of access to orbit.[2] This phenomenon has given rise to a new era known as the New Space Era, characterized by the entry of non-state actors such as SpaceX, Blue Origin, and Virgin Galactic.[3] Their activities include commercial satellite operations, space tourism, and plans for asteroid mining. This transformation has opened the way for non-state actors, such that the role of the state in outer space is no longer dominant. Consequently, the foundational assumptions of the Outer Space Treaty regarding legal subjects and the orientation of outer space use face highly significant challenges.[2]

Upon the advent of New Space Era, private companies such as SpaceX, Blue Origin, and Virgin Galactic have begun to assume strategic roles that were previously entirely dominated by states. These companies possess

[1]Beauvois, Erwan, dan Guillaume Thirion, "Partial Ownership for Outer Space Resources," Advances in Astronautics Science and Technology 3, no. 1 (2020), https://doi.org/10.1007/s42423-019-00042-0.
[2]Ansar, Atif, dan Bent Flyvbjerg, "A Platform Approach to Space Exploration," Social Science Research Network, January 2022, https://doi.org/10.2139/ssrn.4286513.
[3]Peng, K.-L., I. E. Kou, dan H. Chen, "Space Tourism Management and Service Design," dalam Springer Nature (2024), 149–164.

technological and financial capacities that enable them to conduct satellite launch activities independently, without reliance on state infrastructure. Moreover, developments in reusable rocket technology have further reduced launch costs, thereby expanding commercial opportunities in outer space.[4] Such private activities are no longer confined to scientific research, but have extended into more complex, profit-oriented economic sectors. This condition demonstrates that non-state actors now occupy positions equal to, and in some contexts even exceeding, those of states within the space ecosystem.[5] Accordingly, the dynamics of actors in outer space have undergone a significant transformation that has not yet been explicitly regulated by existing international legal instruments.

Globalization has further accelerated this transformation through the liberalization of technology markets, the integration of the global economy, and increasing private investment in the space industry.[6] Cross-border flows of capital and innovation enable private companies to develop large-scale space projects that remain beyond the reach of many developing countries. As a result, outer space is no longer understood merely as a shared scientific domain but has become a competitive and commercial global economic arena. This shift gives rise to normative challenges, as commercial orientations do not fully align with the principle of "for the benefit of all mankind" enshrined in the Outer Space Treaty. The Treaty's inability to anticipate the dominance of non-state actors reveals a gap between idealistic norms and contemporary economic realities. Therefore, a reassessment of the principles governing the utilization of outer space has become an urgent necessity to ensure their continued relevance to global developments.

One of the most crucial conceptual issues in this context concerns the meaning of the term "use" in Article I of the Outer Space Treaty. The Treaty affirms that the exploration and use of outer space shall be carried out "for the benefit of all countries," yet it does not provide a clear definition of the scope of activities encompassed by the words "use for the benefit and interest."[7] At the time of its drafting, use was synonymous with scientific research and peaceful use by states, and thus did not contemplate scenarios involving the dominance of global corporations. In contemporary practice, however, this term is increasingly invoked to legitimize profit-oriented commercial activities, as reflected in national legislations such as the United States Commercial Space Launch Competitiveness Act (2015), which grants private entities rights over extracted space resources without establishing any international benefit-sharing mechanism. Similar regulatory approaches adopted by Luxembourg and the United Arab Emirates further illustrate how commercial exploitation

[4]Wu, Hao, dan Zhiyu Zhang, "Analysis of the Development of Reusable Launch Vehicle Technology," Applied and Computational Engineering 11, no. 1 (2023), https://doi.org/10.54254/2755-2721/11/20230209.
[5]Bousedra, Kenza, "Downstream Space Activities in the New Space Era: Paradigm Shift and Evaluation Challenges," Space Policy 64 (2023), https://doi.org/10.1016/j.spacepol.2023.101553.
[6]Moranta, Sebastien, dan Annalisa Donati, "Space Ventures Europe 2018: Entrepreneurship and Private Investment in the European Space Sector," New Space 8, no. 1 (2020), https://doi.org/10.1089/space.2019.0020.
[7]Bohacek, Petr, Simon P. Worden, dan Kyran Grattan, "Benefit-Sharing as Investment Protection for Space Resource Utilization," New Space 10, no. 2 (2022), https://doi.org/10.1089/space.2021.0050.

of outer space is being normalized in the absence of a global redistributive framework. Such ambiguity creates interpretive space that may disadvantage developing countries. Accordingly, a reexamination of the concept of "use" has become an urgent requirement.

The equivocal surrounding the definition of "use" also poses various threats to global justice in the governance of outer space remains unclear. Commercial activities such as asteroid resource exploitation and the deployment of large-scale satellite constellations have the potential to generate economic inequalities among states. Furthermore, the increasing frequency of launches heightens the risk of space debris, which may endanger operational safety in orbit.[8] Legal fragmentation has also become increasingly evident through the emergence of national legislation granting private companies ownership rights over space resources, thereby conflicting with the spirit of the non-appropriation principle embodied in the Outer Space Treaty. The absence of an international mechanism capable of regulating commercial activities exacerbates this structural inequality. These risks demonstrate that the reinterpretation and renewal of the legal framework governing outer space can no longer be postponed.

In responding to these developments, it is essential to reassess the meaning of the word "use" by examining regulatory practices in other global commons regimes, particularly the United Nations Convention on the Law of the Sea (UNCLOS). The international law of the sea offers concrete regulatory mechanisms through the International Seabed Authority (ISA), which governs exploration, licensing, and benefit-sharing in a more operational manner. While previous studies have largely addressed space commercialization from technical or policy perspectives, this research contributes a normative legal framework by systematically comparing the Outer Space Treaty with the international seabed regime to conceptualize limits on commercial space activities. This study proposes a reinterpretation of "use for the benefit and interest" through a ius constituendum that integrates equitable benefit-sharing, proportional responsibility, and environmental sustainability. By doing so, this research provides a novel legal approach to addressing corporate monopolization and structural inequality in outer space governance, positioning the discussion not merely at a conceptual level but as a practical contribution to contemporary space law reform.

Methods

This research employs a normative juridical method (normative legal research), namely a form of legal research that emphasizes the analysis of applicable positive legal norms. The selection of this research type is based on the object of study, which consists of international legal instruments; accordingly, the analysis focuses on the texts of international treaties and relevant legal doctrines. The data used are secondary in nature, as the study concentrates on existing legal materials. These secondary data sources are classified into three categories: primary, secondary, and tertiary legal

[8]Martinez, Peter, "The UN COPUOS Guidelines for the Long-Term Sustainability of Outer Space Activities," Journal of Space Safety Engineering 8, no. 1 (2021), https://doi.org/10.1016/j.jsse.2021.02.003.

materials. Primary legal materials include international legal instruments such as the 1967 Outer Space Treaty, the 1982 United Nations Convention on the Law of the Sea, official United Nations reports and documents, and relevant national legislation, for example the U.S. Commercial Space Launch Competitiveness Act (2015). Secondary legal materials consist of books, scholarly literature, journal articles, dissertations, and academic opinions concerning space law and commercial activities. Tertiary legal materials comprise legal dictionaries, encyclopedias, and other supporting references.

Data collection in this study is carried out through library research. This method is chosen because the research is normative in nature and thus places greater emphasis on the examination of legal documents and academic literature. Library research is conducted by identifying and analyzing international legal texts, particularly the 1967 Outer Space Treaty, as well as relevant national regulations. In addition, academic literature, scholarly articles, legal doctrines, and decisions or reports of international institutions related to the utilization of outer space are reviewed. This process aims to obtain a broader perspective on how the term "use for the benefit and interest" is understood by various stakeholders, including practitioners, academics, and policymakers. The technique also includes the use of electronic sources, such as international legal databases and online journals. Through library research, the researcher can construct a comprehensive and relevant analytical framework to address the research questions.

The collected data are analyzed using a qualitative, descriptive–analytical method. The descriptive method is employed to outline the applicable legal provisions, particularly the principles embodied in the Outer Space Treaty.[9] Meanwhile, the analytical method is used to critically examine the ambiguity of the term "use" and to assess whether commercial space activities are consistent with the principle of "for the benefit of all mankind." The analysis is conducted by elaborating the norms contained in international treaties and then comparing them with national legal instruments, such as United States legislation, as well as with other international legal regimes beyond national jurisdiction, for instance the international seabed regime.[10] This approach enables the research to identify gaps between general, declaratory norms and the need for clearer technical regulations. Accordingly, the results of the analysis are expected to contribute to the development of ius constituendum in space law.

Result And Discussion

Interpreting the Term "Use for the Benefit and Interest" in the Outer Space Treaty in the Context of Commercial Space Activities

Before examining how the term "use for the benefit and interest" may be interpreted or construed within the Outer Space Treaty, it is first necessary to determine which actors are encompassed by the notion of this term under the Treaty. To gain a deeper understanding of the meaning of "use" in the context of space law, it is essential to begin with its lexical definition. According to the

[9]Jailani, M. S., dan D. A. Saksitha, "Teknik Analisis Data Kuantitatif dan Kualitatif dalam Penelitian Ilmiah," Jurnal Genta Mulia 15, no. 2 (2024): 79–91.
[10]Rifa'i, I. J., et al., Metodologi Penelitian Hukum (Bandung: Sada Kurnia Pustaka, 2023).

Kamus Besar Bahasa Indonesia (KBBI), "pemanfaatan" refers to the process, method, or act of making use of something, indicating the presence of an active element in employing an object for a particular purpose.[11] In its English equivalent, the Merriam-Webster Dictionary defines "utilization" as "the act of making practical and effective use of something," namely the act of using something effectively and functionally to achieve beneficial results. Meanwhile, in the legal domain, Black's Law Dictionary explains "utilization" or "use" as "the lawful or functional employment of something for its purpose," meaning the use of an object in a lawful manner and in accordance with its intended function.[12] From these definitions, it can be inferred that the term "utilization" encompasses an active, purposeful, and directed form of use, and, within a legal context, must be exercised within a framework of legality and legitimate interests.[13] This understanding is essential as a foundation for interpreting how "utilization" in the Outer Space Treaty should be construed—whether it is limited to peaceful and scientific purposes or also extends to commercial activities that remain subject to the principle of the "benefit of all mankind."

Recent studies have also highlighted the normative limitations of the Outer Space Treaty in regulating emerging commercial activities. Chairany, Chiquita, Yusra Fajriyah, and Ema Septaria (2024), in their analysis of space tourism under space transportation law, emphasize that existing international instruments, including the Outer Space Treaty, remain overly general and fail to provide explicit legal definitions for specific commercial activities. Their research identifies regulatory gaps concerning safety standards, liability allocation, and consumer protection in privately operated space tourism, underscoring the inadequacy of current space law frameworks in addressing private-sector participation. This finding is relevant to the present study, as it similarly demonstrates that the abstract formulation of "use" under the Outer Space Treaty creates legal uncertainty and permits commercial practices to develop without comprehensive international oversight.

Building upon this scholarship, this research is positioned as a preliminary normative analysis that extends beyond sector-specific regulation by examining the structural ambiguity of "use for the benefit and interest" itself. Rather than focusing solely on space tourism, this study adopts a broader global commons perspective by comparing the Outer Space Treaty with UNCLOS and its supplementary instruments, thereby proposing an early conceptual framework for integrating proportional responsibility, sustainability safeguards, and benefit-sharing principles into future ius constituendum.

In this study, "use for the benefit and interest" is not understood as a value-neutral permission to act, but as a standard that links the act of using outer space to its expected distributional and public-interest outcomes. It requires that the application of space capabilities, infrastructure, or resources generate

[11] Kementerian Pendidikan dan Kebudayaan Republik Indonesia, Kamus Besar Bahasa Indonesia (KBBI) (Jakarta: Kemendikbud, 2016).
[12]Merriam-Webster, "Book," Merriam-Webster Legal Dictionary, accessed 2022, https://www.merriam-webster.com/legal/minute%20book.
[13]Frey, Alexander Hamilton, dan Henry Campbell Black, "Black's Law Dictionary," University of Pennsylvania Law Review and American Law Register 82, no. 8 (1934), https://doi.org/10.2307/3308065.

tangible advantages (benefit) and be aligned with the needs, priorities, and legitimate concerns (interest) of relevant stakeholders, including States that lack space capabilities. Accordingly, the phrase emphasizes intentional and responsible use—where fairness, appropriateness, and sustainability are considered—rather than merely indicating that something is being used in an operational or profit-driven sense.

Normatively, the interpretation of the term "use" in the Outer Space Treaty was formulated at a time when states were the sole actors capable of conducting space activities. In 1967, the drafters of the Outer Space Treaty assumed that space activities would be undertaken exclusively by states for peaceful and scientific purposes. This assumption resulted in a definition of the term "use" that was general and idealistic, without accounting for the potential emergence of non-state actors. Under these conditions, utilization was not conceived as an activity requiring technical limitations, but rather as a moral principle intended to ensure fairness. However, rapid advancements in space technology have rendered this normative understanding inadequate. Consequently, the concept of use in the Outer Space Treaty was, from the outset, not designed to accommodate the multi-actor context of the New Space Era.

The entry of private companies into space activities constitutes the primary factor rendering the definition of use in the Outer Space Treaty increasingly obsolete. Today, companies such as SpaceX, Blue Origin, and OneWeb possess launch capabilities, satellite production capacities, and financial resources that surpass those of many developing countries.[14] This shift in power demonstrates that space activities are no longer state-centric but have transitioned toward a model dominated by global corporations. In such circumstances, a legal framework that centralizes responsibility on states no longer reflects on-the-ground realities. States are no longer the sole controllers of space use, necessitating an adjustment in the interpretation of use for the benefit and interest under the Outer Space Treaty to reflect a more complex actor structure. This transformation creates an imperative to reinterpret the term "use" in line with contemporary conditions.

The dominance of non-state actors also has normative implications for the principle of the "province of all mankind" enshrined in the Outer Space Treaty. In practice, private companies utilize outer space with a commercial orientation and in pursuit of corporate interests, rather than for the benefit of all states. Economic gains derived from commercial activities—such as satellite launches or resource exploration—are enjoyed primarily by developed countries and corporations based within their jurisdictions. Developing countries lack the technological and economic capacity to participate on an equal footing and thus remain passive beneficiaries. This situation illustrates that the use of outer space no longer aligns with the principle of equitable benefit distribution set forth in Article I of the Outer Space Treaty. Accordingly, a discrepancy emerges between the established norms and the realities of modern space use.

The inequality arising from commercial activities is manifested not only in the unjust distribution of benefits, but also in the risk of monopolization of space

[14] Pasaribu, Mia Gisella Kartika, dan Sandy Tanggono, "Penegakan Province of All Mankind dalam Komersialisasi Antariksa," Honeste Vivere 35, no. 2 (2025): 160–178.

technologies. Companies operating mega-constellations possess the potential to dominate specific orbital regions and monopolize global communication services.[15] Economic benefits concentrated in the hands of a few corporations further widen the gap between developed and developing countries. Developing states lack the capacity to compete or to access orbital resources on an equal basis, thereby reinforcing structural inequalities through the commercial use of outer space. In this context, space utilization no longer reflects a collective international objective but instead functions as a vehicle for economic growth for actors. This condition demonstrates the failure of the fundamental principles of the Outer Space Treaty to safeguard the inclusivity of benefits.

In addition to economic inequality, the use of outer space by commercial actors also poses risks of physical harm to the space environment. The increasing number of objects launched into orbit heightens the potential for space debris, which may compromise the operational safety of other satellites. This risk is further amplified by the proliferation of satellite constellation projects involving thousands of units deployed in low Earth orbit. Satellite fragmentation resulting from collisions may trigger cascading effects, such as the Kessler Syndrome scenario, threatening the long-term sustainability of space activities.[16] Such damage is global in nature and therefore cannot be addressed by individual states alone. Accordingly, intensified space use in the absence of global control mechanisms poses a serious threat to long-term sustainability.

The greater the number of activities conducted in outer space, the higher the probability of damage arising in the absence of clear limitations on space use. The increasing density of objects in low Earth orbit means that each new launch adds to the cumulative risk—not only for the launching entity's satellites, but also for all users of the same orbital regions. Under such conditions, the ambiguity of the term "use for the benefit and interest" in the Outer Space Treaty becomes problematic, as it allows states and corporations to continuously expand commercial activities without proportionate normative obligations corresponding to the risks generated. The absence of normative boundaries defining what constitutes acceptable use may push certain orbital regions toward saturation, where a single incident could trigger a global cascading failure. Thus, as commercial space activities intensify, the need to reinterpret the term "use for the benefit and interest" becomes increasingly urgent so that it encompasses dimensions of damage prevention and environmental sustainability, rather than merely the distribution of economic benefits among states.

From the perspective of legal responsibility, the 1972 Liability Convention establishes that states bear responsibility for damage caused by their space objects, including those launched by private companies.[17] This provision demonstrates that states continue to shoulder legal liability for economic activities conducted by corporations. This imbalance creates a contradiction

[15]Grotch, Steven E., "Mega-Constellations: Disrupting the Space Legal Order," Emory International Law Review 37 (2022): 101.
[16]Qureshi, Tahir, Shaeyuq Ahmad Shah, Abhilash Arun Sapre, dan Shalini Singh, "Space Debris: Legal Challenges toward a Sustainable Space Environment," New Space (2025).
[17]Ziemblicki, Bartosz, dan Yevgeniya Oralova, "Private Entities in Outer Space Activities: Liability Regime Reconsidered," Space Policy 56 (2021): 101427.

whereby non-state actors reap financial benefits, while international risks are borne by states. This situation underscores the fact that international legal instruments remain state-centric, despite the dramatic transformation of space activities. Consequently, a legal gap exists that must be addressed through the reaffirmation of the definition of use and the clarification of responsibility mechanisms. This gap illustrates that the current legal framework is insufficient to regulate the dynamics of space commercialization. A redefinition of use for the benefit and interest, coupled with responsibility mechanisms that explicitly link the intensity of usage to obligations of risk prevention and environmental protection in outer space, is therefore required.

The declining relevance of the term "use" under the Outer Space Treaty is further reflected in the absence of technical mechanisms capable of ensuring that space activities are conducted for the benefit of all countries.[18] The Treaty merely establishes general principles without providing concrete instruments to regulate commercial use. This lack of mechanisms creates broad interpretive space for developed states to enact national legislation legitimizing the exploitation of outer space resources. Such national policies often conflict with the non-appropriation principle embodied in the Outer Space Treaty and exacerbate inequalities among states. Under these circumstances, the term "use for the benefit and interest" no longer functions as a concept that guarantees global justice. Accordingly, the definition of the term use must be clarified to align with developments in modern law and technology.

Based on the foregoing analysis, it can be concluded that the concept of use in the Outer Space Treaty is no longer relevant, as it fails to reflect changes in actor structures, economic orientations, and technical risks associated with space activities. The term "use", originally designed as a collective concept, is now employed to justify commercial activities that generate global inequality. The environmental risks and legal responsibilities arising from commercial activities demonstrate the need for a more comprehensive international legal framework. A reinterpretation of the term "use" is necessary to ensure that the principle of the "province of all mankind" remains preserved within an increasingly competitive space economy. Accordingly, updating the meaning of the term "use" constitutes a fundamental basis for the development of ius constituendum responsive to the demands of the modern era. Such reform is essential to safeguarding sustainability and justice in the use of outer space.

Limiting the Utilization of Outer Space in the Context of Commercial Space Activities

The increasing openness of space activities to the private sector has generated concerns regarding the direction of outer space "use for the benefit and interest," which appears to be shifting from humanitarian principles toward predominantly commercial interests. While such activities undeniably reflect technological progress, they also give rise to a range of legal, economic, and ethical risks that warrant serious scrutiny. Foreseeable risks include the potential for economic monopolization by large corporations based in developed countries, the widening gap between developed and developing

[18] Dey, Anish, dan Jithin Jagadanandan, "Balancing Commercialization and Sustainability in Outer Space: Addressing New Challenges," Acta Astronautica 229 (2025): 895–900.

states, and the exploitation of space resources in the absence of equitable benefit-sharing mechanisms. At the same time, less predictable risks also emerge, such as potential jurisdictional conflicts between states arising from overlapping claims to resource outputs, as well as the possibility of damage to the space environment resulting from uncontrolled exploitation. The absence of global standards governing commercial space activities exacerbates legal uncertainty and creates conditions conducive to the fragmentation of international legal regimes.

One tangible manifestation of the commercial use of outer space is space tourism conducted by private companies such as Blue Origin and Virgin Galactic. Blue Origin successfully carried out its first paid suborbital flight in 2021 using the New Shepard vehicle, transporting non-astronaut passengers to the Kármán line to experience weightlessness. Virgin Galactic has similarly offered suborbital flights aboard its VSS Unity spaceplane for recreational purposes. These activities demonstrate that outer space is no longer reserved exclusively for scientific objectives, but has become a commercial arena.[19] Nevertheless, such practices raise a number of international legal issues, including the absence of global safety standards and uncertainty regarding legal liability in the event of accidents. The Outer Space Treaty merely affirms that states bear responsibility for all national activities in outer space, including those conducted by private entities, but does not explicitly regulate liability toward space tourists—whether such liability rests with the launching state, the state of registration, or the private company involved. This situation reveals the existence of unresolved legal gray areas within international space law.[20]

Beyond space tourism, another form of commercial use involves the exploitation of asteroid resources by companies such as Planetary Resources and Deep Space Industries in the United States. These companies have obtained legal legitimacy through the U.S. Commercial Space Launch Competitiveness Act (2015), which grants U.S. citizens and corporations the right to own space resources extracted through commercial activities.[21] This regulatory framework stands in clear tension with the principle of the "province of all mankind" as reflected in Article II of the Outer Space Treaty, as it opens the door to claims of ownership over celestial resources. When Luxembourg followed suit in 2017 by enacting the Law of 20 July 2017 on the Exploration and Use of Space Resources, and the United Arab Emirates later adopted Federal Decree Law No. 46 of 2023 on the Regulation of the Space Sector, the fragmentation of international law became increasingly apparent. As a consequence, economic benefits derived from outer space are enjoyed primarily by developed states and large corporations, while developing countries remain passive participants and secondary beneficiaries. This situation underscores the urgency of establishing international mechanisms capable of regulating commercial space activities in a fair and equitable manner, so that the principle of the "benefit of all mankind" is not undermined by narrow economic interests.

[19]Purisza, A., H. A. Mau, dan I. Ismail, "Kepastian Status Hukum atas Kegiatan Komersial di Ruang Angkasa oleh Pihak Swasta dan Bentuk Tanggung Jawabnya," Jurnal Sains, Ekonomi, Manajemen, Akuntansi dan Hukum 2, no. 1 (2025): 40–49.
[20]Atip Latipulhayat, Hukum Ruang Angkasa (Jakarta: Bumi Aksara, 2024).
[21]United States, U.S. Commercial Space Launch Competitiveness Act (2015).

The circumstances described above illustrate that the concept of "use for the benefit and interest" in the Outer Space Treaty, formulated in 1967, remains deeply influenced by a state-centric worldview.[22] At the time of its drafting, states were assumed to be the sole actors possessing the technological and financial capacity to conduct space activities, and the term "use" was therefore understood as state use for peaceful and scientific purposes. This assumption is reflected in Article VI of the Outer Space Treaty, which designates states as the primary bearers of responsibility for national activities in outer space, including those carried out by non-governmental entities.[23] In other words, the normative design of the Outer Space Treaty was never truly intended to address a multi-actor order such as that of the contemporary New Space Era, in which corporations are capable of acting on a level comparable to, and in some respects surpassing, that of states.[24] As a result, general principles such as the "province of all mankind" and "for the benefit of all countries" operate without adequate operational instruments to control the intensity of commercial and corporate use.

In this context, it is important to seek comparative references from other global commons regimes that developed in more recent historical phases and are no longer entirely state-centric.[25] The 1982 United Nations Convention on the Law of the Sea (UNCLOS) constitutes a particularly relevant instrument, as it was formulated after prolonged experiences of legal vacuum in the high seas and the international seabed.[26] Prior to UNCLOS, governance of the high seas was dominated by the principle of the "freedom of the high seas," which was soft and partial in nature, producing conditions similar to those currently found in outer space—open to all, yet lacking clear mechanisms for limitation and benefit-sharing. UNCLOS emerged as a "constitution for the oceans," systematically addressing these gaps through more detailed regulation of maritime zones, the rights and obligations of states, marine environmental protection, and a specific regime for the international seabed (the Area).

UNCLOS regulates the high seas and the Area as parts of areas beyond national jurisdiction (ABNJ), which cannot be subject to national sovereignty, but whose use must be directed toward "the benefit of mankind as a whole." This is reflected in Article 136 of UNCLOS, which designates the international seabed and its resources as the "common heritage of mankind," Article 137, which prohibits sovereignty claims over the Area, and Article 140, which mandates that activities in the Area be carried out for the benefit of all humanity, with particular consideration for developing countries. Unlike the Outer Space Treaty, which largely remains at the level of general principles, UNCLOS complements these principles with concrete institutional mechanisms through the establishment of the International Seabed Authority

[22]Lumentut, Dhea T., Yan G. Pelamonia, dan Johni R. V. Korwa, "Analisis Kebijakan Luar Negeri John Howard terhadap Imigran Ilegal di Australia," Jurnal Asia Pacific Studies 4, no. 1 (2020), https://doi.org/10.33541/japs.v4i1.1632.
[23]Ruhaeni, N., "Direct International Responsibility of Non-Governmental Entities in the Utilization of Outer Space," Padjadjaran Jurnal Ilmu Hukum 7, no. 1 (2020): 102–120.
[24]Tyasworo, N., dan M. N. Jumena, "Tanggung Jawab Perusahaan dalam Komersialisasi Ruang Angkasa dan Implikasinya terhadap Outer Space Treaty 1967," Uti Possidetis: Journal of International Law 2, no. 2 (2021): 131–151.
[25]Merdekawati, Agustina, Marsudi Triatmodjo, Irkham Afnan Trisandi Hasibuan, Vivin Purnamawati, dan Nahda Anisa Rahma, "Arti Penting Common Heritage of Mankind dalam Rezim Pengaturan Area dan Perkembangannya," Law Review 21, no. 3 (2022): 286.
[26]United Nations, United Nations Convention on the Law of the Sea (1982).

(ISA). The ISA is empowered to regulate exploration, grant exploitation licenses, supervise the activities of states and corporations, and design benefit-sharing mechanisms. This combination of the "common heritage of mankind" principle with an implementing institution renders UNCLOS a global commons regime that is not merely declaratory, but operational.

The differing historical contexts of their formation explain why UNCLOS is more advanced than the Outer Space Treaty in addressing legal gaps. The Outer Space Treaty was concluded at the height of the Cold War, when the space race was understood primarily as a strategic domain of inter-state competition, and its normative formulation was therefore oriented toward conflict prevention and the affirmation of non-sovereignty.[27] By contrast, UNCLOS was negotiated at a time when demands for global economic justice and the aspirations of developing countries had gained prominence, particularly through the New International Economic Order (NIEO) movement. [28]UNCLOS was consciously designed to respond to criticisms concerning unequal control over shared natural resources, incorporating obligations related to benefit-sharing, technology transfer, and the empowerment of developing states into its text.[29] In this sense, while the Outer Space Treaty may be regarded as a "first-generation" global commons regime that remains highly state-centric and declaratory, UNCLOS represents a "second-generation" regime that seeks to address legal gaps through more concrete institutional and technical mechanisms.[30]

On this basis, this research employs UNCLOS as a comparative regime for the formulation of ius constituendum governing the use of outer space. Conceptually, both outer space and the international seabed constitute areas beyond national jurisdiction grounded in principles of non-sovereignty and common benefit. However, despite structural, technological, and geopolitical differences between maritime and space domains, UNCLOS demonstrates how abstract principles can be operationalized through concrete institutional mechanisms. In particular, elements such as an international supervisory authority, licensing systems for commercial activities, monitoring obligations, and benefit-sharing arrangements administered by the International Seabed Authority offer a reference framework for addressing corporate dominance and unequal access. While these mechanisms cannot be transferred mechanically to outer space governance, they provide normative guidance for developing proportional responsibility, environmental safeguards, and equitable distribution models. Accordingly, this study proposes adapting selected institutional features of UNCLOS to reinterpret "use for the benefit and interest" under the Outer Space Treaty, not only to prevent

[27]Meirizal, Ade, Putu Prisca, Lusiani, Nurhalizah Sarah, "United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) dalam Upaya Antisipasi Militerisasi di Luar Angkasa," Jurnal Ilmiah Hubungan Internasional Fajar 2, no. 1 (tahun tidak tersedia): 16–25.
[28] Svetličič, Marjan, "Lessons of the New International Economic Order for the Contemporary World Economy," Teorija in Praksa 59, no. 2 (2022), https://doi.org/10.51936/tip.59.2.411-442.
[29]Prastyo, Muhammad Ariff Dwi, "Keadilan Distribusi Teknologi dalam Eksploitasi Seabed: Studi Kasus Pelaksanaan Kewajiban Transfer Teknologi di Nauru Island Berdasarkan UNCLOS," UNES Law Review 8, no. 1 (2025): 242–251.
[30]Farhan, Muhammad, "Implementasi United Nations Convention on the Law of the Sea (UNCLOS) dalam Pengaturan Lalu Lintas Kapal Asing di Wilayah Perairan Indonesia," UNES Law Review 8, no. 1 (2025): 29–40.

monopolization but also to articulate enforceable obligations for sustainability and global equity.

Beyond UNCLOS, recent developments in global commons governance further demonstrate how abstract principles of "use" have evolved into operational regulatory frameworks. The Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement) strengthens this evolution by introducing concrete obligations concerning environmental impact assessment, capacity building, technology transfer, and equitable benefit-sharing in areas beyond national jurisdiction. Unlike the Outer Space Treaty, which remains largely declaratory, the BBNJ Agreement translates the concept of common benefit into measurable procedural duties and institutional coordination mechanisms.

This development illustrates a progressive legal trend in which the notion of "use" is no longer interpreted merely as freedom of access, but as conditional utilization subject to sustainability requirements and distributive justice. In contrast, Article I of the Outer Space Treaty still lacks comparable implementing instruments. This preliminary analysis therefore argues that the reinterpretation of "use for the benefit and interest" in space law should draw not only from UNCLOS but also from the BBNJ framework, particularly in embedding environmental safeguards and benefit-sharing obligations as integral components of lawful space utilization.

Conclusion

The meaning of "use for the benefit and interest" in Article I of the Outer Space Treaty was originally formed within a state-centric paradigm in which outer space activities were presumed to be conducted primarily by States for peaceful and scientific purposes. In the New Space Era, however, the rapid expansion of profit-driven activities by powerful private actors has widened the gap between the Treaty's normative promise of common benefit and the realities of unequal access, monopoly risks, regulatory fragmentation, and mounting environmental threats—particularly the long-term safety implications of space debris. This study therefore argues that "use" should not be treated as a value-neutral freedom of access, but as conditional utilization that must be assessed against distributive fairness, proportional responsibility, and sustainability safeguards. The absence of operational mechanisms in the current treaty framework reinforces the urgency of reinterpretation and normative development to keep Article I meaningful under a multi-actor commercial order.

Building on a normative juridical method, this research develops an ius constituendum framework by drawing comparative guidance from global commons regimes that have moved beyond purely declaratory principles. From UNCLOS—particularly the international seabed regime—this study highlights how common-benefit norms can be operationalized through institutional supervision, authorization or licensing logics, monitoring duties, and structured benefit-sharing arrangements. In addition, the BBNJ Agreement further illustrates a legal trend in which common benefit is translated into measurable procedural obligations, including environmental

impact assessment, capacity building, and technology transfer—elements that are still largely absent from the Outer Space Treaty's implementation architecture. While these mechanisms cannot be transplanted mechanically due to the distinctive technical and geopolitical characteristics of outer space, they provide concrete normative guidance for designing enforceable limits on commercial utilization. Redefining "use for the benefit and interest" along these lines is essential to preserving outer space as a global commons oriented toward equity, accountability, and long-term environmental protection.

Recommendation

This study recommends that States and relevant international stakeholders strengthen the practical meaning of "use for the benefit and interest" under the Outer Space Treaty so that it is no longer treated as a general and idealistic principle detached from contemporary commercial realities. In the New Space Era, the rise of profit-oriented, multi-actor activities requires that "use" be understood as conditional utilization that must reflect distributive outcomes and public-interest objectives, particularly in preventing economic inequality and corporate monopolization in outer space governance. Accordingly, interpretive and policy efforts should prioritize the development of clearer normative boundaries on acceptable "use," ensuring that the principle that outer space shall benefit all countries is translated into operational expectations that can guide authorization and supervision of commercial space activities.

In line with the need for reinterpretation and normative development identified in this study, a key recommendation is the formulation of an ius constituendum that supports abstract global commons principles with concrete institutional structures. Drawing on comparative insights from UNCLOS, the international legal framework for outer space should progressively adopt functional features such as supervisory arrangements, licensing mechanisms, monitoring obligations, and benefit-sharing models, while recognizing that these elements cannot be directly transplanted due to structural and technological differences between maritime and space domains. The emphasis should therefore be placed on institutional design that can curb legal fragmentation, reduce unilateral regulatory practices, and create more coherent governance over commercial utilization, including space resource activities and large-scale satellite constellations.

This research further recommends that benefit-sharing models be developed as an integral component of lawful and responsible space utilization, rather than as an optional policy aspiration. Such models should be oriented toward equitable distribution frameworks that address unequal access between developed and developing States and should be structured to prevent disproportionate concentration of benefits within a small number of corporate actors. At the national level, licensing and supervision of private activities should be aligned with these benefit-sharing expectations so that domestic authorization regimes do not unintentionally intensify structural inequality or legitimize monopolization that contradicts the cooperative orientation of the Outer Space Treaty.

Finally, the study recommends that sustainability safeguards be treated as a necessary condition of "use for the benefit and interest," particularly in response to environmental risks arising from space debris and the long-term sustainability of space activities. Given that intensified commercial utilization generates collective risks that cannot be addressed by individual States alone, international and national governance should link the intensity of usage to proportional responsibility in risk prevention and environmental protection in outer space. Future research may elaborate more detailed institutional and procedural options to operationalize these safeguards within ius constituendum, including mechanisms for oversight, compliance monitoring, and accountability that support justice, accountability, and long-term environmental protection as core objectives of outer space governance.

References

Ansar, Atif, dan Bent Flyvbjerg, "A Platform Approach to Space Exploration," Social Science Research Network, January 2022, https://doi.org/10.2139/ssrn.4286513.

Atip Latipulhayat, Hukum Ruang Angkasa (Jakarta: Bumi Aksara, 2024).

Auliarahma, Amadea Nurul, "Pengaturan Pemanfaatan Ruang Angkasa Menurut Perjanjian Internasional Space Treaty 1967," Lex Administratum 9, no. 7 (2021).

Beauvois, Erwan, dan Guillaume Thirion, "Partial Ownership for Outer Space Resources," Advances in Astronautics Science and Technology 3, no. 1 (2020), https://doi.org/10.1007/s42423-019-00042-0.

Bohacek, Petr, Simon P. Worden, dan Kyran Grattan, "Benefit-Sharing as Investment Protection for Space Resource Utilization," New Space 10, no. 2 (2022), https://doi.org/10.1089/space.2021.0050.

Bousedra, Kenza, "Downstream Space Activities in the New Space Era: Paradigm Shift and Evaluation Challenges," Space Policy 64 (2023), https://doi.org/10.1016/j.spacepol.2023.101553.

Dey, Anish, dan Jithin Jagadanandan, "Balancing Commercialization and Sustainability in Outer Space: Addressing New Challenges," Acta Astronautica 229 (2025): 895–900.

Farhan, Muhammad, "Implementasi United Nations Convention on the Law of the Sea (UNCLOS) dalam Pengaturan Lalu Lintas Kapal Asing di Wilayah Perairan Indonesia," UNES Law Review 8, no. 1 (2025): 29–40.

Frey, Alexander Hamilton, dan Henry Campbell Black, "Black's Law Dictionary," University of Pennsylvania Law Review and American Law Register 82, no. 8 (1934), https://doi.org/10.2307/3308065.

Grotch, Steven E., "Mega-Constellations: Disrupting the Space Legal Order," Emory International Law Review 37 (2022): 101.

Jailani, M. S., dan D. A. Saksitha, "Teknik Analisis Data Kuantitatif dan Kualitatif dalam Penelitian Ilmiah," Jurnal Genta Mulia 15, no. 2 (2024): 79–91.

Kementerian Pendidikan dan Kebudayaan Republik Indonesia, Kamus Besar Bahasa Indonesia (KBBI) (Jakarta: Kemendikbud, 2016).

Lumentut, Dhea T., Yan G. Pelamonia, dan Johni R. V. Korwa, "Analisis Kebijakan Luar Negeri John Howard terhadap Imigran Ilegal di Australia," Jurnal Asia Pacific Studies 4, no. 1 (2020), https://doi.org/10.33541/japs.v4i1.1632.

Martinez, Peter, "The UN COPUOS Guidelines for the Long-Term Sustainability of Outer Space Activities," Journal of Space Safety Engineering 8, no. 1 (2021), https://doi.org/10.1016/j.jsse.2021.02.003.

Merdekawati, Agustina, Marsudi Triatmodjo, Irkham Afnan Trisandi Hasibuan, Vivin Purnamawati, dan Nahda Anisa Rahma, "Arti Penting Common Heritage of Mankind dalam Rezim Pengaturan Area dan Perkembangannya," Law Review 21, no. 3 (2022): 286.

Meirizal, Ade, Putu Prisca, Lusiani, Nurhalizah Sarah, "United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) dalam Upaya Antisipasi Militerisasi di Luar Angkasa," Jurnal Ilmiah Hubungan Internasional Fajar 2, no. 1 (tahun tidak tersedia): 16–25.

Merriam-Webster, "Book," Merriam-Webster Legal Dictionary, accessed 2022, https://www.merriam-webster.com/legal/minute%20book.

Moranta, Sebastien, dan Annalisa Donati, "Space Ventures Europe 2018: Entrepreneurship and Private Investment in the European Space Sector," New Space 8, no. 1 (2020), https://doi.org/10.1089/space.2019.0020.

Pasaribu, Mia Gisella Kartika, dan Sandy Tanggono, "Penegakan Province of All Mankind dalam Komersialisasi Antariksa," Honeste Vivere 35, no. 2 (2025): 160–178.

Peng, K.-L., I. E. Kou, dan H. Chen, "Space Tourism Management and Service Design," dalam Springer Nature (2024), 149–164.

Prastyo, Muhammad Ariff Dwi, "Keadilan Distribusi Teknologi dalam Eksploitasi Seabed: Studi Kasus Pelaksanaan Kewajiban Transfer Teknologi di Nauru Island Berdasarkan UNCLOS," UNES Law Review 8, no. 1 (2025): 242–251.

Purisza, A., H. A. Mau, dan I. Ismail, "Kepastian Status Hukum atas Kegiatan Komersial di Ruang Angkasa oleh Pihak Swasta dan Bentuk Tanggung Jawabnya," Jurnal Sains, Ekonomi, Manajemen, Akuntansi dan Hukum 2, no. 1 (2025): 40–49.

Qureshi, Tahir, Shaeyuq Ahmad Shah, Abhilash Arun Sapre, dan Shalini Singh, "Space Debris: Legal Challenges toward a Sustainable Space Environment," New Space (2025).

Rifa'i, I. J., et al., Metodologi Penelitian Hukum (Bandung: Sada Kurnia Pustaka, 2023).

Ruhaeni, N., "Direct International Responsibility of Non-Governmental Entities in the Utilization of Outer Space," Padjadjaran Jurnal Ilmu Hukum 7, no. 1 (2020): 102–120.

Soebagjo, P. E., dan G. P. Marjono, "The Ending of Cold War" (2023).

Svetličič, Marjan, "Lessons of the New International Economic Order for the Contemporary World Economy," Teorija in Praksa 59, no. 2 (2022), https://doi.org/10.51936/tip.59.2.411-442.

Tyasworo, N., dan M. N. Jumena, "Tanggung Jawab Perusahaan dalam Komersialisasi Ruang Angkasa dan Implikasinya terhadap Outer Space Treaty 1967," Uti Possidetis: Journal of International Law 2, no. 2 (2021): 131–151.

United States, U.S. Commercial Space Launch Competitiveness Act (2015).

United Nations, United Nations Convention on the Law of the Sea (1982).

Wu, Hao, dan Zhiyu Zhang, "Analysis of the Development of Reusable Launch Vehicle Technology," Applied and Computational Engineering 11, no. 1 (2023), https://doi.org/10.54254/2755-2721/11/20230209.

Ziemblicki, Bartosz, dan Yevgeniya Oralova, "Private Entities in Outer Space Activities: Liability Regime Reconsidered," Space Policy 56 (2021): 101427.