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Space for the Global South: Navigating a New Frontier of International Collaboration

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Abstract

The exploration and use of space, a domain of virtually infinite resources, is governed by the foundational principle that its benefits should be open to all humanity. This principle, enshrined in the Outer Space Treaty (OST) of 1967, mandates international cooperation for the peaceful and sustainable use of space. However, a significant disparity exists between this ideal and the current reality. The development and exploitation of space technology remain concentrated within a few nations in the Global North. This condition creates a dependency for nations in the Global South, which despite representing over 80% of the world's population and 40% of its GDP are often marginalised in the space sector due to gaps in scientific advancement and economic capacity. The space-based technologies are increasingly critical for daily life and for achieving the United Nations Sustainable Development Goals (SDGs), bridging this divide is imperative. This study contends that states in the Global South can mitigate this dependency by formulating and implementing national space policies aligned with the OST's utilitarian and cooperative principles. Employing a qualitative research methodology, this study analyses secondary data and multiple case studies of national space programmes submitted by Global South nations to the United Nations Office for Outer Space Affairs (UNOOSA). The research investigates how these nations foster international collaboration and reduce their reliance on the Global North. The findings indicate that well-articulated national space programmes not only enhance South-South cooperation but also attract foreign direct investment, thereby contributing to national economic development. Ultimately, this research demonstrates that endogenous space technology development in the Global South, coupled with strategic international partnerships is key to harnessing local resources and advancing the equitable benefits of space for all.

Keywords: global south, OST, South-South Cooperation, Space, Utilitarianism

1. Introduction

Legal recognition recognises the cosmos as a "global common" intended for the benefit and

use of all of humanity. This foundational principle establishes space as a province of mankind, and it is enshrined in the motto of the United Nations Office for Outer Space Affairs (UNOOSA) (UN, 2017). However, the historical trajectory of space exploration reveals a stark contrast to this inclusive ideal. Originating in the technological ferment of the Western Industrial Revolution, the capabilities that would enable spaceflight were first tragically honed in the crucible of the two World Wars. The subsequent Cold War, characterised by an intense arms and technology race between the Union of Soviet Socialist Republics (USSR) and the United States of America (USA), directly catalysed humanity's first forays beyond Earth's atmosphere (Lowe, 2013). The USSR's launch of Sputnik in 1957, swiftly followed by American achievements, inaugurated the space age, framing it initially as a strategic contest for geopolitical supremacy (Oyewole, 2017). In the decades that followed, other nations including the United Kingdom, France, Japan, China, and India introduced their own space programs, recognising the profound potential of space technology to drive socioeconomic development and India also enter into big boys club of space race (Khanna, 2018). The technological advancement for establish supremacy and dominance is the realist demand to establish peace and security in the world as bipolar world is stable than multipolar world (Little, 2017). The Victory through space power in the outer space is applicable and space race is visible in the contemporary time. This proliferation of state actors, and more recently the explosive growth of private commercial entities like SpaceX and Blue Origin, has fundamentally transformed the space sector (Dolman, 2020). This multi-actor landscape, while fostering innovation, has simultaneously generated an urgent need for a robust regulatory framework to govern activities in an increasingly congested and contested domain (Rementeria, 2022). In response, the international community, under the auspices of UNOOSA, developed a corpus of International Space Law, primarily constituted by five core treaties: the Outer Space Treaty 1967, the Rescue Agreement 1968, the Liability Convention 1972, the Registration Convention 1976, and the Moon Agreement 1979. These instruments collectively form the legal bedrock for space activities, providing the essential principles upon which states are expected to formulate their national space program (UN, 2017). Despite this legal architecture founded on the principle of equity, a profound and persistent disparity defines the contemporary space ecosystem. A select group of nations, predominantly from the global north, continues to dominate the sector, controlling the commanding heights of technology, capital, and infrastructure. Because of this imbalance, many countries in the global south are now dependent on others for scientific progress, technology sharing, satellite manufacturing, and launch capabilities (Giri & Hiebert, 2024). This dependency exists in stark contradiction to the explicit language of the Outer Space Treaty of 1967, which mandates that the exploration and use of outer space "shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development (UN, 2017). The global south, representing a significant majority of the world's population and a growing share of its economic output, remains largely on the sidelines of this new frontier, consumers rather than co-creators of its benefits. Still, the paradigm is starting to change. A few leading nations from the global south, notably China and India, have demonstrated remarkable capability in developing end-to-end space programmes. They have achieved milestones in satellite technology, lunar exploration, and resource exploitation, proving that spacefaring prowess is no longer the exclusive domain of the traditional Western powers (Oyewole, 2017). These

nations are not only advancing their own socio-economic agendas but are also emerging as potential partners for other developing countries. The global south developing countries coming together to promote south-south cooperation with its triangular cooperation, and south-south cooperation reduce the dependency on the global north (UNOSSC, n.d.). This evolution occurs within a space industry that has projected to grow a global space economic behemoth valued at over $1.8 trillion by 2035 and is increasingly characterised by space commercialisation (WEF, 2024). Private actors now play a crucial role in reducing launch costs, delivering space-based applications, driving innovation, and further democratising access to space-based services. However, rapid growth and commercialisation bring forth new challenges that underscore the continuing relevance of international law and collaboration (Dobos, 2022). The exponential increase in space activities has led to the proliferation of space debris, a hazardous and global problem that threatens the orbital environment and the long-term sustainability of space operations (IAF, n.d.). This challenge highlights the critical demand for effective governance and regulation to ensure that all space actors, public and private, operate responsibly. It is within this multi-layered relationship between historical inequality, emergent potential, and pressing global challenges that this research paper situates itself (UN, n.d.). This paper will critically examine the pathways through which nations of the global south can overcome historical dependencies and actively participate in the space sector. It will investigate the role of international collaborative frameworks, both existing and nascent, in facilitating technology transfer, capacity building, and equitable partnerships. By analysing the strategies of successful spacefaring nations in the global south and assessing the efficacy of current international space law in addressing the needs of developing countries, this study aims to contribute a perspective on how the foundational principle of space as a "global common" can be translated from a legal tenet into a tangible reality for all of humankind.

1.1 International Space Treaties

Space is global common and its peaceful exploration and use open to all humankind. There are many spaces faring nation’s majority from the global north, and to reach its benefit to all states, the United Nations formulated five International Space Treaties to regulate all states on equality basis and deliver space-based services to all including the global south developing countries. Five such space treaties which is guiding principles for the national space program for new space actor in space industry and regulate the commercial activity of space, as private space actors also entered in space industry (UN, 2017). The five space treaties are guiding principles for states to formulate the national space program for regulating private space actors. Treaties empower the global south developing countries to join the space industry through its capacity building program, workshops, international conferences space education, and skills training as mandate of OST to promote international cooperation (Kojima, A. et al., 2018)

I. Outer Space Treaty (OST) 1967: OST opened for signature on 1967 and came into force on 1968, on the Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies. Article 1 of OST mention the Exploration and Use of Outer Space shall be carried out for the benefit and in the interest of all countries and states shall facilitate and encourage international cooperation (UN, 2017).

II. Rescue Agreement 1968: Agreement on the Rescue Astronauts, the return of astronauts and the return of Objects Launched into Outer Space. The rescue agreement focus on humanitarian ground and facilitating rescue services to humanity (UN, 2017).

III. Liability Convention 1972: Convention on International Liability for Damage caused by Space Objects adopted on 1971 and entered into force on 1972. The treaty make liable to pay the party if damage caused by the Space objects and the United Nations mediate to pay the compensation to effected party. There is provision in the treaty to resolve the liability conflict peacefully (UN, 2017).

IV. Registration Convention 1976: Convention on Registration of Objects Launched into Outer Space entered into force on 1976 after Liability Convention. Both are important for paying the compensation to effected party by space objects and registration of objects also maintain the record by the UN (UN, 2017).

V. Moon Agreement 1979: Agreement Governing the Activity of States on the Moon and Other Celestial Bodies adopted and signed on 1979 and entered into force on 1984. The agreement endorses the state to not claim any sovereignty on the Moon and Other Celestial bodies and these are global common. Article 1 indicates the agreement relating to the Moon shall also apply to other celestial bodies within the solar system, other than the Earth (UN, 2017).

The United Nations Office for Outer Space Affairs (UNOOSA) during 50th anniversary of UNISPACE+50 Conference, defined four pillars and Space Accessibility one of them. Under the Space Accessibility pillar UNOOSA intends to enable all communities, particularly developing countries to use and benefit from space technologies and applications (Kojima, A. et al., 2018)

1.2 Utilitarianism of Space

The peaceful use of space is a fundamental objective of international space treaties, which aim to promote its benefits for all humanity. In the contemporary world, space-based applications are utilized extensively by governments, private actors, and the public. These applications are directly or indirectly integral to critical sectors such as health, education, communication, navigation, disaster management, and climate monitoring.

This widespread benefit aligns with the principles of Utilitarian theory, which emphasizes providing the "greatest good for the greatest number" a concept initially framed in quantitative terms by Jeremy Bentham. Bentham postulated that human nature is driven by the qualitative impulses of avoiding pain and seeking pleasure. Within this framework, utility is defined as the property in any object, action, or policy that tends to produce benefit, advantage, pleasure, or happiness, or to prevent mischief, pain, evil, or unhappiness for the individual or community in question (Oyewole, 2024).

Space offers immense utility through its diverse applications, which have become integral to modern society. Key domains of its application include:

- **Communication:** Satellite technology is fundamental to global communications, directly enabling mobile networks, television, radio broadcasting, messaging, and

internet services. These systems form the backbone of daily life and international connectivity.

- **Navigation:** Space-based navigation systems, such as GPS, are critical for optimizing travel and logistics. They enhance the efficiency and safety of sea trade, road transport, rail transportation, and air routes by providing precise, real-time positioning.
- **Disaster Management:** Space-based tools are vital for both forecasting disasters and coordinating response efforts. The accuracy of meteorological forecasting has reached approximately 80%, enabling early warnings. Furthermore, technologies like Synthetic Aperture Radar and dedicated Search and Rescue satellites facilitate immediate relief operations in the aftermath of natural disasters.
- **Health:** Supporting the United Nations' Sustainable Development Goals, space applications have revolutionized healthcare delivery through telemedicine and tele-education. These borderless services provide critical medical expertise to remote and underserved populations, with demonstrated success in facilitating cross-border healthcare initiatives.
- **Earth Observation and Geographic Information Systems (GIS):** Space technology provides a unique capability for continuous planetary monitoring. Earth observation satellites supply essential data for weather forecasting, high-resolution imaging, and visualisation, which are crucial for environmental monitoring, urban planning, and emergency response management.

1.3 The global South Space faring nations

The capability to manufacture, successfully launch, and place satellites into orbit is no longer confined to a handful of nations. A growing number of spacefaring nations from the Global South are now globally recognized for their technological prowess and capacity to harness space resources. China and India, for instance, are prominent examples from the Global South with demonstrated capabilities in the peaceful exploration of resources beyond Earth (UN News, 2025).

The term "Global South" itself was coined by political activist Carl Oglesby in 1969 and gained prominence during the 1980s, a period when dependency theory critiqued the Global North for the exploitation of resources. It is used interchangeably with "Third World" and "developing countries" to represent nations across Africa, Asia, and Latin America (Kenny, n.d.).

While space exploration was once the exclusive domain of technologically advanced countries in the Global North, outer space is now within the reach of emerging nations. Despite facing significant and uneven challenges, the Global South's economic influence is growing substantially. Its share of world GDP rose to 42% in 2023, a significant increase from 19% in 1990. Furthermore, the Global South accounts for 44% of global merchandise exports and 65% of foreign direct investment inflows (UNCTAD report, 2024).

1.4 The global south countries - the UNOOSA

The space industry is experiencing exponential growth, with private actors playing an increasingly vital role in the use and exploration of space resources. While the United Nations Office for Outer Space Affairs (UNOOSA) mandates the peaceful exploration of space, the entry of private entities necessitates the formulation of robust national space programs to regulate the industry effectively (UN News, n.d.).

Despite the presence of many developing countries in the Global South, only a few possess the capability to launch a satellite into orbit. Given the high costs associated with the space sector, private sector participation is essential for growth. Globally, 44 states have established a space program or submitted space-related documents to UNOOSA; of these, only 22 are from the Global South (UNOOSA, n.d.).

For the purpose of this analysis, the "Global South" refers to nations within Asia, Africa, and Latin America (Britannica, n.d.). Among the countries from these regions that have submitted documentation to UNOOSA, the distribution is as follows:

- **Asia (8):** Armenia, China, Indonesia, Japan, Kazakhstan, Pakistan, the Philippines, and Turkiye.
- **Africa (8):** Algeria, Djibouti, Ghana, Kenya, Namibia, Nigeria, South Africa, and Tunisia.
- **Latin America (6):** Argentina, Brazil, Chile, Colombia, Ecuador, and Peru.

2. Proposed Methodology

The proposed study has taken A Mixed-Methods Approach combining Qualitative case study analysis with Quantitative descriptive network analysis. The sample selection for the study is the global south countries that have their national space program and data as both secondary and primary in nature. Qualitative methods will adopt the case study analysis from the global south countries that submitted their national space program or any space related agreement to the UN and established player, emerging player and new entrant in the space industry. The data sources for the case studies are Document Analysis which analysed the policy documents, national space program, and multilateral agreements of selected countries. Also the content analysis has examined the media reports, speeches by political leaders, and transcripts from international forums.

Theoretical Framework

The research paper is guided by the International Relations theories such as Dependency theory and Complex interdependency. As dependency theory argue the dominance of the global north in scientific advancement and global south has dependency, and in the space technology this gap visible and depended for their satellite manufacture to launch into orbit. The complex interdependence also applicable as cooperation in one area will lead cooperation in another area as Kohane and Nye proposed and collaboration is driven by Mutual economic and scientific benefit, not just power politics. Space industry has spillover effect in its application and produce employment in multiple areas.The neorealist and neoliberal have one structural

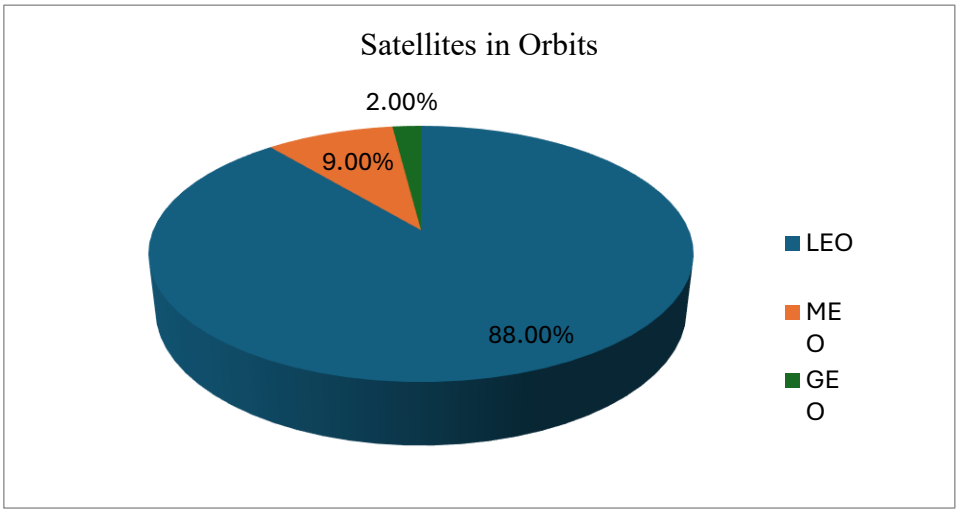
and others institutional approach to international cooperation. Technological advancement is the need of time to harness technology for space use and exploration.

3. Results

The United Nations Office for Outer Space Affairs (UNOOSA) holds the mandate to promote international cooperation and maintain the space industry for peaceful use and exploration. Under the Registration Convention, approximately 88% of all launched objects including satellites, probes, landers, crewed spacecraft, and space station elements in Earth orbit or beyond have been registered with the UN Secretary-General (UNOOSA, n.d.).

The global space industry is experiencing exponential growth, significantly boosting the economic sector through its spillover effects. The industry was valued at approximately $613 billion in 2024 and is projected to reach $1.8 trillion by 2035. Commercial activities by private space actors constitute the majority of this economic activity, accounting for approximately 78% of the total (McKinsey & Company, 2024).

As of May 2025, a total of 12,149 active satellites are orbiting the Earth. These are deployed across three primary orbital regimes: Low Earth Orbit (LEO), Medium Earth Orbit (MEO), and Geostationary Orbit (GEO). LEO is the most densely populated; accounting for 88% of all active satellites, while GEO and MEO account for only 9% and 2%, respectively. This distribution underscores the current dominance of small satellites in LEO over the larger, traditional satellites typically deployed in GEO and MEO, as illustrated in the chart below (Nano Avionics, accessed October 2025).



Sources: https://nanoavionics.com/blog/how-many-satellites-are-in-space/

Accessed: 2025, November 10

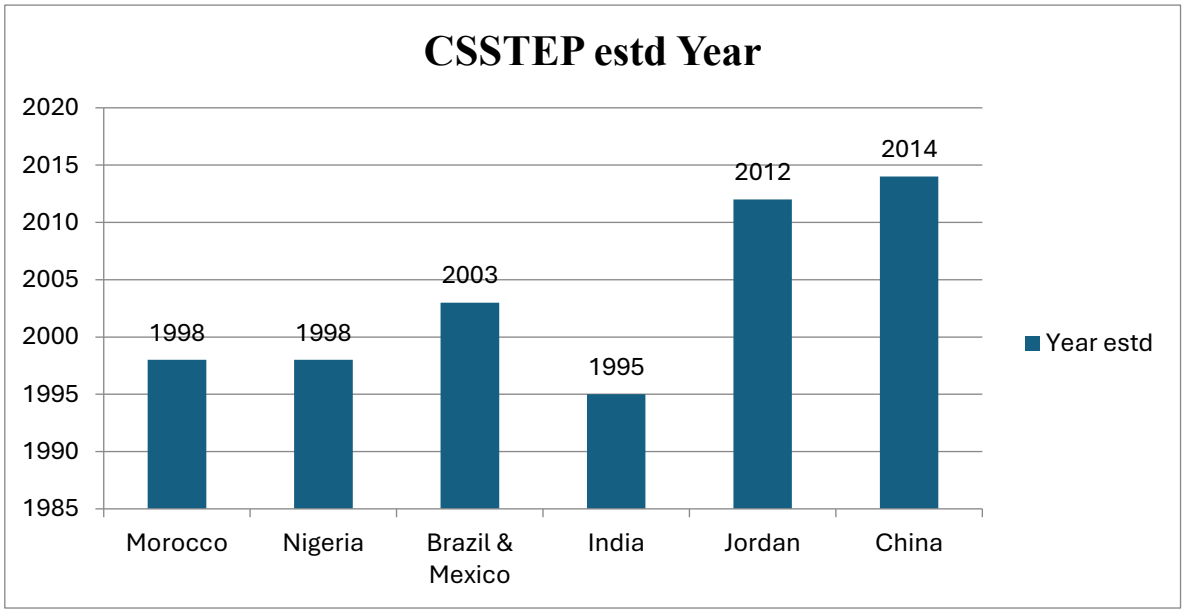
LEO: Low Earth Orbit

MEO: Medium Earth Orbit

GEO: Geostationary Orbit

To promote the principle of "space for all" and enhance global space accessibility, the United Nations Office for Outer Space Affairs (UNOOSA) conducts space outreach activities in various regions of the Global South. A key initiative is the Space Science and Technology Education programme, which is designed for the benefit of developing countries.

In support of this mission, six affiliated institutions were established in collaboration with the United Nations between 1995 and 2014. These centres are distributed across three continents three in Asia, two in Africa, and one in South America with the objective of imparting space-related knowledge and fostering international cooperation (UNOOSA, n.d.).



Sources: https://www.unoosa.org/oosa/en/ourwork/psa/regional-centres/index.html

Accessed: 2025, November 10

CSSTEAP: Centre for Space Science and Technology Education Program Affiliated to the United Nations

The Centre for Space Science and Technology Education for Asia and the Pacific, established in India in 1995, was founded to serve the region and has delivered significant benefits. Between 1996 and 2006, the Centre conducted 23 postgraduate courses and 16 short-term courses in various space science and technology disciplines. These programmes benefited approximately 643 participants primarily from Asia and the Pacific. The beneficiary base extended beyond the region, also including 26 participants from 16 other countries (COPUOS, 2006).

For this analysis, a purposive sample of 22 countries from the Global South was selected based on their contributions to the space market and their status regarding International Space Treaties. These countries were chosen specifically because they have submitted national space program documents or other space-related documentation to UNOOSA, as illustrated in Figure 1 below.

22 Global South Countries current space treaties status

Sl No.	Countries	OST 1967	RA 1968	LC 1972	RC 1976	MA 1979	Satellites	SRA-UNOOSA	Space Agency
	Asia								
1	Armenia	R	R	R	R	R	6	2021	N
2	Indonesia	R	R	R	R		20	2013	Y
3	China	R	R	R	R		1004	2016	Y
4	Japan	R	R	R	R		210	2002	Y
5	Kazakhstan	R	R	R	R	R	7	2012	N
6	Pakistan	R	R	R	R	R	8	2023	Y
7	Philippines	S	S	R	R	R	2	2019	Y
8	Turkiye	R	R	R	R	R	32	2022	Y
	Africa								
1	Algeria	R		R	R		6	2019	Y
2	Djibouti				R		1	2023	N
3	Ghana	S	S	S	S			2022	N
4	Kenya	R		R				2016	Y
5	Namibia							2021	N
6	Nigeria	R	R	R	R		5	2010	N
7	South Africa	R	R	R	R		3	2008	Y
8	Tunisia	R	R	R				1984	N
	South America								
1	Argentina	R	R	R	R		35	2015	Y
2	Brazil	R	R	R	R		19	1994	Y
3	Chile	R	R	R	R	R	2	2001	N
4	Colombia	R	S	R	R			2016	N
5	Ecuador	R	R	R	R		2	2012	N

6	Peru	R	R	R	R	R	2	1974	Y

***Figure 1**

1. Sources: https://astro.unoosa.org/astro/national-space-law-landing-page.html

2. Sources: https://astro.unoosa.org/astro/national-space-law-landing-page.html

3. Sources: https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html

4. https://www.n2yo.com/satellites/?c=&t=country

5.https://www.unoosa.org/res/oosadoc/data/documents/2025/aac_105c_22025crp/aac_105c_22025crp_9_0_html/AC105_C2_2025_CRP09E.pdf

R- Ratified, S: Signed only, Y: Yes, N: No

OST: Outer Space Treaty, RA: Rescue Agreement, LC: Liability Convention, RC: Registration Convention, MA: Moon Agreement

SRA-UNOOSA: Space related agreement- United Nations Office for Outer Space Affairs

4. Discussion

The engagement of Global South nations with the international space governance regime is characterized by broad but uneven adoption. While the ratification of the core international space treaties is widespread, significant variation exists. Analysis reveals that only seven countries five in Asia and two in South America have ratified the foundational Outer Space Treaty. A cohort of nine nations has ratified four of the five treaties, consistently excluding the Moon Agreement. At the other end of the spectrum, countries like Ghana have signed all but the Moon Agreement, while Djibouti has ratified only the Registration Convention. Consequently, nearly all sampled countries from the Global South are party to at least one space law, with Namibia being the sole exception. This pattern suggests a strategic and selective engagement with international law, potentially reflecting specific national interests and capacities rather than a wholesale acceptance of the entire treaty framework.

This legal engagement is mirrored by a similarly stratified landscape in satellite ownership and operational capabilities. While over 100 countries now operate at least one satellite, dominance remains highly concentrated with the United States, Russia, and China. Among the studied developing nations, 17 operate satellites, yet their capabilities vary dramatically. Only a few, notably China and India, possess the full-cycle capacity for manufacturing, launching, and placing satellites into Geostationary Orbit (GEO). For most others, presence in space is achieved through operating smaller satellites in Low Earth Orbit (LEO), often reliant on international partnerships. This dependency is further reflected in institutional capacity; findings indicate that only 12 of these countries have an established national space agency, underscoring a significant gap in the foundational infrastructure required for an autonomous space program.

The global space industry, projected to become a trillion-dollar economy by 2035, offers immense economic potential. However, this study finds that only a very few developing countries currently possess the capability to provide end-to-end innovative solutions from

manufacturing and launch to offering sophisticated space-based services. These advanced, integrated capabilities are the key drivers of competition and value capture in the global market.

Therefore, a strategic and concerted effort to promote national space programs and cultivate a domestic private space industry is not merely an option but a critical imperative for developing nations. Such a dual-track approach is essential to reduce technological dependency, foster indigenous innovation, and build the institutional capacity needed to translate a physical presence in space into tangible economic benefits. By doing so, these countries can position themselves to not only participate in but actively contribute to and benefit from the future space economy, thereby securing a greater share of its projected value for their domestic GDP.

5. Conclusion

The ascendancy of the private space sector necessitates robust regulatory frameworks, a role for which national space programs are uniquely positioned. With private actors now driving over 80% of space activities, effective regulation is critical to mitigate pressing challenges such as space debris proliferation and to govern the dual-use nature of technology with origins in the arms race. While space-based services from communications to Earth observation are deeply integrated into modern life and pivotal for achieving the Sustainable Development Goals (SDGs), their benefits remain unevenly distributed. This is evidenced by the persistent digital divide and the concentration of advanced capabilities in a few nations.

Therefore, the central demand for our time is the effective regulation of space activities. States must exercise their sovereignty by establishing strong national space programs, using the five UN international space treaties as a foundational guide to craft domestic policies that hold private actors accountable. This legal and regulatory scaffolding must be complemented by initiatives like the UN's Regional Centres for Space Science and Technology Education, which are vital for bridging the scientific and technological gap and building institutional capacity.

Ultimately, a synergistic approach that integrates international law with national regulatory mechanisms is paramount. This framework will foster responsible state behaviour and accountable private sector operations, helping to curb the dominance of a few actors and ensure the long-term sustainability of the space environment. Furthermore, enhanced triangular and South-South cooperation facilitated through knowledge sharing, capacity building, and collaborative technology development is essential. Such partnerships will empower nations of the Global South to collectively navigate the capital-intensive space sector, reduce technological dependency, and ensure that the profound benefits of space exploration are shared more equitably across the globe, thereby securing a truly inclusive and sustainable future in space.

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Abbreviation

UN: United Nations
UNOOSA: United Nations Office for Outer Space Affairs
COPUOS: Committee on the Peaceful uses of Outer Space
GDP: Gross Domestic Products
OECD: Organization for the Economic Cooperation and Development
SDG: Sustainable Development Goals
OST: Outer Space Treaty
RA: Rescue Agreement
LC: Liability Convention
RC: Registration Convention,
MA: Moon Agreement
SRA-UNOOSA: Space Related Agreement- United Nations Office for Outer Space Affairs
UNCTAD: United Nations Conference on Trade and Development

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