

# Third World Approach and Outer Space: Interconnections, Opportunities, and Emerging Challenges

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## Abstract

This article examines the intersection of Third World approaches and outer space activities, exploring the challenges and opportunities developing nations face in space exploration and utilization. It addresses the historical marginalization of these countries in space activities and the need for a more equitable global space governance framework. Key research questions include how contemporary space laws influence developing nations' access to outer space and what development opportunities space technology presents for these countries. This article examines the development of space programs in selected developing countries and evaluates how space technology can contribute to achieving Sustainable Development Goals. The methodology combines historical analysis, case studies of developing nations' space programs, and application of Third World Approaches to International Law perspectives to critically examine existing space governance structures. Findings highlight the economic and technological barriers faced by developing countries, as well as innovative strategies employed to overcome these challenges. The study concludes that, despite the existence of significant challenges, greater involvement of developing countries in space activities is essential for achieving equitable global development and ensuring the long-term sustainable use of outer space. Recommendations include strengthening international cooperation, promoting inclusive space governance, and prioritizing space applications for sustainable development.

**Keywords:** TWAIL, Space governance, Developing nations, Sustainable Development Goals, Space technology, International cooperation

## 1. Introduction

### 1.1 Background

The exploration of outer space marks a pivotal chapter in human history, ignited in the mid-20th century. The launch of Sputnik 1 by the Soviet Union in 1957 signalled the beginning of the Space Age, triggering an intense rivalry between the United States and the USSR known as the Space Race. This era witnessed remarkable advancements, from Yuri Gagarin's pioneering human spaceflight in 1961 to the monumental Apollo 11 moon landing in 1969. ("The Space Race | PPT," 2024, 3) As the initial enthusiasm waned, the paradigm of space exploration underwent a transformation. The bipolar nature of early space endeavors transitioned into a more multipolar context, with European nations, Japan, China, and emerging economies such as India and Brazil establishing their own space programs. This diversification has fostered a more intricate and collaborative international space environment. Concurrently, TWAIL Relations and Development emerged, contesting the Eurocentric foundations of global governance. Third World Approaches to International Law (TWAIL) developed as a critical school of thought in the late 20th century, positing that the prevailing international legal order is deeply entrenched in colonial and postcolonial power structures that persistently marginalize developing nations. (Gathii, 2021, 5) Scholars within the TWAIL framework advocate for a reinterpretation of the principles of international law to facilitate more equitable participation and benefit-sharing for the Global South.

### 1.2 Research Objectives

This study aims to explore the intersection of outer space activities and Third World perspectives, with the following objectives:

- To examine how Third World Approaches to International Law (TWAIL) perspectives can illuminate disparities in space access and legal frameworks that favor Western interests over those of the Global South.
- To analyze the evolution of space programs in select Third World countries, evaluating their strategies, achievements, and obstacles.

- To assess the potential of space technology in addressing Sustainable Development Goals (SDGs) in developing countries, focusing on practical applications and policy implications.
- To critically evaluate existing international space law and governance structures through a TWAIL lens, identifying areas where reform may be necessary to ensure more equitable participation.
- To explore the geopolitical implications of increasing participation by Third World countries in space activities, including shifts in power dynamics and the potential for international cooperation.
- To investigate innovative approaches and policy recommendations for enhancing capacity building and technology transfer in space-related fields for developing nations.
- To propose a framework for more inclusive and equitable global space governance that accounts for the needs and aspirations of developing nations.
- To contribute to the broader discourse on decolonizing international law and institutions by using space activities as a case study for applying TWAIL principles.

### 1.3 Research Questions

To guide this study and achieve its objectives, the following research questions have been formulated:

1. In what ways do contemporary space laws influence the access of developing nations to outer space, and what specific challenges do these nations encounter in the implementation of their space programs?
2. What potential development opportunities does space technology present for developing countries, and what ethical considerations emerge from the commercialization of outer space?

### 1.4 Research Methodology

This research takes a comprehensive approach to investigating the intricate relationship between space exploration and its effects on developing countries. The study delves into the historical progression of space exploration and international space law, complemented by case studies of space programs in selected developing nations. Utilizing Third World Approaches to International Law perspectives, the research critically examines existing space governance structures, offering a fresh perspective on current frameworks. To provide a robust and thorough analysis, the research draws upon data from international space agencies, policy documents, and relevant academic literature.

### 1.5 Significance of the Study

1. It contributes to the ongoing discourse surrounding the reform of international space law, advocating for a more inclusive and equitable framework.
2. By emphasizing the potential of space technology to address the Sustainable Development Goals (SDGs), it underscores the necessity of broadening access to space capabilities.
3. This study's findings can be used to inform policy recommendations that promote developing countries' involvement in space activities and guarantee their access to space-derived data and technologies.
4. It explores the geopolitical implications of evolving space power dynamics, thereby contributing to discussions on global stability and cooperation in the realm of space.
5. By examining ethical considerations in space exploration through non-Western perspectives, it advocates for a more inclusive and responsible approach to space governance.

As humanity's frontiers extend further into space, it is imperative to ensure that the benefits and opportunities of this new era are accessible to all nations. This study aspires to contribute to that objective by providing insights into the challenges and potential solutions for fostering a more equitable space future.

## 2. Historical Context and Theoretical Framework

### 2.1 Evolution of Space Exploration

The mid-20th century signified the inception of space exploration, marking a transformative epoch in human history. Propelled by rapid technological advancements and intense geopolitical rivalry, outer space emerged as a novel domain for scientific inquiry and national prestige. The launch of Sputnik 1 by the Soviet Union in 1957 is frequently acknowledged as the catalyst for the Space Age, instigating a vigorous competition between the United States and the USSR, commonly referred to as the Space Race. This period witnessed a succession of groundbreaking milestones: Yuri Gagarin's historic orbital flight in 1961 rendered him the first human in space, while Alan Shepard's subsequent suborbital flight heralded the United States' entry into manned space missions. The Apollo 11 expedition in the year 1969, during which Neil Armstrong and Buzz Aldrin achieved the historic milestone of being the inaugural human beings to traverse the lunar surface, epitomized the zenith of this epoch (Launius, 1994, 6).

As the initial fervour of the Space Race abated, the landscape of space exploration began to undergo a transformation. The bipolar nature of early space activities, predominantly dominated by the US and USSR, gradually yielded to a more multipolar environment. This transition was marked by the arrival of new state actors in the space domain, such as European nations (collaborating through the 'European Space Agency'), Japan, and China. (Peter, 2006, 15) The conclusion of the Cold War further expedited this trend, with emerging economies such as India and Brazil developing their own space programs. This diversification has led to a more intricate and collaborative international space environment, characterized by both cooperation and competition among a broader spectrum of actors. (Clay Moltz, 2019, 4)

### 2.2 Third World Approaches to International Law

#### First world

'During the Cold War', the term "First World" originally described countries aligned with the United States and its allies, generally characterized by capitalist economies and democratic governance. ("First World Countries 2024," 2024, 6) In contemporary discourse, it generally refers to highly developed, industrialized nations possessing high standards of living, advanced technological infrastructure, and robust economies. These countries frequently exert significant influence over global politics, economics, and culture. Prominent examples include the United States, Canada, Western European nations, Japan, and Australia. This concept stands in contrast to the "Second World" (formerly communist states) and the "Third World" (developing countries), although these latter terms are less commonly employed in current usage.

#### Second World

'During the Cold War', the term "Second World" referred to countries aligned with the Soviet Union, typically characterized by communist or socialist governments and centrally planned economies. ("The First, Second, And Third World Countries: Origin Of Concept And Present Beliefs - WorldAtlas," n.d., 4) These nations were distinct from the capitalist "First World" and the developing "Third World." The Second World encompassed the Soviet Union, Eastern European nations such as Poland and East Germany, and other communist states including China and Cuba. Although the Cold War concluded in the early 1990s, the term is still occasionally utilized to refer to former communist states that are currently transitioning toward market economies and democratic governance.

#### Third World

In the context of the Cold War, the designation "Third World" was coined to characterize countries that refrained from aligning with either the capitalist or the communist spheres of influence ("Emergence of Third World and Non-Alignment: Part I – SELF STUDY HISTORY," 2014, 5). In contemporary discourse, the term is commonly used to characterize developing nations that exhibit lower levels of industrialization, economic advancement, and living standards. These countries frequently encounter a myriad of challenges, including pervasive poverty, restricted access to education and healthcare, and political instability. Nevertheless, numerous Third World nations possess significant natural resources and a rich cultural heritage. Ongoing efforts to enhance their economic and social conditions are facilitated through international aid, development programs, and local initiatives that promote sustainable growth.

### 2.3 The Outer Space Treaty and TWAIL

The 1967 Outer Space Treaty (OST) constitutes the foundation of international space law. Its essential provisions encompass the peaceful use of outer space, the prohibition of national appropriation of celestial bodies, and the principle that the exploration of space should benefit all humanity. While the OST is frequently regarded as a landmark agreement, its implications for developing nations merit closer scrutiny. Third World Approaches to International Law perspectives offer a nuanced view of the Outer Space Treaty, recognizing both its progressive aspects and its inherent problems. (Anghie, 2023, 6) On one hand, its emphasis on the peaceful use of space and the common interest of all humanity resonates with the aspirations of developing nations. On the other hand, the formulation of the treaty occurred at a time when most Third World countries lacked the capacity to participate meaningfully in space activities, potentially entrenching existing technological and economic disparities. (Pelton, 2019, 10)

### 2.4 Outer Space and Technological Development

The potential benefits of space technological advancement for developing countries are substantial and multifaceted. Satellite technology, in particular, offers transformative applications in areas critical for sustainable development. Earth observation satellites provide valuable data for 'agriculture, environmental monitoring, and disaster management'. Communication satellites can bridge the digital divide, facilitating improvements in education, healthcare, and governance in remote areas. (Wood et al., 2024, 7) Space-based technologies also contribute to achieving the United Nations Sustainable Development Goals (SDGs). (Leloglu and Kocaoglan, 2008, 12) Examining the history of space exploration through the lens of Third World Approaches to International Law reveals a multifaceted landscape of both opportunities and challenges for developing nations. As the space sector advances, effectively addressing these issues will be essential to ensure the equitable distribution of benefits from space exploration and technology among all members of humanity.

## 3. Analysis of Emerging Third World Nation's Space Programs

Historically, the exploration of outer space has been dominated by global superpowers, particularly the 'United States and the Soviet Union' (now Russia), who spearheaded initiatives during the Cold War. However, in recent decades, numerous developing nations, often referred to as Third World countries, have made substantial advancements in establishing their presence in space. This chapter critically examines the space programs of selected Third World countries, analyzing their motivations, achievements, challenges, and potential future trajectories.

### India: An Ascendant Space Power

India stands out as a prominent example of a developing nation that has successfully established itself in the field of space exploration. The Indian Space Research Organization (ISRO), founded in 1969, has achieved remarkable advancements in both satellite technology and planetary exploration. ("Indian Space Research Organisation," n.d., 1) India's space program is notable for its cost-effectiveness and focus on practical applications that benefit its large population.

India has achieved substantial advancements in space exploration, showcasing its technological capabilities and cost-effective methodologies. Noteworthy space missions from the country include:

1. Mars Orbiter Mission (MOM) – Mangalyaan- Launched in 2013, Mangalyaan positioned India as the first nation to successfully achieve Mars orbit on its initial attempt. ("8 Years of Mangalyaan Launch: Here's All You Need to Know about the Mars Orbiter - India Today," 2021, 7) This mission was accomplished at a significantly reduced cost compared to analogous endeavors undertaken by other space agencies, thereby illustrating that space exploration can be conducted efficiently by nations with constrained resources. The success of Mangalyaan significantly enhanced India's scientific prestige on the global stage.
2. Chandrayaan-3- In 2023, India reached a significant milestone with the Chandrayaan-3 mission. This lunar exploration initiative successfully facilitated a soft landing of a rover in the Moon's south polar region, thereby positioning India as the fourth nation to accomplish a soft landing on the lunar surface and the first to achieve this feat in proximity to the lunar south pole.

3. Aditya-L1 Mission- Launched in 2023, Aditya-L1 represents India's inaugural space-based solar observatory. (“ADITYA-L1,” 2024, 4) The mission is designed to investigate solar phenomena from a halo orbit around the first Sun-Earth Lagrangian point (L1), thereby yielding significant data on solar activities and their implications for space weather.

4. Future Gaganyaan Mission- India is currently preparing for its inaugural crewed space mission, Gaganyaan. (“India Announces Four-Member Crew for ‘Gaganyaan’ Space Mission | Reuters,” 2024, 2) This ambitious initiative aims to transport Indian astronauts to low Earth orbit, thereby signifying India's entry into the domain of human spaceflight. Furthermore, India has made notable advancements in satellite technology, exemplified by its Indian Regional Navigation Satellite System (IRNSS), which provides navigation services to the Indian subcontinent. (Paikowsky, 2017, 4) The country's remote sensing satellites have proven to be invaluable tools for disaster management, weather forecasting, and agricultural planning.

### **China: Bridging the Gap**

While the classification of China as a Third World country is subject to debate, (“Is China a Developing Nation? The US Congress Is Skeptical. – The Diplomat,” 2023, 7) particularly in light of its significant economic growth, the trajectory of its space program provides valuable insights for other developing nations. China's space ambitions have rapidly evolved, transforming the country from a latecomer into a major space power. The China National Space Administration has reached numerous milestones, including human spaceflights, lunar exploration missions, and missions to Mars. The Chang'e lunar exploration initiative, particularly the Chang'e-4 mission, which achieved a successful landing on the Moon's far side in 2019, serves as a testament to China's advanced technological prowess (Vernile, 2018, 5) Furthermore, China's space station program, highlighted by the Tiangong space station, demonstrates its commitment to a long-term presence in low Earth orbit. (“ST/SPACE/71 - European Global Navigation Satellite System and Copernicus: Supporting the Sustainable Development Goals. Building Blocks towards the 2030 Agenda”, 2017, 7) This accomplishment positions China among an elite group of nations capable of maintaining a crewed space station.

### **Brazil: Focusing on Practical Applications**

The Brazilian space initiative, governed by the ‘Brazilian Space Agency’, has predominantly concentrated on the advancement of satellite technology aimed at Earth observation and telecommunications applications. The country's distinct geographical position, characterized by the significant expanse of the Amazon rainforest within its territory, has catalysed its interest in remote sensing technologies. (K. Anderson et al., 2017, 3) Brazil's collaboration with China on the China-Brazil Earth Resources Satellite (CBERS) program, which has successfully launched multiple Earth observation satellites, serves as a salient example of how developing nations can harness international cooperation to enhance their space capabilities while simultaneously addressing national priorities such as environmental monitoring and resource management. (“SATELLITE COMMUNICATION: CONCEPTS AND APPLICATIONS - K. N. RAJA RAO - Google Books,” n.d., 4)

### **Nigeria: Pioneering Space Technology in Africa**

Nigeria has emerged as a leader in space technology on the African continent. The country's space agency, NASRDA, has successfully deployed several satellites, including Nigeria Sat Series (Froehlich, 2018, 5) These satellites fulfil a range of functions, encompassing environmental monitoring, disaster management, and telecommunications. Nigeria's space program exemplifies the potential of space technology to address critical challenges faced by developing countries, such as food security, natural resource management, and the enhancement of telecommunications infrastructure. (“Space4Women |,” 2024, 3)

### **Iran: Advancing Despite Challenges**

Despite facing international sanctions and geopolitical tensions, Iran has made significant strides in its space program. The Iranian Space Agency has successfully launched multiple satellites into orbit, with the launch of the ‘Omid satellite’ in 2009 marking Iran's entry into the group of spacefaring nations. (Harding, 2012, 4) Iran's space ambitions reach beyond low Earth orbit, as demonstrated by their public announcements of planned lunar missions. However, the country faces significant obstacles due to international restrictions on technology transfer and concerns about the potential ‘dual-use nature of its space technology’. (Wood et al., 2024, 3)

Developing nations often adopt similar strategies for their space programs, prioritizing practical applications. These include using Earth observation for agriculture and disaster management, and communication satellites to improve connectivity. These programs emphasize cost-effectiveness, international collaboration, and fostering national pride. They also prioritize capacity building by investing in education and training to develop local expertise and technological capabilities.

## **4. Opportunities and Challenges**

### **4.1 Economic Opportunities**

The space sector presents considerable economic opportunities for developing nations. Space-based services and applications have increasingly become integral to contemporary economies, offering potential for growth and innovation. (“The Space Economy in Figures”, 2019, 6) Earth observation satellites provide critical data that supports agriculture, urban planning, and natural resource management. Additionally, communication satellites facilitate connectivity in remote areas, thereby enhancing e-commerce, financial technology (fintech), and other initiatives within the digital economy. The job creation potential within the space sector is significant, extending beyond direct employment in space agencies and research institutions to encompass downstream applications, data analysis, and ancillary support services. Furthermore, the space economy acts as a catalyst for innovation across various sectors, including materials science and artificial intelligence, thereby fostering the development of high-tech industries.(Giannopapa et al., 2019, 4)

### **4.2 Sustainable Development Goals (SDGs) and Space Technology**

Space technology is instrumental in supporting and monitoring progress toward the United Nations Sustainable Development Goals.(B. N. Anderson, 2022, 4) Earth observation satellites generate critical data for environmental monitoring, thereby supporting initiatives aimed at mitigating climate change (SDG 13), promoting sustainable forest management (SDG 15), and conserving marine resources (SDG 14).(Guo, 2010, 5) Satellite communications enhance educational outcomes (SDG 4) and healthcare delivery (SDG 3), particularly in remote and underserved areas. Initiatives in telemedicine and distance learning, enabled by satellite connectivity, can significantly improve access to these essential services.(Kaku and Held, 2013, 7w) Furthermore, in the realm of disaster management and early warning systems, space technology proves indispensable. Satellites provide real-time data for the monitoring of natural disasters, thereby bolstering both preparedness and response efforts. This capability is particularly critical for developing nations, which are often more susceptible to the adverse effects of climate change and natural disasters.

### **4.3 Capacity Building and Technology Transfer**

For developing countries, education and training programs are crucial to develop the skilled workforce needed to participate in space activities. Numerous nations have established space-related academic programs and research centres aimed at nurturing local talent. Nevertheless, challenges persist regarding the retention of skilled professionals and the provision of advanced training opportunities. International cooperation and knowledge sharing are pivotal for capacity building in this field. The United Nations Office for Outer Space Affairs (UNOOSA) has implemented initiatives such as the Space4Women program, which aims to promote gender diversity within the aerospace sector. Significant challenges remain in acquiring and maintaining technological capabilities, including the high costs associated with space technology, export control regulations that may inhibit technology transfer, and the rapid pace of technological advancement that can swiftly render skills and equipment obsolete.

However, these opportunities are accompanied by significant challenges, both technical and geopolitical. These challenges are fundamentally rooted in economic, political, and technological limitations, as well as the broader geopolitical context.

- Limited Financial Resources
- Lack of Technical Expertise and Human Capital
- Dependence on Foreign Technology and Collaboration
- Geopolitical Challenges and Space Diplomacy
- Environmental and Social Priorities
- Legal and Policy Challenges

## 5.1 Suggestion

Based on the analysis, the research proposes the following suggestion:

1. **Strengthening International Cooperation:** Enhanced collaboration between established space powers and developing nations is essential. This collaboration should extend beyond traditional technology transfer to encompass joint research programs, personnel exchanges, and shared infrastructure. Initiatives such as the United Nations Space4Women program provide models for targeted cooperation.
2. **Promoting Inclusive Space Governance:** International space forums should endeavor to achieve more equitable representation and decision-making processes. This may involve reforming voting structures within international organizations and ensuring that the concerns of developing countries are adequately addressed in policy formulation.
3. **Enhancing Capacity-Building Initiatives:** Targeted programs aimed at developing human capital in space-related fields are critical. These programs should include not only technical training but also education in space law, policy, and management. Scholarships, exchange programs, and online learning platforms could be utilized to broaden access.
4. **Developing Sustainable Funding Mechanisms:** Innovative financing models, such as public-private partnerships and international cooperation funds, should be explored to address the substantial costs associated with space activities.
5. **Prioritizing Space Applications for Sustainable Development:** Developing countries should concentrate on space applications that directly contribute to their development goals, ensuring that investments in space yield tangible socio-economic benefits.
6. **Addressing Legal and Regulatory Challenges:** Efforts should be prioritized to develop more equitable frameworks for orbital resource allocation and technology transfer. This may involve revisiting existing international space law treaties and formulating new instruments to address emerging challenges.

## 6. Conclusion

Outer space is assuming a progressively significant position in the context of global development. The utilization of space technology and its associated applications possesses the capacity to function as equalizers, equipping developing nations with essential tools to confront pressing socio-economic issues and promote their technological advancement. However, realizing this potential necessitates concerted efforts to overcome the significant barriers that developing nations encounter in accessing and utilizing space resources. This necessitates not only technological and economic considerations but also a reevaluation of the ethical and philosophical foundations guiding our engagement with outer space. The increasing participation of developing countries in space activities introduces new perspectives and innovative approaches to tackling long-standing challenges. Their participation is imperative not solely for their individual advancement but also for the enduring sustainability and harmonious exploitation of extraterrestrial realms. As we embark upon a novel epoch of cosmic exploration and application, the decisions we undertake at present will shape the trajectory of humankind's affiliation with the universe. In conclusion, while the challenges facing developing countries in their space endeavours are substantial, the potential benefits render these efforts worthwhile. Through continued research, international cooperation, and innovative policy approaches, we can strive for a future in which space technology serves as a powerful tool for global development and understanding, transcending terrestrial boundaries and contributing to the progress of all humanity.

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