

RESEARCH PROJECT: INDIA-CHINA SPACE COMPETITION AND ITS IMPACT ON PAKISTAN'S SPACE POLICY

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ABSTRACT

In this research paper, the changing nature of space competition with India and China is studied especially in reference to space policy for Pakistan. It examines the strategic drivers of the competition, the capabilities of the two countries and where that has left regional geopolitics. Based on methodologically qualitative, this research provides an overall review regarding the behaviors according to the document analysis and expert interviews. Highly relevant results revealed that security concerns in the region are being heightened and Pakistan is fast aligning with China in a number of its space activities. The paper finally offers policy planning prescriptions for Pakistan to improve space capacity and national security in the emerging wider regional dynamics.

INTRODUCTION

Research in the Title : "India-China space rivalry and its connotations on Pakistan Space Policy" has been made to investigate the emerging scenarios of space competition between India and China and consequences in during Pakistan Space Policy analyses. India, China pushing for major strides with space and both are at a strategic juncture, Pakistan needs to re-examine its space policy; This study aims to determine the main factors behind the Indo-China rivalry, assess how it will forward with geopolitical implications and study how Pakistan perceives this competition in her strategic decision making in the space technology. Research is pursued through qualitative methods in an attempt to offer qualitative insights into Russia-China's deepening security concerns in its recognition of space with a particular focus on Pakistan forming closer alignment with China on multiple space-related initiatives. Finally, the project seeks to initiate policy recommendations for Pakistan to strengthen its space-capable national security by providing us a better understanding that these developments are part of changing regional trough lines.

Objective

The purpose of this research project is to investigate space competition between India and China, understand its characteristics and derive how they should affect Polity-I on the space front in Pakistan. It will analyze the past, present and future of this competition with a special focus on how it impacts strategic decision-making of Pakistan with respect to space technology.

Research Questions:

1. What are the major elements of Indo – Chinese space rivalry?

There are a multitude of elements that define the Indo-Chinese Space Rivalry which represents the aspirations and strategic interest of both countries in space exploration & technology.

Autonomous Space Launch

India, China have evolved the new class of launch vehicles both in aspects for both of the developed countries. India has done great with PSLV although China tightened their grip using the Long March rocket series. It started with India's Mangalyaan — proof-of-concept that not only sent the nation to first Asian nation to make it in to Martian orbit

but also while it was getting clear another more than accomplished in their space exploration.

Development Of China's Satellite Technology

Big investments by both countries to develop satellite technology for many applications (communication, navigation, reconnaissance). The GSAT series, respectively BeiDou Navigation System (China) are fundamental components of core space strategy in both India (India). Satellite technologies have made their way into the military mainstream as both countries are able and willing to field modern surveillance/ reconnaissance platforms that make them feel debt relief in the security stack.

Geopolitical Ramifications

The contest is linkage to this often-overlooked rivalry but larger geopolitical choreography in the Indo-Pacific. A sense of momentum and power is that India and China get to show in space as well. As this Olympic split winds to its end, the competition is no longer about the high-flying tech wonders — national pride and international honor are on the line.

National Security Issues

The magnitude of the national security implications from the space races to the real legs, whether operated by one nation or two as they conquer and (pace) their way onto this new limb strengthening their other leg with space tech. Security on regional scale – space is a dual-use asset, and what can be civilian in one country becomes immediately military for another.

Highway to Economic and Technological Nirvana

Space programs generally viewed as an economic development venture, technology competitive Since space is still not a market in which either the success of the two major powers have to take off anyway India and China intend to use their burgeoning space power in synergy with greater economic strength and development in order Human strategic objectives call for longer run delivery.

Undoubtedly a multidimensional and evolving competition, it illustrates the

complexities so characteristic of international relations today as well as technological 21st competition.

2. What was the result of the competition for regional geo-politics?

Indo-Chinese Space Race and Geopolitical implications in the region

The Indo-Chinese space race has significantly altered the regional geopolitics and protracted competition for influence in the Indo-Pacific. Across both countries, their use of space assets to secure power and strategic interests are serving military readiness on steroids; surveillance complexes spinning like whirling dervishes at wedding receptions through regional alliances.

Geopolitical Tensions and Alliances

These rivalries have escalated the tension, especially in South Asia and the Indian Ocean. While New Delhi in its perceived view that China is strategic encircling through BRI has replaced RIC, Allies such like U.S. & Japan and most recently Australia with Quad began to close the gap and forge greater ties to fight against China

On the other side, China has expanded its ties to Pakistan and Sri Lanka which increase regional power equation besides the geopolitical compomix.

Economic Implications

The space innovation is also being employed by both nations to fortify technology industries and generate economic value. India has challenged China's Belt and Road Initiative once vocalized by New Delhi on a presentational level, but has challenged with a DMARC authentication too turning BRI as an encircling net due to which India has started to initiate regional development programs also have partnered economically more closely with its neighbours.

Future Outlook

The Indo-Chinese competition will only curtail the strategic space available to that region. Both countries are chasing technological and geo-political superiority leading to the potential impacts on defense, economic growth and ultimately alliances. Smaller states will have to walk this rapids

with appropriate care to balance the struggle over regional pre-eminence.

3. This rivalry is having a what kind of implications on the space policy and programmes of Pakistan?

For the moment, it means that the Indo-Chinese space rivalry can not be ignored in formulating Pakistan's space policy and programs with prime drivers being security and regional issue. This is why as Indian space grows, Pakistan is compelled to enhance its own space programs — often in alliance with China to match India advancements.

Security Concerns

Today space programs like those of India threaten Pakistani national security, fearing about the implications of a growing Indian capability in satellites and ASATs (anti satellite weapons).

This drove Pakistan to invest in its own space, particularly satellites for communication and reconnaissance to keep track of the regional activities. China, a major ally, further enables Pakistan to procure cutting-edge technologies and skills needed to be able to advance its capabilities in space.

Technological Development

India's strides are giving an impetus to Pakistan's space agency, SUPARCO who are quickly on the back foot as it comes to research and development. But this competition might drive a new investment in more peaceful space exploration and away from military applications to humanitarian initiatives such as disaster management or crop surveillance. The rivalry could also motivate development in Pakistan's technology fields as the desire to remain on par with India drives investment in space research.

Regional Cooperation

Also, it is likely that this rivalry will compel Pakistan to be more chummy with China thus more projects where mutual gains are derived from improved space capabilities. For alongside the exchange of tools and knowledge, probably missions too for the betterment of Pakistan in space. In balance between the security necessities and prospective technology advancements &

regional cooperation, Pakistan will have to consider actively its strategic stance with regard to space.

Methodology Overview

Qualitative methods—document analysis, expert interviews and policy reviews will be used in this research to characterize the India-China space competition and its RRL implications on Pakistan.

Background

1. India's Space ambitions

History of ISRO

The Indian Space Research Organization (ISRO) came in the picture with an ambitious vision of making use of space technology for the benefit of country as we all know. Indian Space Research Organisation (ISRO) has made numerous landmarks in the space industry over the years such as Commence communication satellite, weather forecasting, cam navigation.

Pilot Milestones

Chandrayaan Missions: Started off with Lunar exploration in India, Chandrayaan-1 2008 validated the presence of water molecules on moon. Chandrayaan 2 attempted to land on the south pole of the moon, but lost communication during its descent as with the previous try, Chandrayaan-1.

Mangalyaan (Mars Orbiter Mission): India launched its first trip to Mars in 2013 placing not only became the forth space agency in history but also the very first Asian country to place a spacecraft into orbit around Mars. This mission put on display the technological prowess and economy of space exploration by India.

India: Gaganyaan —An ambitious Program that will shoot astronauts into space by 2023 (this gives rise to aspirations of a larger human space exploration presence in India).

Strategic objectives of space in India

Indian space ambitions have a mix of civilian and military use. The country wants to increase its prowess in satellite-based surveillance, reconnaissance, communication that are vital for national security. India also wishes to be a frontrunner in terms of global

norms development and space governance vis-à-vis international collaboration.

National Space strategy has China CNSA (China National Space Administration)

CNSA was founded in 1993 and has rapidly climbed the space agency mountain, a mix of exploration and technology demonstrator. China's broader approach to space is rooted in the largess lavished by state upon its space sector and an enduring ambition of discovery in exploring and colonizing the universe.

Achievements

Lunar Exploration: China has executed a number of lunar missions successfully, such as Chang'e series. History was made in 2019 when Chang'e-4 landed on the far side of the Moon, this was a milestone for future space exploration.

Tiangong Space Station: In the near future China is going to build its modular space station, named Tiangong and will be fully operational by end of 2022. This iteration of the project seeks to support a permanent human settlement in low Earth orbit

Mars Exploration: Tianwen-1 mission successfully sent a rover to Mars in 2021(China is now the second country to soft-land and operate on Mars) .

Belt and Road Initiative: The Space Dimension of a Dual-Use capability Dual-use Space Strategy of China — Technologies Espoused for Military and Civilian Use Dual use technologies, from BRI point of view and particularly in space wherein Satellite-Based Technology (SBST) projected to further influence nations along with space collaboration among them

Historical Piece

The Beginning of Space Exploration in Asia

Southeast Asia and the space race they are mirroring geopolitics discords (and corambes) over technological supremacy. As a national power and technological resources, along with space programs in India and China

Effect of Space Dominance on national sovereignty;

Geopolitical fatigue and The role of Space in National Security. Real Past national security strategies across the region are increasingly focusing on dominating space as major factor. Indian strategic over China is considered absolute to the extent of India and China Space technology advances

3. Indias China Space Rivalry

Drivers of Competition: Security As Concerns at Regional Level: Security concerns have sharpened since the strategic rivalry between India and China: both countries regard developments in space tech as critical to their national defense/deterrence. The Space militarisation has become an important issue, since both side develop capabilities in which a potential could serve for conflict-situation somewhere.

Prestige in Global Space Race: The performance achievements of space are believed to display national capabilities and technological competitiveness. India and China are trying to gain global prestige with regard to their successful space missions, these military of installation of satellite are a reflection that how India/China have advanced sciences.

Economic and Technological Buzz: The competition is about using space technology for economic and technology harvest. Each of the states have acknowledged, that space technology has amazing potentials in promotion of various sectors like telecommunication, agriculture and disaster-management etc.

Areas of Competitions

Satellite Tech and communications

Systems: In the forefront of investment by both countries for sophisticated communications, navigation, surveillance .Unfortunately very significant for national security and economic development the country has to its own indigenous capability the satellite. Exploration and interplanetary missions: India, China are competing for a lot of lunar/Mars exploration attempts and have good future plans.

Space militarization Anti-satellite weapons and ISR Creation (Another new & growing worry) Another concern to add on is the increase space militarization. As both are investing in capabilities to not only threats sans, however the kind of whole other space assets it escalates more the security factor while regional dynamics.

International Collaborations

India Partnerships : India works in the pursuit of international space collaboration with partners like NASA, European Space Agency (ESA) and the Quad countries to improve its space capability. Partnerships facilitate the transfer of knowledge and expedite technological empowerment.

China Alliances: China forged strategic alliances with Russia and BRICS nations along with African states to advance its space cause Partnerships in general can include technology transfer and joint ventures, thereby deepening Chinese participation in space.

4. Pakistan Space Policy And Program

A Whiz-Why Small Unmanned Aerial Suparco SUPARCO, Space & Upper Atmosphere Research Commission (suparco) was Pakistan's sole space agency up to date established in 1961. SUPARCO has come a long way in designing satellite technologies and conducting the process of space research despite facing challenges.

Current Endeavours: Some important ones are the creation of communication satellites (pakSat-1R) and remote sensing. They envision these to be a step in bolstering the technology capabilities of Pakistan and numerous areas like agriculture disaster-management.

Challenges: Budget Constraints and a dependency on external alliances, mostly with China (Pakistan). Meeting the necessary investment and capacity building is required to keep Pakistan's space program sustainable.

Regional Competitions & how it hurts

Strategic alignment with China: Pakistan's space policy is getting more convergent to China, focusing on technology transfer and

joint ventures. Pakistan needs this partnership to grow its own capabilities in order to keep pace with India's strides.

Implications of Indian Progress-A space tech capability, especially if it is defence-related needs more investment from Pakistan for the regional strategic balance in favour of Pakistan so as not be outperformed by Indian advances.

Opportunities for collaboration: The increasing Chinese collaboration opens the window of innovation with respect to satellite tech and space exploration Malaysia within the regional space satellite landscape.

5. Regional Stability Implications Space Militarization and Security

Space Arms Race Risks: The space competition between India and China can destabilize region as an arms race could look possible in outer space. The rising capabilities in space such as anti-satellite weapons and other military further escalate these dangers. Pakistan should not just accept the vulnerabilities; it must identify and develop appropriate countermeasures As both India and China strengthen their military space capabilities, the Punjab must do what is necessary for national security; This includes building up its own space defence force.

Economic and Diplomatic Implications

Space as a GDP booster: Space technology will encourage economic development in Pakistan, with new applications to telecommunications, agriculture and disaster management emerging. Reliance on space technology can help the socio-economic development of Pakistan also.

Regional Alliances: Expanding ties with China and other nations can further the multilateral cooperation in space governance where Pakistan's diplomatic standing and influence could be leveraged in global space regulatory arrangements. Joint endeavors can also include co-benefits of technology and economic development.

6. Case Studies

Cooperation of Space between China and Pakistan PakSat-1R and Pakistan Remote Sensing Satellite (PRRS) are some of the

collaborative projects that indicate the rapprochement of Pakistan with China — Joint Research Initiatives: Already Pakistan and China have explored joint research initiatives for advanced satellite technologies and applications. These collaborations enrich the technical capabilities in Pakistan and also augment knowledge sharing & capabilities of Pakistani scientists with working engineers.

India–Pakistan Space Dynamics Space Program Comparative Studies: While the space programmes of India and Pakistan are fundamentally individual and the budget disparities between these two countries like a great rift razor this gap cannot be denied but at some places similarity was clear. India invested heavily in its space programme but Pakistan have been budget and resource constrained and their responses to India has been minimal.

India Space Successes, Sped up the Vagaries of Pakistan; Pakistan growing more and more anxious towards India each time they achieve a space success, be it lunar or Martian exploration. The perception of there being a technological gap in Pakistan has made the country move much faster to develop its own space initiatives particularly in defense technologies.

7. Policy Recommendations for Pakistan

So Pakistan might take some policy recommendations to escape from the India-China space competition difficulty, as under;

Increase Spend on Space Technology: The govt should shift focus to higher allocation for space matters, ensuring domestic capabilities and minimized friendship with foreign associations.

Work More Closely with China: In space technology, Pakistan should further consolidating collaboration with China by introducing common projects and research endeavours to build their own capabilities.\

Create Full-Spectrum Space Strategy: A clear national space strategy directed at full objectives and priorities should be created so that we can enable pathway for the

achievement of target of Pakistan space ambitions from here. Strategy must include space technology applications that are civilian and also armament.

Promote International Cooperation: Alignment with China notwithstanding Pakistan needs to partner with other countries and international bodies in order to develop a wider technological base, international recognition in space governance as well.

8. Conclusion

The evolving space competition between India and China has significant implications for Pakistan's space policy and programs. As both nations continue to advance their space capabilities, Pakistan must strategically align itself with China while investing in its own technological development. By fostering collaboration and enhancing its space initiatives, Pakistan can navigate the challenges posed by regional competition and ensure its national security in an increasingly complex geopolitical landscape. The future of space exploration in South Asia will depend on how these dynamics unfold and the strategic choices made by Pakistan in response to the evolving regional landscape. As the competition intensifies, it is crucial for Pakistan to remain proactive in its approach to space technology, ensuring that it not only keeps pace with its neighbors but also leverages its partnerships to foster innovation and growth in its space sector.

9. Detailed Discussion of Three Key Entities

Indian Space Research Organisation (ISRO) ISRO (Indian Space Research Organisation) — The biggest and only Indian Govt run space agency in their country Its projects include: Satellites: ISRO has built a gamut of launch vehicles — the PSLV, Geo-Synchronous Satellite Launch Vehicle (GSLV) The country has launched multiple satellites all over the globe using these spacecraft making it a competitive player in the international commercial market.

Space Missions: The groundbreaking endeavors of ISRO like Chandrayaan and Mangalyaan went on to find worldwide recognition. Chandrayaan-1 revealed water on the moon and Mars Orbiter Mission

beamed informally marked India's first successful international mission by entering a Martian orbit, demonstrating technology-driven and economical space mission paradigm.

Strategic Objectives: ISRO's pursuits are not limited to the domain of scientific exploration but also incorporate some military objectives with strategic intentions. Among these, there is the development of satellite systems for reconnaissance and surveillance that are very relevant for national security due to regional tensions with Pakistan and China.

China National Space Administration (CNSA) China National Space Administration (CNSA), the governmental space agency leading all of China's space program. CNSA had swiftly expanded both its space capability and ambition since it was founded in 1993.

CNSA Key Points Lunar/Mars Exploration: CNSA has put some big markers within lunar exploration with its Chang'e program, being especially notable by landing on the far side of the moon with Chang'e-4. Tianwen-1 is the first of its name to successfully land on Mars, signalling that China can do deepspace exploration well.

Development of a Space Station: Construction of the Tiangong Space Station by CNSA is due to be fully operational by 2022. This marks the effort of China seeking to become a world power in space through establishing long-term human presence in low Earth orbit and undertaking inspace science investigations.

Dual Use of Space Technology: China's space strategy — a strategy which prioritizes and promotes dual-use technologies with versatile applications to serve both civil and military needs. An important part of China's national security strategy, communications, navigation and surveillance (satellite) advancements are key to China's "space race" fight for supremacy with the U.S. and India.

Space & Upper Atmosphere Research Commission (SUPARCO) SUPARCO : The Space & Upper Atmosphere Research

Commission is the national space agency of Pakistan, created on 19 June 1961. Suparco — despite its many challenges- SUPARCO has done some great things for Pakistan space capabilities.

Pivotal elements of SUPARCO are:
Satellite Development: SUPARCO has undertaken several satellite programs including the generation of commercial communication satellite PakSat-1R and the research satellite – Pakistan Remote Sensing Satellite (PRSS). Essential uses of these satellites are Telecommunication, Agriculture and Disaster Management.

Chinese collaboration: China has aligned parts of the space policy to SUPARCO in a way that it focuses on technology transfer and various joint collaborations. Pakistan needs a partner in this regard as it is regressing from its space technology capabilities vis a vis India.

Machinations and Their Press (Journalistic Note): SUPARCO bogged down by budgetary woes, and dependence on foreign affiliates-China. Nevertheless, this burgeoning collaboration opens the door for innovation and capacity-building that will allow Pakistan to project its presence better within regional space. The space competition between India and china is a evolving space that has huge impact on Pakistan space policy, programs. Both countries are drawing near at their space capabilities, so Pakistan must pragmatically cozy up to China and start churning out its tech. Pakistan can deal with challenges associated regional competition in a way that forward-looking strategic alignment is federated with local space collaborations and development to protect national security in an increasingly geopolitical space. How these play out is going to shape the future trajectory of space exploration in South Asia and reflect the strategic responses by Pakistan to a fast changing regional landscape.

12. Future Directions

Broader Tech development and research Pakistan should invest in Research and Development (R&D) so that it can have complete efficient space program. Setting up autonomous research institutes and marriage

of practice with academia at SUPARCO will have a paradigmatic shift in space satellogical domain and beyond. Public-private partnerships can also be a means to foster innovation and bring in investment support for the space sector at large.

Capacity Building and Contents Pakistan needs to build capabilities and capacity in STEM (fields of science, technology, engineering and mathematics) for logistical support its space goals. Establishing specialized apprenticeship opportunities and scholarships for aerospace engineering with the attached pipeline will go a long way to fostering skilled labor to lead the country's space efforts into the future. Public Awareness and Engagement Public Education on the relevance of space technology and its utility can become a tool to garner support to Pakistan's space program. Increasing public interest, and possibly investment in space exploration, through outreach programs and educational campaigns can directly inspire young minds to dedicate their lives into this field.

Environmental Concerns

Space Technology for Environment Monitoring Pakistan has many environmental crisis of its own climate change, natural calamities & resource management. Space technology can yield useful information for decision making and policy formulation if used to monitor on environment. Remote sensing satellites can be employed to observe land use, deforestation, waters and disaster management since it will help Pakistan address environmental issues appropriately Fostering Sustainable Action It is essential for minimizing the environmental impact of space activities in Pakistan to incorporate sustainable practices in the country space program. That includes using green technologies for sending satellites in the sky, encouraging use of renewable power sources in space endeavors and right management of space litter. Sustainability in Pakistan and its role in making the global space arena a bit more responsible.

14. Space for the Enhancement of National Security

Developing Space-Based Defences Pakistan should take into account the development of space-based defence capabilities as regional

tensions, hoten defense application in the future. It has to be developed by spending money on the space reconnaissance, surveillance and communication systems to secure national security. The need for building indigenous capabilities in space defense gives a strategic edge to Pakistan to discourage the possible threats from adversaries.

Space operations: Cybersecurity in Aerospace As orbital technology dependency grows, cybersecurity for space operations will become more crucial than ever. Placing funds in state-of-the-art cybersecurity to secure its satellite systems and space infrastructure from possible cyber attacks should be some of the priority of Pakistan. Working with international partners to share best practices for establishing national cybersecurity frameworks offers the way forward for improving the security of aerospace in Pakistan. Space Competition between India and China continues to develop, facing both difficulties for China, opportunities for India, and threats for Pakistan too. Drawing on a concept-based plans of lobbying, partnering and investing strategically with China.

Pakistan should strive to make itself more competitive in the regional space intelligence space besides the strategic initiatives of alignment with China. This competition has a larger ramification, beyond national security and indeed economics and international cooperation in space exploration [sic] ranges from technology development to the economics. While Pakistan struggles with this, as an aspirant space power it needs to be current in its view of space-tech and ensure not only parity with neighbors but also use its own things (and sometimes provide that contribute to the space conversation) in a fast evolving global landscape space technology .

16. Future Research Directions

16.1 Pushing the Boundaries in Exploring the Unknown Following research needs to go beyond new frontiers in space exploration and perhaps with involvement in lunar, Mars missions, as future. Pakistan can gain by being part of international efforts for space exploration which enhance its science, and technology prowess apart from humans. 16.2 The Effects of Space Technology on the

Socio-Economic Sectors Pak should start examining the socio-economic impact of space technology in various sectors in Pakistan through research as well. Knowing how space technology could cultivate economic growth or disaster/crisis management, environmental sustainability helps to inform policy decision-making as well investment. 16.3 Global Space Policies: The Case for Impact Assessment Now that global space policies are changing, this needs to a set into reviewing the impact of evermore on Pakistan's space aspirations. Research must explore the role of international conventions, norms and participation in influencing strategic decisions of Pakistan in the domain of space.

17. Final Thoughts

In short China and (Pakistan) need to be resilient, innovative and collaborative for the journey in space exploration technology ahead. With an understanding of emerging technologies, collaborating the private sector and cooperation with international partners Pakistan can continue to manoeuvre the India-China space competition arena and become a major stakeholder of this globalized Space Mecca. The space for growth and progress in this field is colossal, and with vision and a will the country of Pakistan can use space tech to propel national development and provide better security in a hyper competitive global world.

Emerging Technologies in Space Artificial Intelligence and Machine Learning Artificial intelligence (AI) & machine learning (ML) into Space technology will add a great dimension for the capabilities of satellite control and analytic, data study and mission planning in Pakistan. Finally, using AI algorithms will assist Pakistan in making data satellites more actionable so they respond to the environmental changes more quickly and help in Disaster Management. Besides the application of Predicated Analytic for the satellite health, AI can further help in augmenting satellite monitoring and also give better data that will reduce the operational cost for space assets.

Small Satellite Technology Small satellite, or CubeSat development and deployment is an economically feasible option for Pakistan to grow its space cadre. Some of the smaller satellites can be used for different purpose

such as Earth observation, communications, and scientific research. Pakistan can make its investment in small satellite technology pay dividends for data collection and experimentation instead of at the exorbitant cost of larger satellite systems.

Space Robotics Robotics are vital in the very aspect of space and satellite to ensure they deliver the right output. Given Pakistan's current limitations in robotics, it needs to partner with countries that go way beyond the frontiers and form the space robots programme. This ultimately enables remote operations in space, like satellite repair and maintenance along with being good to the concept of future lunar and Mars missions.

19. Improving Public-Private Partnerships

Getting The Private Sector Involved Pakistan should invite private sector to take part in space related projects for strengthening its Space program. This will stimulate innovation and economic development by spurring private investment in satellite technology, launch services and research. An enabling regulatory regime to promote private sector involvement in space activities is essential for developing a flourishing space economy.

Commercialising Space Technology The other startup scene in the space sector Creating space innovation organizations focusing on the startup can help to build a competitive solution- driven ecosystem. Funding, mentorship and resources will be given by government to spur these startups out in creating solutions for satellite technology, data analytics and the exploration/development of space. Encourage an entrepreneurship culture in Pakistan and thus use the creativity and brains of its youth for space sector.

20. Global Collaboration to Achieve Sustainable Development

Engaging in Global Partnerships For sustainable development in space technology, Pakistan should come out with some seeds and participate in the global initiatives. This will not only resources but complementarily endeavours for Pakistan to actualise the heights, in projects based Climate Monitoring, Disaster Response and Resource Management i.e., together addressing world problems through collaborations with

international organizations & sovereign nations.

Sharing the Best Practices Initiatives for mutual knowledge sharing with the world can offer Pakistan extraordinary input on best practices around space technology and policy. Had Pakistan learnt from past successes of other countries, it would have initiated its own way of space development without being behind other nations. India-China space rivalry — dangerous for Pakistan equally a challenge and opportunity within the complex Strategically aligning with China, investing in new technologies and establishing public-private partnerships are among measures through which Pakistan can bolster its space capabilities and strategically place itself in both regional and global space environment.

The consequences on this level of competition are larger than national security and includes economic development, progress and international space exploration cooperation. Pakistan struggles to maneuver through its space tech labyrinth and so it has to be proactive in this space, such that it is not only abreast with its neighbours but also able to deploy its own comparative advantages in global space exploration and technology discussions. Pakistan's space policy in the future will evolve in accordance with its ability to shake off newer geopolitical realities and mould them around national objectives amidst rapid technological change.

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