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COMMERCIAL EXPLOITATION OF OUTER SPACE RESOURCES: A CRITICAL ANALYSIS OF INTERNATIONAL LAW & NEED FOR A MULTILATERAL FRAMEWORK TO DEAL WITH CONTEMPORARY DEVELOPMENT IN SPACE.

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ABSTRACT:

Space, which was earlier a state-dominated arena, has evolved into a competitive commercial frontier. The rapid entry of the private players in the extraction of resources particularly the lunar and asteroid mining, space tourism and machine learning & artificial intelligence has emerged into a pressing legal issue and policy concern of the 21st century. Much domestic legislation has emerged that explicitly permit the private entities to engage in commercial space activities while contradicting with the international obligations that prohibit national appropriation. While the international conventions relating to space says space to be treated as commons but it does not specify about its resources and its appropriation of private players. This paper critically examines the impact of commercialization of space and its effect in various developing and under-developed countries, impact of national legislation in international treaties and Also advocating for a new multilateral framework for equitable benefit sharing of space resources and defining the stand of private participants in the space.

Earlier space explorations:

Earlier, Space explorations by the countries were celebrated as achievements of national pride and symbols of human progress. Outer space was treated as a realm of knowledge acquisition, scientific frontier – mapping planetary systems, earth's geomorphology and structures and testing of human endeavours beyond terrestrial units.

From the late 20th century through the emergence of Tele-communication revolution, marks the first commercial and profit driven application of satellites and such led to the establishment of public-private partnership. This transformed the space exploration which was previously scientific endeavour into commercial endeavour.

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The real paradigm shift emerged in the 21st century with the emergence of private companies operating space missions. Their ventures ranges from reusable rockets, space tourism and resource extraction. This led to the shift of space scientific exploration to commercial exploitation.

International Convention for space law:

Initially the space was a matter of nation-state dominated arena and thus its progressive development necessitated a codification of international law for global cooperation and equitable access to all the countries. Thus the United Nations have incorporated various treaties for regulation of the same. One such was the Outer Space Treaty 1967 – Treaty on the principles governing the activities of the state in the exploration and use of outer space, including the moon and other celestial bodies. The initial signatories of the treaty were the USA, UK and the Soviet Union. And now over 111countries have presently ratified the treaty including all major spacefaring nations.

The treaty outlines the principles on space exploration and is considered as a Magna Carta of international space law. It states that the exploration and use of outer space has to be for the benefit of all and must be for the peaceful purposes. It prohibits the use of nuclear weapon in space. Article 1 of the treaty states the freedom of exploration and the principle of "province of all mankind". Also the Moon Agreement 1979 declares the as the common heritage of mankind. Article II of the treaty prohibits the national appropriation or claim of sovereignty of space resources. Article III states that the State parties shall carry out activities of exploration in accordance with the international law including the charter of United Nations with the aim of promoting international peace and security and fostering global cooperation. Article VI states that the activities of non- governmental entities in outer space shall require authorization and continuing supervision by the appropriate state party to the treaty. Article VII states that state party is liable for the damage to another state party by an object launched by state into space.

Since it was drafted during the era of state were only the space actors it did not provide provisions relating to the regulation of private players as space actors. This arises a scope of ambiguity for the private entities. The treaty did not provide detailed rights, obligations or regulatory frameworks for the private players and their ownership rights to the resource extraction. There exists a legal vacuum in this aspect. But as per lotus principle, where the outer

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space treaty is silence on the resource appropriation of the private players and did not explicitly prohibit and therefore it is not forbidden.

Emergence of Private space players:

Apart from the Monopolized space agencies like NASA, Roscosmos, ISRO etc., many private companies like SpaceX, Blue Origin, Rocket Lab, Virgin Galactic and many emerging Indian start-ups in India primarily as space organizations such as Skyroot Aerospace, Agnikul Cosmos, Pixxel , Dhruva Space are redefining the industry. These private players participation though creates innovation and lower cost and wider accessibility to the space often comes with many legal and regulatory challenges.

The private players as space actors get their access through the national laws enacted by the respective legislature of the states. The vacuum in the international treaty has been exploited by the national laws to enable ownership and appropriation of resources extracted by the private players. Such national laws acts provides an authentication as enumerated in the article VI of the outer space treaty. *The U.S. Commercial Space Launch Competitiveness Act, 2015 and Luxembourg's Space Resources law 2017, UAE's National space law, japan law concerning the promotion of business activities related to the exploration and development of business activities related to exploration and development of space resources* are crucial acts in this debate as the USA, Luxembourg, UAE & Japan have passed laws recognising the ownership rights of the private entities over resources outer space.

These national laws that are local in nature have potential ability to create conflicts between different jurisdiction of states and its actors in the space. This infringes the article II of that the outer space treaty that prohibits national appropriation by claim of sovereignty. This leads to lack of global cooperation, harmonisation and recognition of international law. Also it can also be regarded as indirect claim of sovereignty over the space that state access through private players. While some is on the perceptive that it does not amount to the violation of article II as it does not explicitly prohibit private players it was primarily concerned on the state actors.

Various commercial space activities have taken up by the private players predominantly the space mining and manufacturing, space tourism and development of machine learning solutions for refuelling satellites in orbit are significant potential areas.

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Space mining

Space mining is the extraction of resources from the celestial bodies such as moon and asteroids. . Space mining is the extraction of resources from the celestial bodies such as moon and asteroids. The space and the celestial bodies like the moon, planets, and asteroids contain vast amount of valuable resources which includes helium-3, water ice and rare earth mineral and also platinum. This can be used in many industrial activities as raw materials and fuels. These resources have attracted private players and thus space mining has become a significant endeavour in the recent days. Space mining presents both immense opportunities and also complex legal, socio-economic challenges.

Though space mining still remains in a speculative phase there are government backed funding that support these initiatives. The U.S. government and NASA have been partnering with private players to fast-track their progress in space mining. Thus space mining could witness progressive phase in the next five years with integrated approach of both state and private players. NASA has awarded contracts to few companies to extract lunar regolith from moon .Also, Private space agencies, the planetary resources and deep space industries has made initiatives to target asteroid mining in the next five years and also Gilmour space technologies of Australia are extending their intensive operations to develop autonomous launch vehicles capable of taking independent mining equipment to the surface of the moon, mars and asteroids in the over next five to eight years.

Space mining possesses high potential growth and could be a worthwhile endeavour yet its cost is exorbitantly high. It offers extremely valuable resources that are rare earth minerals and would take millions of years to renew or replenish if exhausted. There has been mining technology employed for extraction of water concerning water scarcity in the earth. It has been expected that the first trillionaire will come through asteroid mining. Such would replace the earth's mining that is plundering of earth's resources and deep sea mining that would cause harmful environmental effects could be replaced. The task of sending rockets to space and bringing them back with extracted minerals are all indeed a highly polluting and energy intensive task which cost high.

Such space mining has much economic impact especially on the developing nations that are rich in mineral resources whose predominant source of income lies on the export of such minerals. This would reshape the global economy of raw minerals. The asteroid mined

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resources would flood the market that would decrease the existing demand for such raw materials essential in any industries.

The space mining is predominantly carried on by the developed nations with both public and private players of developed nations such as the USA, UK, UAE, Japan, Luxembourg etc. Where the developing and under developed countries could not enter into such competitions due to the lack of financial source. Also, such would lead to the unemployment of low-skilled workers employed in mining industry.

Space tourism

Such development in space mining can be witnessed contemporary to the development of space tourism. Space tourism is a recent phenomenon and development where human engagement in space and tour to the international space stations and to space orbits which would provide the experience of earth's view from space. Growing popularity and endeavours to such adventurous activities create a boom to such private industries involved in such missions.

Need for a multilateral framework

All these endeavours to space predominantly by the private enterprises lack a common international legal and regulatory framework. These private players of the developed countries are supported by their national legislations which provide them exclusive rights over the space extracted resources and such act as a license to access the arena of space.

While some developing countries which have increasing private participation and leading role in the arena of space lacks national legislations and thus stays backward in the commercial space competition market. And many such developing countries which lacks such national legislations are denied equitable access to the space market.

And therefore there is a dire need for a multilateral framework which has to be adopted and internationally ratified by the all the countries. Such framework should address all the contemporary developments in the space and must provide a legal and regulatory framework for the private players in space, their position, the ownership of the resources, the equitable access and the stance of the nation-state and their legal obligation for the damages incurred which defines a legal liability for the state as well as the private actors.

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Such multilateral framework must establish a balanced legal framework that balances the commercial interest, sustainability and upholding the principle of "province of all Mankind". It must act a guiding rulebook for various national legislations that are to be adopted in the future.

CONCLUSION:

The space and its explorations so far has been a subject of the nation-state but as the development and progress of mankind and profit-driven capitalist economy. There are emergence of private players in the field with evolution from scientific research to commercialization of space with space mining, space tourism, employment of artificial intelligence and machine learning in regulating the satellites. The interference of private players has made a market of space efficient by launching various reusable rockets that zre cost efficient. Such endeavour to space has potential growth benefits and could potentially reduce the burden on the natural resource extraction from the space. But such lacks legal and regulatory framework which are essential for their effectiveness. Various national legislations are present in developed countries that authorise their private players exclusive license and rights over the access to space and its resources that fills the vacuum of lack of international framework but still for an inclusive development in space access to all the countries has to be made by formulating a multilateral framework for legal and regulatory framework for all.

Way forward:

Creation of the multilateral framework would be efficient in creating a broad legal and regulatory framework common for all. Such would lead to equitable and fair access to the space upholding the principle "province of all mankind".

Establishing various national legislations catering their needs as a developed, developing and under developed countries with compliance to the international standard would be effective which would provide equity to all the nations.

The bearing of liability must be adhered before undertaking of all such space related activities and also regarding the regulation for space debris which is already a matter of concern to various private and public stakeholders.

Private-public partnerships, financial supports and aid to the private players by the nation and

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also emphazing for the societal good and welfare in such activities fir the beneficial for all and common good of the nation.

Establishment of a separate control agency for the regulation and supervision of the space would be extra expeditious and effective in dealing with such space related issuexs with appropriate jurisdiction.