CHAPTER - 11

HARMONISED RULES FOR EMERGING PRIVATE INITIATIVES IN SPACE?: IN QUEST OF FAIR, EQUITABLE AND COMMERCIALLY VIABLE RULES FOR EXTRATERRESTRIAL MINING

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I INTRODUCTION

1.1 Lex Mercatoria as Traditional Goal of Harmonisation

The harmonisation of law has traditionally been associated with *lex mercatoria* – law merchant.[1] This indicates that the harmonisation of law, originating in the uniform law movements in late nineteenth century, has aimed at ensuring application of a common set of rules across the borders of political powers. With the nation states gaining the monopoly over the legislative power in the nineteenth century, divergences in law caused therefrom were deplored as creating barriers to cross-border transactions, and reconstructing the autonomous body of laws, which is believed to have existed centuries ago in Europe and around the Mediterranean, has become the goal.

Another connotation of association with *lex mercatoria* is that the harmonisation of law has, at least conceptually, focused on the private law. In fact, two of the best known subjects of uniform law in early days are the law of international sales and maritime transport. Both are rules for the industry that had been least regulated: international sales, at least prior to the emergence of socialist regimes, had enjoyed

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1 See Ole Lando "The *Lex Mercatoria* in International Commercial Arbitration" (1985) 34 International and Comparative Law Quarterly 747.

autonomy from the regulatory power of sovereign states,[2] while the shipping industry traditionally enjoyed the freedom of the sea as far as international carriage was concerned[3]. Another subject, in which the unification efforts have made a significant success, is arbitration, again strongly identified with the autonomy from sovereign state's power.

1.2 Harmonised Private Law Reflecting Public Policy

The reality has been somewhat different. From the early days, there were other subjects of uniform law strongly influenced by the policy of respective states, such as the law of intellectual property or of air transport.[4] More recently, the degree of policy orientation has become ever more apparent. The UNCITRAL Guide on Privately Financed Infrastructure Projects[5] and the very recent Legal Guide on Contract Farming produced by the joint initiatives of Unidroit, the Food and Agriculture Organization (FAO) and the International Fund for Agricultural Development (IFAD),[6] are just two examples of instruments for harmonising transactions with strong public interests. The series of works by UNCITRAL on secured transactions are clearly motivated by the aspiration to facilitate financing to support emerging economies in making transitions to market economy: again the policy aspects are apparent.[7] Turning the eyes to the law of intellectual property, the public policy issues have become the focus of rulemaking, as are observed in mandatory license exception under the TRIPs Agreement (The Agreement on Trade-

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2 On the history of law of sales, see Roy Goode, Herbert Kronke and Ewan McKendrick (eds) *Transnational Commercial Law: Texts, Cases and Materials* (2nd ed, OUP, 2015) ch 8.

3 See generally, Patrick JS Griggs "Uniformity of Maritime Law – An International Perspective" (1999) 73 Tulane Law Review 1551.

4 See, Jürgen Basedow "Uniform Private Law Conventions and the Law of Treaties" [2006-4] Uniform Law Review 731.

5 UNCITRAL *Legislative Guide on Privately Financed Infrastructure Projects* (2000) UN Doc A/CN.9/SER.B/4.

6 UNIDROIT/FAO/IFAD, *Legal Guide on Contract Farming* (2015).

7 For the background, see N Orkun Akseli *International Secured Transactions Law* (Routledge, 2011) 1 ff. See also Souichirou Kozuka "The Bifurcated World of Uniform Law: The Uniform Law of 'Islands' and of 'the Ocean'" in Unidroit (ed) *Eppur si muove: The Age of Uniform Law* (Unidroit, 2016) 333.

Related Aspects of Intellectual Property Rights),[8] new initiatives on traditional knowledge[9] and the sovereignty claims over the genetic resources.[10]

Given the ever larger policy orientation in harmonisation of law, it is high time to consider how the public policies, in particular those generally accepted and embodied in international public law regimes, can best be reflected in harmonised private law instruments. If the policy consideration is unavoidable after all, the international society needs to develop the methodology for handling it in a better way.

1.3 The "New Space" or Private Initiatives in the Outer Space

One of the emerging subjects of commercial law, which is likely to raise controversies over the policy, is the space activities by private initiatives. The activities in the outer space have long been dominated by the states, space agencies and international organisations. It is only within the last few decades that private operators of launchers and satellites, including those privatised from international organisations, appeared on the scene. These few years have witnessed significant developments changing such settings, sometimes described as "new space."[11] The concept includes several connotations: on the one hand, it refers to the transition from traditional heavy industry manufacturers to information technology enterprises. Another aspect is the purely private initiatives in the space sector, funded by the private money rather than states' budget. The outcome of these developments is the emergence of, or plans for, new types of activities in the space, such as constellation of satellites on non-geostationary orbits, on-orbit operations including refuelling of spacecraft and active debris removal, and exploitation and expropriation of resources in celestial bodies, often referred to as "extra-terrestrial mining."

These initiatives can be the "game changer" of space activities. While it is unlikely that they will dominate the space activities by replacing the traditional space

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8 The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement) (adopted 15 April 1994, amended on 6 December 2005, amendments entered into force 23 January 2017) 1869 UNTS 299, arts 31 and 31bis.

9 African Regional Intellectual Property Organization (ARIPO), Swakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore (adopted 9 August 2010, entered into force 11 May 2015).

10 The Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79, art 15.

11 See the presentations at the France/Japan seminar on Cross-cutting perspectives in space law held on 7 April 2016, as an off-shot event of the Legal Sub-committee of the United Nations Committee on Peaceful Use of Outer Space (COPUOS). The materials are available on the website of the Legal Sub-committee of COPUOS <www.unoosa.org/oosa/en/outreach/events/2016/lsc2016-france-japan-seminar.html>.

activities led by states and space agencies, at least in a short period of time, they will bring about new challenges in terms of applicable law: as activities of private entities, they require application of commercial law. Still, it is obvious that such activities governed by the rules of commercial law must remain within the internationally accepted framework of the law of outer space, the most important of which is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (hereinafter as "Outer Space Treaty"),[12] and be compatible with the policies embodied in such a framework. Because the private entities engaged in such activities can be of various nationalities and there can be transactions between such entities, sooner or later there will be a need for harmonised rules to govern the transactional aspects of such space activities, which reflect the international public law regime and ensuring the compatibility with the embodied policies that the international society ascribed to.

This paper is a modest attempt to consider what such harmonised rules should look like with regard to the extra-terrestrial mining. At the same time, it is a step to explore the methodology to duly reflect the public policy in the harmonised private law regime, which needs to be examined more generally, as mentioned above. The subsequent sections of this paper will discuss the following. First, the developments that have recently occurred with regard to extra-terrestrial mining is introduced, and the rules of public international law regime applicable to those activities are examined. Then why, or in what aspects, harmonised rules are necessary for extra-terrestrial mining is considered and the possible alternatives are advanced, distinguishing the substantive rules on rights. Next, procedural rules for disputes resolution will be discussed. These will be followed by brief conclusions, indicating the implications for the harmonisation of law in general.

II RECENT DEVELOPMENTS IN EXTRATERRESTRIAL MINING

2.1 Relevant Policies Embodied In International Public Law

For extra-terrestrial mining, the most important policy is found in Article I of the Outer Space Treaty. This Article prescribes that the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out "for the benefit and in the interests of all countries". Considering the *travaux preparatoires*, this article is considered to be applied not only for state but also for private party and

12 610 UNTS 205.

international organization.[13] The declaration of Space Benefit[14] interprets this provision and shows the respect for the space commercialization and intellectual property rights.[15] At the same time, commentators view that this Article prescribes declaration of principle and moral obligation.[16] Therefore, it may be considered that this provision should be implemented through international cooperation such as providing opportunities for non-space-faring parties to participate in space programs.

In addition to this, Article II of the Outer Space Treaty and the Agreement Governing the activities of States on the Moon and Other Celestial Bodies[17] (hereinafter "Moon Agreement") are relevant to extra-terrestrial mining. Article II of the Outer Space Treaty prescribes the prohibition of national appropriation by claim of sovereignty. Considering the *travaux preparatoires,* this article can be understood as containing the obligation not only for individual states but also for all countries and international community as a whole including private parties.[18] By referring to the terms of the Moon Agreement, it may be considered that the extra-terrestrial mining activities (exploration of natural resources) does not constitute a means of "appropriation".[19]

Regarding the extra-terrestrial mining by private parties, one of the most controversial issues is the concept of "Common Heritage of Mankind (CHM)" prescribed in the Moon Agreement, which governs the exploration and exploitation

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13 Even if this clause only refers "countries", not private actor, this is certainly a reflection of the time that Outer Space Treaty was drafted. Therefore, considering the preamble and other clauses, now we can interpret as follows that the object of this clause is to ensure the exploration and use of outer space carried on for the benefit of "all peoples". Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds) *Cologne Commentary on Space Law* (Carl Heymanns, 2009) vol 1, 38, 49.

14 Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries (adopted 13 December 1996 UNGA Res 51/122).

15 Setsuko Aoki "The Function of 'Soft Law' in the Development of International Space Law" in Irmgard Marboe (ed) *Soft Law in Outer Space - The Function of Non-binding Norms in International Space Law* (Boehlau, 2012) 81.

16 Bin Cheng *Studies in International Space law* (OUP, 1998) 234-235; Ricky J Lee *Law and Regulation of Commercial Mining of Minerals in Outer Space* (Springer, 2012) 157.

17 1363 UNTS 3.

18 For example, when some private companies alleged to be "selling" plots of land on the moon and issued "deeds of sale", the Board of Directors of the International Institute of Space Law (IISL) published a statement that questioned the basis of their claim and denied the validity of their activities. The Board of Directors of the International Institute of Space Law "Statement on Claims to Property Rights Regarding the Moon and Other Celestial Bodies" <www.iislweb.org/docs/IISL_Outer_Space_Treaty_Statement.pdf>. See Hobe, Schmidt-Tedd and Schrogl (n 13) 56-57.

19 Hobe, Schmidt-Tedd and Schrogl (n 13) 59.

of natural resources of the moon and other celestial bodies.[20] Article XI (1) of the Moon Agreement declares that the moon and its natural resources are the "common heritage of mankind" and that they shall not become property of any entity. Other paragraphs of the same Article provides that the property rights to resources *in situ* on a celestial body are denied and that the exploration of the natural resources of the Moon are to be governed by international regime. As the total number of States Parties to the Moon Agreement is 16 and the number of Signatories that are not Parties is only 4 in the end of 2016,[21] the most controversial issue is whether CHM is customary international law or not and whether CHM can be applied to the non-contracting states to the Moon Agreement. Some commentators view that CHM can be regarded as customary international law,[22] but the others have opposite opinion.[23] Although this issue has been studied and debated for a long time, diverging opinion relates to the contrast between developed and developing states and South and North of the world.[24] Therefore, it is considered that final resolution of this legal debate needs much more time.

2.2 The Legislative Initiatives Already Taken

There have been a few business plans on extra-terrestrial mining made public by private enterprises. However, a critical step on the legal aspect was taken only as late as 2015, when the United States enacted the Commercial Space Launch Competitiveness Act (CSLCA)[25] and included in its Title IV a few provisions on extra-terrestrial mining. One of the provisions requested the US President to "discourage government barriers to the development in the United States of economically viable, safe, and stable industries for commercial exploration for and commercial recovery of space resources in manners consistent with the international obligations of the United States."[26] Another provision declared that "[a] United

20 Ibid.

21 "Status of International Agreements relating to activities in outer space as at 1 January 2016" (A/AC.105/C.2/2016/CRP.3) 10.

22 For instance, Rüdiger Wolfrum "The Principle of the Common Heritage of Mankind" (1983) 43 Zeitschrift für Austländisches öffentiches Recht und Völkerrecht 333-334; Gbenga Oduntan *Sovereignty and Jurisdiction in the Airspace and Outer Space Legal Criteria for Spatial Delimitation* (Routledge, 2012) 193-194.

23 For instance, Christopher C Joyner "Legal Implications of the Common Heritage of Mankind" (1986) 35 International and Comparative Law Quarterly 197-199; Kemal Baslar *The Concept of the Common Heritage of Mankind in International Law* (Martin Nijhoff, 1998) 350-352.

24 Fabio Tronchetti *The exploration of natural Resources of the Moon and Other Celestial Bodies: A Proposal for Legal Regime* (Martin Nijhoff, 2009) 129-130.

25 Public law 114-90, 129 Stat 704 (2015).

26 51 USC, §51302 (a) (2).

States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States."[27] This latter provision caused controversies among space lawyers because of its reference to entitlement to "possess, own, transport, use and sell" the resources.[28]

The first point to note is that all these entitlements are subject to "applicable law, including the international obligations of the United States." Such international obligations include the Outer Space Treaty, to which the United States is a Party, but apparently not include the Moon Agreement, given the fact that the United States have neither signed nor ratified the latter and as discussed above, the legal status of CHM is controversial. Therefore, an issue has been raised as to whether Article II of the Outer Space Treaty, discussed above, excludes property rights in resources extracted from a celestial body (the Moon or an asteroid).[29]

It is in this context that the board of the International Institute of Space Law (IISL), a globally recognised body of space law specialists, published a Position Paper soon after the enactment of the CSLCA stating that the CSLCA stays within a possible interpretation of the Outer Space Treaty.[30] There are also academic writings with more elaborated analysis that supports the CSLCA's compatibility with the Outer Space Treaty. Still, there are also severe criticisms against the CSLCA, based on the concept of CHM included in the Moon Agreement.

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27 51 USC, §51303.

28 See, for example, Fabio Tronchetti "Title IV – Space Resource Exploration and Utilization of the US Commercial Space Launch Competitiveness Act: A Legal and Political Assessment" (2016) 41 Air and Space Law 143; Gbenga Oduntan "The scramble for the asteroids vs. the Common Heritage of Mankind/Province of Mankind Principles" The event of European Space Policy Institute (ESPI) on Space Mining between the Space Treaties and the US Commercial Space Launch Competitiveness Act, Vienna (April 2016) <www.espi.or.at/Events/space-mining>.

29 An analogy to resources extracted from the Earth may lead to a negative answer, because under many countries' law on mining the resources become property of the licensed miner once extracted and taken off the ground, despite the fact that most of such countries claim that the resources lying under the ground belongs to the state, according to the principles of eternal sovereignty to natural resources.

30 International Institute of Space Law "Position Paper on Space Resource Mining adopted by consensus of the board of directors on 20 December 2015" <www.iislweb.org/html/20151220_news.html>.

2.3 The International Forum on the Policy Issues

The US is not alone in confirming the right to extracted resources by legislation. A few months later, Luxembourg declared its aspiration to be a European hub of extra-terrestrial mining and publicly admitted that it is already preparing legislation on the subject.[31] It is anticipated that the legislation will be more or less in line with the CSLCA of the US. The United Arab Emirates, an emerging power in exploration of the space, is also reportedly preparing a similar legislation.

There have also been developments to form an international forum to consider policy issues regarding extra-terrestrial mining. The Hague Space Resources Governance Working Group, organised by the initiatives of the Dutch Government, aims at forging mutual understandings among the different positions in the world about extra-terrestrial mining.[32] It is apparent that there are states having already confirmed or being prepared to confirm private entities' right to extracted resources, while there are some others that do not share the view. There could be still another position emphasising the need for any activities in the space, including private initiatives, to be conducted for the benefit and in the interests of all countries, as required in Article I of the Outer Space Treaty. Although the Working Group has been making serious efforts, reaching a consensus will require not a short period of time.

III CONCEIVABLE REGULATORY FRAMEWORK OF EXTRATERRESTRIAL MINING

3.1 Need for Harmonised Rules for Transactions

Thus, it is possible that the divergence of views will remain, while private initiatives proceed and, if successful as planned, start actually extracting and processing resources in space. Then a question may arise as to whether the resources extracted can be the subject of transactions between entities of different states. Among the various resources that could be mined in the space, the most likely activity to take place in the initial stage is extraction of water from the Moon or asteroid with the aim of processing it into fuel for spacecraft engaged in space exploration. As the mining enterprise will not be consuming the processed fuel itself, a transaction is probable to take place, and the possibility that parties to such a

31 See the press release of the Luxembourg government "Luxembourg to launch framework to support the future use of space resources" (3 February 2016) <www.spaceresources.public.lu/en/press-corner/press/en_Press-release-03_02_2016.pdf>.

32 See the Working Group's website at <http://law.leiden.edu/organisation/publiclaw/iiasl/working-group/the-hague-space-resources-governance-working-group.html >.

transaction belong to different states is not small. Here, harmonised rules for transactions ("uniform commercial law" by a classic terminology) are called for.

While a transaction requires a contract scheme, disputes arising from interference are also conceivable. On the one hand, there can be a case of undue interference, such as obstructing another enterprise's mining activities, destroying facilities of the latter or remotely taking control of another person's mining spacecraft and expropriating the mined resources without consent. On the other hand, if more than one state issue licenses pursuant to the due procedure of respective state's law to competing mining activities (in an extreme case to mining of resources in the same place), there can arise a "lawful" interference between two or more private enterprises. Again, to resolve such disputes in a peaceful manner, harmonised rules for private activities have the role to play.

These harmonised rules may consist of two sets of rules. One is the substantive law rules, in particular with regard to entitlement to extracted resources. Whether transaction or interference, private disputes cannot be solved without determining who (if anyone) has the right to what. Given that private entities' right to extracted resources recognised under the domestic law is controversial, harmonised rules need to provide a clear guidance on this point. The other set of rules is the procedure for dispute resolution.[33] As the favoured dispute resolution in space industry is arbitration, the rules on how to reflect the policy under the public international law in arbitration are required. These will be examined in turn.

3.2 Possible Disputes That Could Lead To Difficulties without Harmonised Rules

Unless there is a set of harmonised rules, difficulties may arise, which can be demonstrated through some illustrative hypothetical examples. In all of the hypothetical cases below, Equatoriana and Ruritania affirm private entities' right to own, use and sell extra-terrestrial resources under its law, while Medietraneo does not. Mediteraneo holds the view that such shall be contrary to the concept that the outer space and resources *in situ* are common heritage of mankind. Equatoriana requires any entity that is licensed to extract resources from the outer space under its laws to make a certain amount of contribution to the global fund for space education, but Ruritania's law gives no such consideration.

33 See Tanja Masson-Zwaan "Space resource utilization and international space law" The Symposium on Legal Aspects of Space Resource Utilization, The Hague (April 2016) <www.universiteitleiden.nl/en/events/2016/04/symposium-on-legal-aspects-of-space-resource-utilisation>.

3.2.1 Case 1. Sales among Parties with Different Policies

A is a company incorporated in Equatoriana, B is a company incorporated in Mediterraneo, and C is a company incorporated in Ruritania. A extracts resources from an asteroid and sells B, which then resells them to C. The delivery is done on orbit and B's engagement in the chain of sales is only on documents. C later disputes the validity of the sales and refuses to make payment to B, alleging that the subject of sales is illegal under the laws of Mediterraneo.

3.2.2 Case 2. Sales between Parties in States with Similar but Different Policies

A is a company incorporated in Equatoriana, and C is a company incorporated in Ruritania. C extracts resources from an asteroid and sells them to A. A later denies the validity of the sales contract by claiming that under the laws of Equatoriana, mining resources from the outer space without paying any attention to the principle that the exploration and use of outer space "shall be the province of all mankind" (as declared in Article I of the Outer Space Treaty) and taking account of the needs of developing countries, as required by the Space Benefit Declaration, is illegal.

3.2.3 Case 3. Confiscation of Resources from the Outer Space

D is a company incorporated in Equatoriana and E is a company incorporated in Ruritania. D extracts resources from an asteroid and sells it to E, which brings it to the territory of Mediterraneo to deliver it to an end user there. The officials of the government of Mediterraneo confiscate the resources on the basis that private uses of resources from the outer space are illegal under its laws.

3.2.4 Case 4. Launch Contract for Mining Spacecraft

F is an extra-terrestrial mining company incorporated in Mediterraneo, and G is a launch service company incorporated in Equatoriana. F and G enters into a launch service agreement by which G undertakes to launch F's spacecraft for mining an asteroid by G's launcher. Later G realises that Mediterraneo denies private entities' rights to resources from the outer space and avoids the launch service agreement for the reason that the mission of F's space craft is in breach of the law of its state of incorporation. F disputes by arguing that it has been duly licensed by Ruritania, where F's holding company is incorporated, to extract resources.

3.2.5 Case 5. Competing Licenses from Different States

H is a company incorporated in Equatoriana, and J is a company incorporated in Ruritania. Both companies acquire licenses to mine the same resources for exactly the same area on the same asteroid. H's mining spacecraft reaches the Asteroid first and H has already set up an exploration facility on the surface. J sues H in Ruritania

by illegally interfering its right by occupying the area for which J is licensed to mine without a title.

3.3 Inspirations from the Paris Convention on Industrial Property

When considering the possible rules for the substantive rights aspect of extra-terrestrial mining, the experiences of industrial property law conventions in early days are inspiring. When the Paris Convention was concluded in 1884, the motivation was to protect technologies even if the products are displayed in public (such as on the occasion of international exhibitions). However, some states in Europe adopted the policy not to protect technologies by patents as a matter of domestic law.[34] Therefore, the rules in the Paris Convention were, in fact, those on foreign citizens' rights. A state party (for example, the Netherlands) accepted to provide the same protection by patents to a citizen of another state party (for example, France) that the latter enjoys in its own country, even if it adopts a policy not to grant any protection by patent to its own citizen under the domestic law. A comparison could be drawn to the divided views on the private rights to extracted space resources of today.

Still, the implication cannot be taken in a straightforward manner. It is because the "denial of right", which is raised as a basis to dispute the validity of an agreement in Case 1, means different things in a different context. In the case of industrial property, if protection by patent is denied, the technology can be used by anybody. In other words, the technology denied of protection belongs to public domain. While the government of Mediterraneo in Case 3 might raise such an argument, this is not the usual argument when it is alleged that a private right to space resources shall be "denied." Contrary to claiming that the resources should be exploited freely by anybody, the advocate of such an argument requires that the resources be placed under the control of some public body (most typically the international mechanism to be established according to Article XI of the Moon Agreement) and protected from private entity's exploitation.

3.4 Possible Alternatives for Harmonised Rules of Extra-terrestrial Mining

As a result of such differences, an international regime of the Paris Convention type that simply requires a state party to recognise a foreign entity's right as granted by the state of origin will make sense only in the case of interference (as in Case 3 above). In that situation, a foreign entity will be assured that its right to the extracted resources will not be expropriated even under the jurisdiction of a state that

34 Fritz Machlup and Edith Penrose "The Patent Controversy in the Nineteenth Century" (1950) 10 The Journal of Economic History 1.

domestically "denies" such a right. However, it makes little sense in the case of a transaction (as in Case 1), because an assignee of the space resource in the state that denies the right to space resources (Mediterraneo) will not be able to use the resource, even if the assignor had been granted a right to the resource under the laws of its own state (Equatoriana), which the former state (Mediterraneo) recognises only as long as the resource remain in the hands of the assignor.

A different outcome will be achieved if the harmonised rule requires mutual recognition of rights under the jurisdiction of states parties. To be more precise, a state party will recognise a right to resources extracted from a celestial body if the mining was conducted in compliance with the regulation of the miner's state. This is notwithstanding that an entity in the former state would be required to comply with a different set of regulations (or possibly never permitted to engage in extra-terrestrial mining because that state denies private entity's extra-terrestrial mining as its domestic policy). If applied to Case 2 above, C's right to extra-terrestrial resources shall be recognised in Equatoriana, as C's exploitation is fully in compliance with its state, i.e. Ruritania, though such laws are different from those of Equatoriana. Under this type of a regime, a transaction will be more promoted, as the assignee has only to make sure that the assignor complied with the regulation of the assignor's state.

Thus, there are two possible alternatives for a harmonised rules for extra-terrestrial mining, either the Paris Convention type regime (of recognising foreign entity's right as granted by its original state) or mutual recognition type regime (of permitting a domestic entity to acquire a resource mined according to the law of the miner's state). If the latter approach is adopted as a harmonised rule on extra-terrestrial resources, the agreements in Case 1 and Case 2 above are assured of its validity.

Whichever of these two alternatives are adopted, the public policy under the Outer Space Treaty must be respected as a precondition. Therefore, in order to qualify for being recognised in another state party, the right must have been granted in compliance with the Outer Space Treaty, which is an internationally recognised law of public policy. In other words, the harmonised rules to be produced shall include the minimum standard for the domestic regime on the issuance of a license for extra-terrestrial mining. It is again comparable to the Paris Convention, which introduced the minimum standard for the protection of industrial property. If such a minimum standard is established and accepted by most states in the world, the dispute such as in Case 4 above will be prevented. Launch service provider G shall examine whether the laws its client F is subjected to (ie the laws of Ruritania) meets

the minimum criteria under the harmonised rules (which Equatoriana, Mediterraneo and Ruritania all accept).[35]

The public policy of the Outer Space Treaty includes the principle of its Article I, which requires that space activities be conducted for the benefit of all mankind. It may imply that the extra-terrestrial activities, even by private initiatives, needs to contribute to the entire population on the globe. If the extracted resources are used for scientific or other public mission, such as fuelling the spacecraft for deep space exploration, the requirement may be regarded as satisfied. In other cases, the entities engaged in extra-terrestrial mining will be advised to contribute the return from their activities for the sake of sustainable development of the world. The Space Benefit Declaration will give good guidance in this regard.

IV DISPUTES RESOLUTION MECHANISM FOR EXTRATERRESTRIAL MINING ACTIVITIES

The harmonised rules for extra-terrestrial mining must also include rules on dispute resolution. This is because the dispute resolution procedure, while commercial in nature, needs to ensure that the public policy embodied in public international law is duly reflected in the resolution of the disputes.[36]

4.1 Arbitration Rules of PCA

Regarding the reflection of public international law to the dispute resolution, the Permanent Court of Arbitration (PCA) offers an important possibility. In the 1990's, PCA adopted some Optional Rules and extended its mandate to cover not only disputes involving state alone, but also those involving private parties and international organization.[37] In this context, PCA advisory group created the Optional Rules for Arbitration of Disputes relating to Outer Space Activities (hereinafter "Optional Rules") in 2011.

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35 This paper intends to imply no projection about the minimum standard that the global society agrees on. However, given that the Space Benefit Declaration is recognised as proper interpretation of Article I of the Outer Space Treaty, it is unlikely that such a minimum standard can derogate from the requirement under the Space Benefit Declaration.

36 A fundamental distinct category of *public policy* is recognized in the idea of international public policy, meaning public policy derived from international law or broader international norms, sometimes referred to as transnational public policy or truly international public policy. Alex Mills *The Confluence of Public International Law: Justice, Pluralism and Subsidiarity in the International Constitutional Ordering of Private Law* (CUP, 2009) 274-276.

37 PCA, The Optional Rules for Arbitrating Disputes between Two States (1992); PCA, The Optional Rules for Arbitrating Disputes between Two Parties of Which Only One is a State (1993); PCA, The Optional Rules for Arbitration Between International Organizations and States (1996); PCA, The Optional Rules for Arbitration Between International Organizations and Private Parties (1996).

The Optional Rules are based on the UNCITRAL Arbitration Rules as revised in 2010 (hereinafter "UNCITRAL Arbitration Rules")[38] with changes in order to reflect some specific features of international space law. They are; to (i) reflect the particular characteristics of disputes having an outer space component involving the use of outer space by States, international organizations and private entities; (ii) reflect the public international law element that pertains to disputes that may involve States and the use of outer space, and international practice appropriate to such disputes; (iii) indicate the role of the Secretary-General and the International Bureau of the Permanent Court of Arbitration at The Hague; (iv) provide freedom for the parties to choose to have an arbitral tribunal of one, three or five persons; (v) provide for establishment of a specialized list of arbitrators mentioned in article 10 and a list of scientific and technical experts mentioned in article 29 of the Rules; and (vi) provide suggestions for establishing procedures aimed at ensuring confidentiality.[39]

In fact, article 35 of the Optional Rules prescribes that "[f]ailing such designation by the parties, the arbitral tribunal shall apply the national and/or international law and rules of law it determines to be appropriate."[40] Therefore, the award of the PCA will be affected by the public international law including United Nation Space Treaties.

4.2 Need for Rules Applicable To Disputes between Private Parties

Some argue that the PCA optional rules have multiple advantages for the resolution of space-related disputes, such as flexibility of choosing arbitral panel and procedures, preservation of confidentiality of sensitive information, finality of the award as binding on the parties and the possibility of enforcement by way of the New York Convention.[41] Regarding the reflection of public policy, the PCA can refer public international law to the award. However at the same time one obviously remaining issue is that the PCA cannot solve disputes between private parties, even if the parties refer to the optional rules.

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38 UNCITRAL Arbitration Rules as revised in 2010 (adopted 6 December 2010 UNGA res 65/22).

39 PCA, The Optional Rules for Arbitration on Disputes relating to Outer Space Activities (adopted 6 December 2011), Introduction <https://pca-cpa.org/wp-content/uploads/sites/175/2016/01/Permanent-Court-of-Arbitration-Optional-Rules-for-Arbitration-of-Disputes-Relating-to-Outer-Space-Activities.pdf>.

40 Ibid art 35.

41 Stephan Hobe "The Permanent Court of Arbitration Adopts Optional Rules for Arbitration of Disputes Relating to Outer Space Activities" (2012) 61 Zeitschrift für Luft- und Weltraumrecht 4-6; Fausto Procar "An Introduction to the PCA's Optional Rules for Arbitration of Disputes Relating to Outer Space Activities" (2012) 38 Journal of Space Law 171-179.

With the space market expanding, it is expected that the presence of private parties will increase compared to the traditional entities such as states, space agencies and international organizations. The number of disputes between private entities will certainly increase in the era of space commercialization. As discussed above, although space agencies and the government will play a key role for extra-terrestrial mining in the future, we cannot neglect the emerging private parties called "new space". Therefore, even if the PCA has advantage in applying public international law to the dispute, the fact that disputes between the private entities cannot be resolved by the PCA poses a serious problem.

4.3 Required Possibility of Referring to Public International Law

If a dispute related to commercial space activity between private entities occurs, the private law rules and regulations concerning commercial activity will be mainly referred to solve the problem. However, it is difficult to rule out the possibility that private parties refer to public international law, especially Articles I and II of the Outer Space Treaty. If the concept of CHM under the Moon Agreement is applicable (as in the case where all parties to the dispute are located in the State Parties to the Moon Agreement), it must also be considered in solving the dispute. As mentioned above, these public international laws constitute public policy for extra-terrestrial mining.

4.4 UNICITRAL Model Law on Arbitration as the Starting Point?

Above mentioned study clearly shows that dispute resolution mechanism for extra-terrestrial mining activities in future requires two elements; applicability to the dispute between the private parties and possibility of referring to the public policy embodied through public international law including Outer Space Treaties. The international commercial arbitration, if proceeded according to appropriate rules, can satisfy these requirements.

Needless to say, the international commercial arbitration can deal with the disputes between private parties and some previous studies show that the international commercial arbitration is considered as an effective dispute settlement mechanism for commercial space activity.[42] Besides, although there is a possibility

42 IHPh Diederiks-Verschoor and V Kopal *An Introduction to Space Law third revised edition* (3rd and revised ed, Kluwer Law International, 2008) 157. The previous study shows that regarding the commercial space activity under contract, such as commercial space launch, satellite telecommunication and space insurance, International Commercial Arbitration like International Chamber of Commerce, American Arbitration Association, and London Court of International Arbitration will be utilized for dispute resolution because they have highly specialized and technical procedure, guarantee of confidentiality, and neutrality and possible enforcement through New York convention. See also Claude-Alain du Parquet "Specific Clauses Launch Services Agreement" in Lesley Jane Smith and Ingo Baumann (ed) *Contracting for Space Contract Practice in the*

that states assert sovereign immunity and international organizations claim privileges and immunities as are necessary for their effective functioning,[43] if the State or International Organization agree to an arbitration clause in its contract, the agreement is considered a waiver of its immunity.[44] Therefore, the international commercial arbitration will be useful whichever set of parties, among private party, state and international organization, may be involved in the dispute.[45]

In addition to this, a tribunal in the international commercial arbitration can refer the public international law in its award by two ways, namely to apply national substantive law as affected by the public international law or to apply the public international law directly.

Firstly, the parties to the arbitration choose a national substantive law to govern their contract and a place of arbitration whose *lex arbitri* will govern the arbitral proceedings.[46] Regarding this point, a lot of space-faring states establish national space legislation, which can directly apply to private parties in order to implement international responsibility prescribed in Art.6 of Outer Space Treaty (international responsibility for non-governmental entities),[47] and also to embody national space policy, such as the promotion of its industry. For example, CSLCA of the US will give US space companies the rights to own and sell natural resources they mine from bodies in space, including asteroids.[48] Considering the current situation that substantive norm regarding commercial space activity is continuously developed in a lot of countries, it is anticipated that a national space law prescribing substantive norms will be selected as an applicable law in the international commercial arbitration.

European Space Sector (Ashgate, 2001) 391; Laurence Ravillon "Le Contentieux Arbitral dans le Secteur de l'Activité Spatiale" (2003) 7 International Business Law Journal 819; Alexis Mourre "Arbitration in Space Contracts" (2005) 21 Arbitration International 52- 54.

43 Philippe Sands QC and Pierre Klein *Bowett's Law of International Institutions* (6th ed, Sweet & Maxwell 2009) 494-495; Jan Klaabbers *An Introduction to International Organizations Law* (3rd ed, CUP, 2015) 130-136.

44 Margaret L Moses *The Principle and Practice of International Commercial Arbitration* (2nd ed, CUP, 2012) 56.

45 Frans G von der Dunk "Space for Dispute Settlement Mechanisms-Dispute Resolution Mechanisms for Space? A few legal considerations" [2001] Proceedings of the Forty-Fourth Colloquium on the Law of Outer Space 442-452.

46 Moses (n 44) 67.

47 Mark Sundahl "Financing Space Ventures" in Frans von der Dunk with Fabio Tronchetti (eds) *Handbook of Space Law* (Edward Elgar, 2015) 127-128.

48 Public law 114-90, 129 Stat 704 (n 25).

Referring to the above mentioned hypothetical Cases, Cases 1 and 4 are good examples because the outcome of the arbitration between private parties depends on the applicable national substantive law. In Case 1, if the national substantive law of Mediterraneo where extra-terrestrial mining is considered to be contrary to the CHM is chosen, C, who insists on refusal of payment on the grounds of laws of Mediterraneo, has the advantage. Contrary to this, if that of Ruritania is chosen, B has the advantage. In Case 4, if the national substantive law of Mediterraneo is chosen, F's argument which is based on the license of Ruritania is at the disadvantage. As opposed to this, if that of Ruritania is chosen, F's argument gains the advantage.

Next to the national substantive law, public international law is focused as an applicable law to the arbitration, and UNCITRAL Model Law on International Commercial Arbitration (hereinafter "UNCITRAL Model Law")[49] may play an important role as a starting point. The purpose of UNCITRAL Model Law was to harmonize national legislation in each country concerning arbitration. Each country refers this UNCITRAL Model Law to enact its national law on which international commercial arbitration will be conducted.[50] Art 28 of the UNCITRAL Model law attaches the importance to the party autonomy to keep the room to choose the applicable rules of law by the parties.[51] As the wording is "rules of law" instead of "law", the rules of law that have been elaborated by an international forum and not yet been incorporated into any national legal system can be selected.[52] Besides, under the UNCITRAL Arbitration rules which prescribe the procedure and are frequently used in ad hoc arbitration, the view was expressed that "Law" prescribed in Art 35 (1) of UNCITRAL Arbitration rules includes public international law and if parties agree, and thus the public international law can be applied.[53] However, it is not necessary that all of the public international law rules can apply to the

49 United Nations Commission on International Trade Law (UNCITRAL), Model Law on International Commercial Arbitration (adopted 21 June 1985 UNGA Res 40/72, amended 7 July 2006 UNGA Res 61/33).

50 Many countries have adopted the UNICITRAL Model Law as their arbitration law. Moses (n 44) 6.

51 Art 28 of the UNCITRAL Model law prescribes that "(1) The arbitral tribunal shall decide the dispute in accordance with such rules of law as are chosen by the parties as applicable to the substance of the dispute. Any designation of the law or legal system of a given State shall be construed, unless otherwise expressed, as directly referring to the substantive law of that State and not to its conflict of laws rules. (2) Failing any designation by the parties, the arbitral tribunal shall apply the law determined by the conflict of laws rules which it considers applicable."

52 Goode, Kronke and Mckendrick (n 2) 591.

53 David D Caron and Lee M Caplan *The UNCITRAL Arbitration Rules: A Commentary* (2nd ed, OUP, 2013) 116.

arbitration. In fact, a view was expressed that only the principles of law such as "*pacta sunt serbanda*" can apply to international commercial arbitration and public international law does not apply actively because the latter is drafted with ambiguous wording compared to the contract.[54] Detailed discussion and analysis based on the characteristics of public international law is required.

In Cases 2, 3 and 5 above, the result of the arbitration between private parties depends on the applicability of public international law to the dispute. For example in Case 2, A denies the validity of sales contract by referring to Article I of the Outer Space Treaty. In considering the application of this article, one must note that the clause "for the benefit and in the interests of all countries" in Article I was derived from the first and second principles of the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space[55] before the Outer Space Treaty was adopted, and then reconfirmed by the Declaration of Space Benefit later. Therefore, the clause may be referred to the arbitration.

On the other hand, in Cases 3 and 5, application of international law to the arbitration will be controversial. In these cases, both of the private parties to the dispute (D & E in Case 3, and H & J in Case 5) act legally in accordance with national legislation of respective state of incorporation. Still, in each case, the conflicts occur owing to the difference between the substantive rules of the national laws (Mediterraneo and the other two states in Case 3, and Equatoriana and Ruritania in Case 5). In order to solve the problem, private parties need to require that the government of the state where they are incorporated consult or negotiate with the other state. In this phase, Article IX of the Outer Space Treaty will have importance. It prescribes that a State Party "shall undertake appropriate international consultations before proceeding with any […] activity or experiment", when it has reason to believe that an activity or experiment planned by it or its nationals in outer space would cause potentially harmful interference with activities of other States Parties. However, as mentioned above there are some doubts whether public international law like Article IX is applied to the arbitration.

In order to enable the application of such kind of public international law provision, a model law is beneficial. For example, if neither party has the bargaining power to force the other party to accept its own national law, and if the contract involves the sales of goods, United Nations Convention on Contracts for the International Sale of Goods (CISG) will be selected as an applicable law to the

54 Julian D M Lew *Applicable Law in International Commercial Arbitration* (Oceana, 1978) 404-405.

55 Adopted 13 December 1963 UNGA Res 1962 (XVIII). Hobe, Schmidt-Tedd and Schrogl (n 13) 29.

arbitration.[56] Likewise, in order to make sure of the application of public international law in arbitration for the extra-terrestrial mining, the necessity for drafting a model law is emphasized. This model law should include not only substantive rules comparable to those in CISG but also procedural rules regarding dispute settlement, where the application of public international law is prescribed. In this point the optional rule of PCA gives us a good model. The rules reflect the public international law element and prescribe that "[f]ailing such designation by the parties, the arbitral tribunal shall apply the national and/or international law and rules of law it determines to be appropriate".[57] If the same clause is included in the new model law with regard to arbitration for extra-terrestrial mining, there will be a room for the arbitrator to choose the applicable law and reflect public policy embodied in public international law, especially the above mentioned space laws by its power.[58]

4.5 Collaboration of UNICITRAL and UNOOSA

The above examination shows that the necessity of new model law, which is applicable to the international commercial arbitration is emerging. Needless to say, in drafting such a model law, the UNCITRAL should play the central role, as the model law will be harmonised rules on international commercial transactions. Furthermore, in order to deepen and accelerate the discussion, collaboration between the UNCITRAL and Office for Outer Space Affairs of the United Nations (UNOOSA)[59] will be valuable, as the latter office has the expertise in space law. Such a collaboration has taken place between the UNOOSA and the International Civil Aviation Organization (ICAO), a specialised agency of the United Nations responsible for civil aviation. The collaboration started in order to coordinate the regulations and standards for civil aviation and sub-orbital flights and other space activities in Low Earth Orbit, which is another field of "new space." It has proven to be very successful in producing a shared understanding among the governmental,

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56 Moses (n 44) 73.

57 Art 35 (1) of PCA's Optional Rules prescribes that "In resolving the dispute, the arbitral tribunal shall apply the law or rules of law designated by the parties as applicable to the substance of the dispute. Failing such designation by the parties, the arbitral tribunal shall apply the national and/or international law and rules of law it determines to be appropriate."

58 Even if the arbitral tribunal shall apply the national and/or international law and rules of law it determines to be appropriate, it seems valid that the treaty contracted by the state whose national substantive law is applied to the arbitrated dispute and the customary international law is applied to the arbitration because predictability to the private parties should be ensured.

59 OOSA works to promote international cooperation in the peaceful use and exploration of space, and in the utilization of space science and technology for sustainable economic and social development. UNOOSA web <www.unoosa.org/oosa/en/aboutus/index.html>.

intergovernmental and private entities.[60] Given such a good precedent, the UNCITRAL may be interested in establishing collaboration between the UNCITRAL and UNOOSA on the possible rules for extra-terrestrial mining. The "UNISPACE+50," the fiftieth anniversary of the first UNISPACE conference of 1968, may be a good opportunity to start collaboration and analyse the relationships between United Nations Space Treaties and a possible model law under the auspices of UNCITRAL.[61]

V CONCLUSIONS

As an emerging business, the "new space" or space activities by private initiatives, offers a new frontier for harmonised commercial law. In extra-terrestrial resources mining, where the policies can be divided among states and the interpretation of relevant public international law can be divergent, the harmonised rules must also include mechanisms to coordinate such policies. It might appear as an additional difficulty in formulating such harmonised rules. Contrary to the generally held belief that uniform laws are of purely private law matters, however, the recently adopted instruments to harmonise commercial law rules have policy orientation to some degree. The need to ensure that policies are duly reflected is a norm and not an exception. Therefore, the harmonised rules on extra-terrestrial resources mining will not, in fact, be an extreme outlier among harmonised commercial law.

The policies embodied in public international law must be reflected both in substantive and procedural rules. The inclusion of procedural rules is particularly important, given that most of the disputes arising from outer space activities will be solved by arbitration. A work to promulgate these substantive and procedural rules will indeed be a challenge. Still, it will be a worthwhile challenge, as the extra-terrestrial mining by private entities, once realised, requires predictable legal environment, which can only be ensured through formulation of internationally harmonised rules.

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60 See ICAO "Space Transportation" <www4.icao.int/space>.

61 As a thematic priorities in the conference, "Legal regime of outer space and global space governance: current and future perspectives" is presented and assessing the state of affairs of UN space treaties and their relationship with other relevant international instruments is prescribed as object. See "UNISPACE+50: Thematic priorities and the way ahead towards 2018" (A/AC.105/2016/CRP.3) 13.