

Sustainable Development and Scientific Research in Outer Space

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Abstract

The interpretation of the “interest of mankind” principle has led, first, to the adoption of the Moon Agreement and, at the same time, brought to its defeat. At present we see a renovation of interest in the doctrine of the “global commons” within the sustainability policy of men activities on earth and in space, the new challenge is to balance the need to preserve outer space for future generations, the enhancement of scientific research and the freedom to enact space activities compliant with the peaceful purpose principle and all other principles set at the international level.

1. Introductory remarks

Among different and diversified tasks, law has the hard duty to maintain a balance between the interest of a single subject, being it an individual or a State, and the interest of collectivity, being a community of people or the International Community of States, in order to assess a legal order. In accomplishing this task, in centuries law has been influenced by the economic development of States as well as by their social and technical evolution, features that characterised policies and laws of every field of men’s activity. Therefore, sometimes laws allow an activity because of the need to protect individual freedom to act or to allow national progress, and other times laws forbid a particular activity due to its riskiness or to a superior interest to be pursued. In both cases, however, the legal framework tries to keep in consideration all the interests involved and to assess a proper balance between them.

Within the international domain, the balance to be found is more complicated. On the one side, States push forward their interests and needs enacting a national foreign policy which features the relationship with the other States of the International Community; such policy is driven by the balance found within the national legal framework between national and individual interests and it works as a propeller in the creation of international norms. On the other side, the interest of the International Community as a

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whole does not always coincide (better to say often collides) with the *ratio* behind State's international behavior, therefore States have to decide if the individual profit of a single State or the collective general benefit shall prevail. This choice has consequences not only within international law but also in international relationships.

2. Sustainability, sustainable development and environmental law

The concept of sustainability deals with the capacity of humans to live within environmental constraints respecting ecological limits and ecological integrity while performing activities on earth.¹ It is a traditional non-legal notion, derived from the idea of humans living in harmony with the mother earth, and it acquires a proper definition and normative relevance after the industrial revolution, when the environmental impact of human activities became self-evident, and the need for precise plans to avoid un-restorable damages began to be part of the agenda for policy makers. Here it is the strict connection to environmental law, on the one side, and the main distinctive approach, on the other. If both concepts deal with the protection of the environment² we consider environmental law as a branch of international law, and therefore the attempt to define, at the supra-national level, rules for States and other international legal framework's subject that allow the protection of our living planet. On the other side, sustainability is a multi-dimension concept, that encompasses an holistic approach to the actions of human beings within the ecological shape of our planet. While the environmental law approach proposes defensive actions towards the actual (or potential) damages caused by human activities, the sustainability approach tends to regulate and drive propositive actions devoted to a minor impact on the environment, therefore including cultural and educational rather than normative skills. Sustainability can therefore be seen as an engine for normative amendments and proposals, driving the national and international legislators to a conscious intervention that strikes the best balance between the technological and industrial evolution of our society and the need to protect the natural dimension of the planet we live in. Here the rise of the sustainable development principle, a normative concept³ derived from the sustainability principle and appeared for the first time in

1 See M.D. Sánchez Galera, *Educational and cultural challenges of the European sustainability model*, Springer Nature, Switzerland, 2020, p. 32.

2 No precise definition of the term is available yet, but from the combined reading of the international instruments dealing with its protection it emerges the there are 3 elements concurring to its definition: i) it has to be created naturally and not by human intervention; ii) it is a set of living conditions and iii) it is all-encompassing.

3 It would be a short-sighted approach to define sustainable development only as a normative principle, since following its use in recent times it can be defined as a multi-dimension notion, where it can be seen as a political objective, a legal concept,

1987 within the Brundtland Commission Report *Our Common Future: Report of the World Commission on Environment and Development*.⁴ The document enlightens that: “*humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of the future generations to meet their own needs*”, and opens the path to the discussions about the legal value of the principle and the consequences of its breach. The international Community has widely accepted the principle as a counterpart to the right of development recognized to all nations, endorsing its legal value in many international instruments,⁵ and therefore attributing to it binding force through Treaties towards States’ parties, but there is still ambiguity as for its normative value as a principle of international customary law. The International Court of Justice (ICJ), as well as the International Tribunal for the Law of the Sea seems to be still reluctant in deciding pending cases on the basis of the sustainable development principle,⁶ preferring to use it as an interpretative tool of existing agreements and norms. The first case where it came to the attention of the ICJ is the Case concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia), decided in 1997, and originated from a dispute between Hungary and Slovakia concerning the suspension of a Treaty providing for the ctualizati of a dam and a system of locks on the Danube river. Following Hungarian arguments, the project would have had great adverse environmental consequences that could make the societal and economical advantages of both nations less relevant. Because of the mentioned considerations, Hungary suspended the work on the project and

a legal principle, a human right, a methodological framework for the creation and appreciation of international and national norms or an interpretative tool for legal documents. The adoption of the UN 2030 Agenda on Sustainable Development demonstrates the actual relevance in terms of policy and international action’s goals; see <https://sdgs.un.org/2030agenda>, where States “*recognise that social and economic development depends on the sustainable management of our planet’s natural resources*” (paragraph 35).

- 4 The Commission was created by the General Assembly of the United Nations in order to unite Countries, developed and developing ones, to pursue environmental protection finding a global consensus on the need for a new *corpus* of environmental law.
- 5 See, *ex multis*, the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Droughts and/or Desertification, Particularly in Africa, 1994; United Nations Framework Convention on Climate Change, 1992; Rio Declaration on Environment and Development, 1992; Copenhagen Declaration, 1995; Dublin Declaration by the European Council on the Environmental Imperative, 1990.
- 6 See ICJ, *case concerning Pulp Mills on the River Uruguay* (Argentina v. Uruguay), Judgment of 20th April 2010, where the Court did not mention the principle of sustainable development in order to solve the case (even if pertinent), therefore deciding on the basis of a formal obligation contained in an agreement between the two involved States.

Slovakia, disagreeing with Hungary, constructed a modifies system of locks on the Danube, reducing the flow of the river downstream into Hungary. Called to rule the case, the Court assessed Hungarian violation of the Treaty but, at the same time, observed that Slovakian activities damaged Hungary, asking both parties to enter into good faith negotiations to reach a workable solution that keeps into account the principle of sustainable development, as an expression of the need to reconcile economic development with the protection of the environment. Despite the relevance of the concept, the ICJ does not affirm its normative value, neither applies it to solve the case, but its intervention is limited to the qualification of sustainable development as a principle that has to be taken into account by the parties themselves to solve the clash between development and sustainability following the good faith principle enshrined in the Vienna Convention.

Within this context, the Court stresses the evolution of the principle and underlines that the scientific insights and the increasing awareness of the risks for mankind have led to the rise of a set of standards to be satisfied in the accomplishments of legitimate economic activities, standards that must be followed not only in the actualization of new activities, but also when continuing activities begun in the past. For the purpose of this study it is worth mentioning two elements of the reasoning of the ICJ, that will lead us to the analysis of outer space activities. First of all sustainable development is a concept to be used in the interpretation and actualization of international law that allows to take into account the interests of a subject that is formally not bound by a Treaty (or by any other source of international law) but is interested and touched by its application: mankind as a whole. This is self-evident whenever regulation relates to the so called global commons, and therefore its use impacts on humankind.

Secondly, the Court underlines the role of scientific research in pointing out the risks for the environment and leading to the elaboration of proper standards based on sustainable development. Science is therefore the engine of knowledge and the basis for any risk assessment, as well as the instrument through which sustainable development is put in practice and applied to human activities. Sustainable development could not be elaborated as a concept without scientific research and can not be applied independently from scientific evidences. Scientific research is then the origin and the application of the principle at stake.

More recently also the ITLOS approached the sustainable development principle within the application of the UNCLOS Convention.

In the advisory opinion on coastal and flag State duties to ensure sustainable fisheries management, rendered on April the 2nd 2015, the Tribunal observed that Article 61(2) of UNCLOS provides that coastal states, taking into account the best scientific evidence, must ensure through proper conservation and management measures the maintenance of the living resources of the EEZ, considering that the ultimate goal of sustainable management of

fisheries “*is to conserve and develop them as a viable and sustainable resources*”, and that therefore “sustainable management” meant “conservation and development” as referred to in Article 63(1) of UNCLOS. The way through which such a goal has to be pursued is international cooperation and coordination, in accordance with Article 61 (2) and 61 (3) of the Convention. Stressing the need for a proper balance between fishing resources management and environmental protection, implies the use of the principle of sustainable development as a tool that can solve the clash between the two different interests in a proper manner.

But the ITLOS goes beyond the well assessed use of sustainable development as a tool for the interpretation of international binding instruments. In 2011 the Seabed Dispute Chamber delivered an advisory opinion concerning the limits of State liability when a contractor that a State is sponsoring to explore and exploit the seabed areas beyond national jurisdiction causes damage or harm to the environment. Within the opinion the Chamber addresses international environmental law in connection to the obligations of States with respect to the common heritage of mankind, promoting the application of the precautionary principle in situations where scientific research is insufficient to assess the balance between environmental and economic interests. Recalling Principle 15 of the Rio de Janeiro Declaration⁷ it concluded that States must apply a precautionary approach as an integral part of their UNCLOS due diligence obligations “*in situations where scientific evidence concerning the scope and potential negative impact of the activity in question is insufficient but where there are plausible indications of potential risks*”. From the above it can be inferred that whenever global commons are interested by human activities, the knowledge of the area where the activity takes place and the state of the art of the scientific research in that area play a fundamental role in the assessment of the balance of the different interests involved and in the application of the principle of sustainable development, thus imposing to take into proper consideration not only the economic needs of the parties involved, the environmental protection needs (as pertaining to mankind) but also other factors such as the scientific community needs, given the central role attributed to their evidences and findings in the concrete application of the principles of environmental law.

7 Principle 15 “*In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.*”

3. ... And its shift to outer space activities

Moving to outer space regulation, at least five basic elements have to be fixed before discussing the role of the sustainable development principle and the need to take into consideration scientific research needs in the interest of all mankind.

First of all, outer space is an area free from sovereign jurisdiction of States or whatever subject of the international community. It comes from the very beginning of the space law Magna Carta that outer space and celestial bodies are not subject to national appropriation and that all States are entitled to access, explore, investigate and exploit it for peaceful purposes for the benefit and in the interest of all countries (article I and article II of the Outer Space Treaty). In addition to the substantive limits contained in articles I and II, the use of outer space (whether for pure scientific research or for economic revenue) must be compliant with the prohibition of harmful interference and harmful contamination and with the due regard principle (see article IX OST).⁸

Secondly the regulation of human activities in outer space is multilevel, given the existence of some basic principles at the international level (assessed in the UN Treaties or in customary international law) that constitute *lex specialis* in the very field of space activities and the necessary integration of the system through general international law⁹ and national regulations. The

8 *“In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment”*.

9 See article III OST, stating that *“States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding”* and its comments.

interaction of different levels of regulation implies permeability of the special regime to the general principles of the legal order it inserted in (i.e. international law), at least for the interpretation of the existing norms (following art. 31.3 (c) of the Vienna Convention on the Law of Treaties), while the “unsaid” remains subject to national regulation.

Third, the sole existing binding international legal instruments provide for general rules applicable to all activities in outer space, the interpretation of which leaves a great deal of uncertainty. When the UN Treaties were adopted they were seen as a starting point for further elaboration, that never came through binding agreements.¹⁰ It is not the ambition of this paper to discuss the reasons of such a failure, but it is self-evident that the vagueness of the principles enshrined in the Treaties, together with the lack of enforcement mechanisms provided thereto, left room for different and diversified interpretations that opposed States and commentators in the past decades. These considerations leave the room for the so called “evolutionary interpretation”, an approach that seeks to find the meaning of a treaty at the time of its concrete application instead of at the time of its conclusion. The approach has been followed by the European Court of Human Rights, interpreting the European Convention on Human Rights,¹¹ as well as by the ICJ interpreting the UNCLOS,¹² leading judges to qualify both conventions as “living instruments” of international law, capable to adapt to modern challenges of human rights’ protection and sea based activities. Precondition for the application of evolutionary interpretations is the draft of Treaty norms through terms that can embrace change of meaning, expanding their coverage so as to include new activities not conceived at the time the treaty was established. Analysing the history of the adoption of the so called corpus *iris spatialis* and the circumstances it was concluded, it is worth saying that the parties were aware that the meaning of the terms they implied was likely to evolve over time, so that some general principles became immediately customs of international law, while others (or their application to new fields of outer space activities) became the arena for debates and international attempts (failed) of new regulation. It is however true that evolutionary interpretation can not go beyond the intention and the will of States to rule at

10 See P. Jankowitsch, The background and history of space law, in F. Von der Dunk, F. Tronchetti (ed.by), *Handbook of Space Law*, Cheltenham, Northampton, 2015, p. 27.

11 ECHR, *Tyrer v. UK*, Series A., No.26, 1978.

12 Separate Opinion of Judge Lucky, in Request for Advisory Opinion submitted by the Sub-Regional Fisheries Commission, Advisory Opinion, 2 April 2015, ITLOS Reports 2015, p. 92. For a comment on the application of the evolutionary interpretation to UNCLOS see H. Zhang, *Redefining Marine Scientific Research in UNCLOS. Could Evolutionary Interpretation Play any Role?*, in K. Zou, A. Telesetsky (ed. by), *Marine Scientific Research, New Marine Technologies and the Law of the Sea*, Leiden Boston, 2021, p. 48.

the international level a given topic, so that the wording of the binding rule (and its natural meaning) always has to guide the interpretation following the Vienna Convention's rules.

Fourth, the notion of "environment" employed by international law instruments does not seem to include (at least literally) outer space, since it usually relate to earth ecosystem, but nothing in the wording of international law precludes the extension of the principles enshrined therein to outer space whenever human activities taking place out of the earth atmosphere damage or might damage or hamper the area causing relapses on life on earth.¹³ However, the different scope of application and normative value of environmental law and of the principle of sustainable development allow interpreters to easily assume the relevance of the sustainable development principle instead of the special rules adopted at the international level to protect the natural environment of the earth.

Fifth, the notion of sustainability in outer space is not unknown. The last decade saw an impressive growth of space activities (including the launch of objects in outer space, especially in LEO and GEO orbits) that does not seem to be sustainable any more under current governance. Precisely, the increase of space activities strikes a problem of sustainability in terms of i) space debris; ii) crowding of near earth orbits and iii) space security, and the solution to the above mentioned problems is to be found in international soft-law instruments, providing for best practices, norms of responsible behaviour and greater data sharing to be followed on a voluntary basis by space-farer nations and private subjects. In this perspective, the UN COPUOUS in June 2019 adopted the Guidelines for long-term sustainability of Outer Space Activities, aimed at providing guidance to all entities active in outer space on the policy and regulatory framework for space activities; safety of space operations; international cooperation, capacity-building and awareness; and scientific and technical research and development.

Considering those premises, the concept of sustainable development can be introduced.

It is undeniable that space activities have evolved in a way that was unpredictable at the time when international space regulation was draft; it is however undeniable that the basic principles States have agreed upon in the OST are still the ground for States' and private actors' intervention in outer space. The issue then moves to their interpretation and capability to rule and apply to modern challenges of space exploitation, given the use of generic terms and the impossibility to adopt new binding instruments matching the interests of space faring States, developing States, international organizations and new subjects of the international legal framework.

13 See R. Popova, *The Legal Requirements for the Environmental Protection of Outer Space: a Truly Global Concern?*, in P. Achilleas, S. Hobe (ed. by), *Fifty Years of Space Law. Cinquante ans de droit de l'espace*, Leiden/Boston, 2020, p. 642.

Sustainable development principle can be seen as a guiding tool for the evolutionary interpretation of the rules contained in the Treaties, asking for a proper balance between the interest for development (in economic terms as well as in scientific evolution terms) and the interest for sustainability (meaning the necessity to keep in mind future generations' needs, that can imply further scientific investigation or economic exploitation). Therefore, as for example, the interpretation and application of article IX OST (harmful interference prohibition and due regard principle) should lead the interpreter to consider not only the actual interests and activities carried out by others in outer space, but also the potential benefits that future generations can derive from outer space and celestial bodies. Reminding that the sustainable development principle is not a static concept, but implies a case-by-case approach, the balance between the actual benefits and the future benefits has to be made in compliance with the "interest of mankind" clause, that allows to take into consideration also the scientific research needs in an area where knowledge is still evolving together with technology.

4. The balance between economic development and sustainability in outer space activities: the role of scientific research

From Article I OST it is clear that outer space is a common good to which use and exploration all States are equally entitled.¹⁴ It is worth saying that States are not the sole subjects of outer space activities, even if they maintain the responsibility of their exploitation, since international organisations, first, and private operators, recently, have become the propulsive factor for the deployment of new space systems and the development of space-based services. Moreover, as it emerges from the above, the regulation of space activities (as well as environmental law and the law of the sea, as branches dealing with global commons) entails to take into account the interest of a fourth subject: mankind, in the interest of which all space activities shall be carried out.

Another consideration shall be made: sustainable development traditionally means to balance economic development with the protection of the environment, but in recent years the concept has been enriched with other values and interests the protection of which is essential for mankind. For example, poverty fight, right to food, right to education and, also, right to scientific research and human knowledge advance.

Whenever economic activities take place in outer space, independently for the definition of the word "environment" to be protected through environmental law rules (with the limits we already mentioned) it is worth underlying the importance of scientific research in ensuring the enhancement of human

14 R. Popova, cit., p. 658.

knowledge on universe and the origin of life, as well as on the possible uses and benefits deriving from outer space.

In order to do that, it is essential to clarify what does “scientific research” (SR) mean. There is not a unique definition of SR within international legal instruments, since a juxtaposition between pure and applied research has always been raised, meaning for “pure research” the studies made only for peaceful purposes and in order to increase knowledge, while “applied scientific research” entails the application of the studies in a tool that can increase the economic advancement of the owner of the property rights. For example, and going back to the parallel with the law of the sea, such a distinction has been argued during the preliminary works of the UNCLOS, where at the end no definition was included leaving room for different interpretations.¹⁵ In the final draft of the Convention, limits and rights are differentiated depending on the marine zone where the activity takes place: territorial seas are still under national jurisdiction of the coastal State, and therefore stricter limits can be opposed to foreign States’ research activities, while in the high seas the freedom of scientific research is established.¹⁶ In the same direction goes the the Outer Space Treaty, where article Art. I. states that “*there shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies, and States shall facilitate and encourage international co-operation in such investigation*”; as well as the Moon Agreement, whose Art. 11 (4) states that “*States Parties have the right to exploration and use of the moon without discrimination of any kind, on the basis of equality and in accordance with international law and the provisions of this Agreement*”.

15 See T. Treves, *Marine Scientific research*, in R. Wolfrum (ed. by), *Max Planck Encyclopedia of Public International Law* (Volume VI), Oxford university Press, 2012, p. 1068, who defines maritime scientific research as “*any study or related experimental work designed to increase knowledge of the marine environment*”, opposite to the American International Law Association that in the Definitions for the Law of the Sea, 2012, qualifies marine scientific research as “*those activities undertaken in ocean space to expand scientific knowledge of the marine environment and its processes*”.

16 See art. 87 UNCLOS “*The high seas are open to all States, whether coastal or land-locked. (...) It comprises, inter alia, both for coastal and land-locked States: (...) (f) freedom of scientific research, subject to Parts VI and XIII*”. See also art. 77 (1) “*The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources*” and art. 238 “*All States, irrespective of their geographical location, and competent international organizations have the right to conduct marine scientific research subject to the rights and duties of other States as provided for in this Convention*”. For an analysis of rights and obligations associated with maritime scientific research see K. Zou, A. Telesetsky, *Marine Scientific Research, New Marine Technologies and the Law of the Sea*. An introduction, in K.Zou, A. Telesetsky (ed. by), *Marine Scientific Research, New Marine Technologies and the Law of the Sea*, Leiden Boston, 2021, p. 1.

Some principles can be drawn from the above articles: 1) there is no distinction between pure scientific research and applied research in the wording of space law Treaties, therefore the freedom to investigate (as an ancillary right deriving to the more general freedom to use and exploit outer space on an equitable basis) refers to both activities; 2) such a freedom has to be exercised for peaceful purposes, avoiding harmful interference with other space activities (whatever nature they have, purely commercial, military or scientific) and in accordance with all the other principles enshrined in the Treaty; 3) scientific research in outer space shall also be conducted in compliance with international law, being outer space law a special legal regime inserted in the international legal order. Therefore international space law does not recognise to scientific research higher value than economic activities, being all space activities on the same level as for being subject to the application of the basic principles stated in the UN Treaties (and in international law rules in general).

This is the reason why we shall move from the analysis of the freedom of scientific research, as it is stated in the Treaties and recognised to all States without any discrimination, to the corresponding “right to scientific research”, as a fundamental right acknowledged to human beings that need to be protected by States at the national and supra-national level.

In this sense we can distinguish a right to research, meaning freedom of scientific investigation, as a right enshrined in the more general freedom of thought and expression, recognised in every national constitution and international declaration,¹⁷ from the right to enjoy the benefits of scientific progress and its applications, therefore including a “common interest of mankind” dimension in delimiting its scope of application.¹⁸ The birth of a right to the results of SR is self-evident, for example, in EU scientific research programmes and recommendations, where the principle of open data sharing is well assessed and the need for dissemination of the results of researches carried on thanks to EU co-funding is established.¹⁹

17 See art. 10 and 11 of the Charter of Fundamental Rights of the European Union; artt. 9 and 10 of the European Charter of Human Rights; arts. 10 and 11 of the 1789 Declaration of the rights of man and of the citizen; art. 9 of the Italian Constitution. See G. D'amico, *Verso il riconoscimento di un diritto alla scienza?*, in *Diritti fondamentali.it*, fasc. 2, 2019, p. 13.

18 International Covenant on Economic, Social and Cultural Rights, UN General Assembly resolution 2200A (XXI), 16 December 1966.

19 See 2012/417/EU: Commission Recommendation of 17 July 2012 on access to and preservation of scientific information, in OJ L 194, 21.7.2012, p. 39-43. spec. recitals 5 and 6 “*Open access policies aim to provide readers with access to peer-reviewed scientific publications and research data free of charge as early as possible in the dissemination process, and enable the use and reuse of scientific research results. Such policies should be implemented taking into account the challenge of intellectual property rights. Policies on open access to scientific research results should apply to all research that receives public funds. Such policies are expected to*

If we consider all the above mentioned elements, and bringing the concept of sustainable development back, it is fundamental to stress that today we only know a little about the universe in which our planet is located, and we still do not have the technology to be able to exploit all the potentials deriving from space activities; we neither do know how human activities in space will develop in the future 10 years, therefore, we are not able to predict what is or will be harmful for future activities or which indirect and not wanted consequences are hampering future space exploitation.

Therefore, the combination of the right to scientific investigation acknowledged to States with the right of individuals to research and benefit of the results of SR, leads us to consider that the application of the principle of sustainable development to space activities entails the need to balance the economic exploitation of space and celestial bodies with, among other principles, the need for scientific research development, evaluating on a case by case basis the relapses of the specific activity enacted and the possible consequences on the advance of knowledge. Even if scientific research activities in outer space do not have a different regime compared to economic and commercial activities, they acquire a special value in the application of the sustainable development principle where the right to research, with the aim of increasing the benefits for humans, can therefore be seen as one of the counterbalances of the economic development, therefore being capable to limit commercial activities.

5. Conclusive remarks: international cooperation and consultations as a balancing tool

Being said that the principle of sustainable development plays an essential role in the interpretation and the application of the rules contained in the Treaties to the activities carried on in outer space, and that its role is more relevant than in other fields of international regulation because of the qualification of outer space as a global common, it is still to be defined how the principle has to be applied. Since its application on an *ex post basis*, meaning the application by international judicial authorities deciding the conflicts relying under their jurisdiction, does not seem to be sufficient, given also the fact that States still did not ask the ICJ for any interpretation or application of the UN space Treaties, it is up to the international community to establish proper mechanisms capable to enforce the application of the principle.

improve conditions for conducting research by reducing duplication of efforts and by minimising the time spent searching for information and accessing it. This will speed up scientific progress and make it easier to cooperate across and beyond the EU. Such policies will also respond to calls within the scientific community for greater access to scientific information”.

Sustainable development has been defined as a multi-dimensional concept that calls for global governance, and it is at the global level that we have to act; therefore consultation and coordination mechanisms are the way through which the balance between the economic development and the scientific research has to be done. States should make an effort to create consultive fora where not only governments and economic actors are heard, but where the scientific community represents the needs for scientific investigation together with the utility for mankind, in order to evaluate the possibility to limit the economic development in favour of the scientific one. At present times several associations, foundations and companies try to underline the potentials and the risks of space exploitation but the composition of those subjects is mainly univocal. It means bodies grouping the experts of a given scientific community (i.e. astronomy, law, engineering etc.) already exist but they face relevant difficulties in integrating their needs into policy makers' work sessions.

The international community, precisely such international consultation tools, could then be considered as a preferential room where the operation of the proper balance of economic and scientific needs can be done.

If the sustainable development principle has been considered having a "rule generating potential", here it comes its vocation for "international process creation potential", where the application of international rules to activities involving the exploitation of global commons still has to be made in the interest of mankind.