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# FOREWORD TO ISSUE 2/2023

# SPACE LAWS AND REGULATIONS. WHAT ROLE FOR PUBLIC AND PRIVATE INTERNATIONAL LAW?

In its second issue of 2023, the JMLI hosts a thematic section on "Space laws and regulations. What role for public and private international law". The rationale is to give "space" to a topic which deserves attention, also from the legal sector. It is a fact that currently the "space industry" is being reinvigorated by both the public and private sectors, at both the international and national level. Particularly, the combination of the increased level of "technology sophistication" with the entrance into the space activity of private parties, is requiring a prompt legislative answer in term of, among all, liability issues, public-private relationships, property issues, sustainable development (such as the environmental impact).

Within the said framework, the Editorial Board has welcomed contributions addressing the main question raised by the call for papers: "to what extent public and private international law play or might play an (increased) role in the regulation, and implementation of public and private space activities".

The first paper "Addressing space environmental safety" provides a detailed analysis on the relationship between the space industry and environmental issue. The attempt is to suggest a solution to align innovation according to the already well-known precautionary principle. The second paper on "The EU call to bridge the digital divide: the new IRIS constellation and legal challenges in outer space" proposes a focus on the EU political agenda on outer space activities, with a focus on IRIS constellation which is a topic deserving much attention. Lastly, the paper on "Property on space resources: the search for a terminology. A focus on the Moon and its mineral resources" deals with property issues on space objects. The line of reasoning suggested by the Author proves that the "scenario" might change, but the legal questions related to the property remain the same.

The said section is opened by two innovation letters addressing the topic from two different, however strictly linked, perspectives. The "Present and the future of Space Law" clearly sums up the most relevant legal issues raised at both international and

national level by the space industry, while "The regulatory odyssey: Navigating the uncharted realm of space innovation" shows that an analysis on space industry needs necessarily to understand the "technological aspect". In other words, any attempt to analyse the legal issues linked to space industry and space activities must prove to be backed by at least some basic knowledge on the technical aspects. Orbits and satellites, radio frequencies allocation and liability can be framed within clear and truly effective legal provisions as long as it is clear what space objects are, how they work, and how space activities are conducted.

The Editorial Board appreciates the overall result which testifies one of the key standpoints of this Journal: law and innovation cannot get rid of each other's. The question at stake is to pave the way to combine them through an integrated reasoning.

B.C., R.d.C., C.P.

*Pietro Pagani* *

# INNOVATION LETTER

# THE REGULATORY ODYSSEY: NAVIGATING THE UNCHARTED REALM OF SPACE INNOVATION

***Abstract***
The human capacity of imaging has brought human beings in Space; human knowledge must now understand whether, and how to frame a better relationship between our planet and "what is beyond". Therefore, technicians and legislators/ regulators at all level must act in synergy. The former shall guide the latter on what is feasible and what should be done to get effective results that will benefit all.

**JEL CLASSIFICATION**: O30, Y20

It took several millennia for Humanity to be able to lift off the ground by just a few meters with a vehicle that was heavier than air: it was the first aeroplane type. That historic flight of the Wright brothers happened in 1903 and from there, the curve of conquest was steep: only 16 years later we were able to fly across an ocean and 50 years after that we managed to send the people to the Moon which is some 400.000 km away.

Today we can connect any two points of the Earth with flights that are available to anyone at low-cost fares and almost everything of what we do in our daily life, from the moment we wake up depends on thousands of satellites orbiting our planet at speeds that are in the order of the kilometres per second (km/s).

That posted picture that we check with the morning coffee of our friend's tropical holidays is nothing more than a string of bytes that has most likely travelled halfway around the world in an instant while being relayed by a few satellites. Then we might check the weather to decide what to wear and we don't realise that having that precise forecast is only thanks to satellites that constantly measure our atmosphere and provide data for the meteorology. Once we step out of the door we ask our mobiles to give us directions to get to work: the very map that we are looking at has been drawn and is

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constantly updated thanks to mapping satellites and our devices can understand exactly where on that map we are thanks to the GNSS (Global Navigation Satellite System) which is composed by many constellations of satellites that can cover with their radio signals the entire planet and allow our devices to calculate in an instant the relative position with respect to some of them and therefore the absolute position on the Earth, very similar to what sailors used to do with lighthouses, but this time with a precision that can go down the centimetre and in the pocket of every one of us, just one lock screen away.

This list could go on and on, but I would stop at the first couple of hours of our day because I think that the concept is clear: our society already depends in an irreversible way on so-called “space technology”, and this is not only at the state or big companies’ level, but it really gets down to the individual with tools that we give for granted and are very cheap and available to everyone; thus the importance of understating and regulating this “space technology”.

On top of the very intense use of space that we already do, there are missions that only belonged to science fiction up to a couple of decades ago and they are now a real possibility for the near future: I’m referring here to concepts like human exploration of other planets or being able to exploit resources on extra-terrestrial bodies. Those kinds of missions do open the need for regulations that are driven by problems that humankind might have never encountered before, and they require the regulatory bodies to be up to speed with the exponential growth of the technological means available.

However, even when staying more “down to Earth” there are already many complex regulatory issues that are not completely solved and are vital for this industry's prosperous and safe continuation. The matter of space debris is one very relevant example: all the thousands of satellites that we previously mentioned, will eventually come to the end of their life. The satellite will stop functioning and therefore stop providing that service that it was built for, however, the satellite itself, depending on the characteristics of its orbit, will keep orbiting the Earth, without control, for centuries and in some cases even indefinitely, thus causing danger for all future missions.

It is a fact that currently, a collision at orbiting speeds with even the smallest of the screws coming from a disintegrating satellite could be devastating for any spacecraft, avoidance manoeuvres are extremely complicated and expensive and even more complicated, if not impossible, are missions to go and collect debris. Here is the importance of binding satellites manufacturers at including de-orbiting strategies and devices in the design phase, so that the object will remove itself from the orbit at decommissioning and either burn in the atmosphere or be placed on a “graveyard orbit” that can’t cause any harm. The tracking and the orbit determination of all the man-made objects that are already tumbling around the Earth and will never be removed is also of vital importance and it is a task for the most powerful and expensive telescopes.

And all this happens because it was tailored that way. Would it be (technologically) feasible to change its course? At which stage is the technological innovation?

Those are some of the practical questions a technician, as I am, could raise when thinking about "the space industry".

The question is pressing; the human capacity of imaging has so far led the human being in space; human knowledge must now understand whether and how to better define a relationship between our planet and what there is beyond. The premise is this following: being able to expand our presence to a tiny (for now) portion of the space in our solar system is a privilege that humanity has been able to gain only with the combination of efforts of the most brilliant minds in many different scientific fields that solved very complex problems and keep solving the ones ahead; the present is that we have reached a point were space technology could only proceed if this effort is expanded and different kind of expertise are involved such as lawyers and regulators. The present future is this one: The ambitious law expert that will venture into space law research needs an open mind that can tackle issues that don't find any precedent in the literature combined with the willingness to study and understand the basic physics principles that govern space flight.

In practice, technicians must be collateral and legislators, at all levels, must act in synergy. The former shall guide the latter on what is feasible and what should be done in order to get effective results that will be of benefit to all.

*Marco Pedrazzi* *

# INNOVATION LETTER

# THE PRESENT AND FUTURE OF SPACE LAW

***Abstract***
Rapid developments taking place in the space sector present both opportunities and risks. The underlying principles of international space law remain valid today. However, there is much need for new regulations and solutions to address the myriad emerging issues resulting from the new realities and prospects of space exploration and utilisation. While soft law is a valuable tool, it cannot be the only answer. The law must uphold the protection of the common interests of humanity, and doing so will not impede but rather promote good industrial and commercial endeavours by private entities.

**JEL CLASSIFICATION**: K33, O30, Y20

Never before has space been such a part of our daily lives as today. Many day-to-day activities rely on space applications, from positioning and navigation signals to accessing telecommunication services transmitted via satellite. Weather forecasts, environmental pollution and climate change monitoring on our planet are primarily based on satellite data. There is also a significant space dimension to war as can be seen in the context of the conflict currently ravaging the heart of Europe, once again. At the same time, preparations are underway for deeper exploration of our Moon and close planets, primarily Mars, and to establish permanent human outposts farther away than ever before. There are occasional setbacks, as always: challenging endeavours can only be achieved one step at a time. Private undertakings play an essential role in all these achievements, and as technology advances and space exploration becomes increasingly affordable, even the smaller private enterprises have the means to launch smaller and smaller satellites.

Ongoing developments do have the potential to significantly improve our life on Earth. At the same time, they also carry high risks that directly affect our planet. In this context, I will briefly focus on three fundamental concepts: safety, security, and

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sustainability. Although we have a better understanding of space today, it remains a harsh environment and poses not-indifferent safety risks, all the more so where human life is concerned; for example, the escalating debris crisis resulting from human activity has exacerbated the safety conditions in orbit.

I will come back to this issue later. Security may be of even greater concern: satellites are high-value assets vulnerable to various types of attacks, including those by private entities. Cyber capabilities are also essential but vulnerable components of every space-based application. The risks increase when States are involved: targeting satellites, albeit 'only' through cyber means, may become a new form of warfare, capable, in the worst-case scenario, of paralysing global communication and exchange. An unfettered arms race in outer space could produce even more apocalyptic scenarios. Sustainability is not only an issue for tomorrow: it is already today's problem. Orbital debris poses a significant challenge to the long-term sustainable exploitation of space for the benefit of our planet. The growing number of (also sub-orbital) space launches contributes to environmental pollution on Earth, an issue we cannot fail to address. Future planned activities on the Moon, asteroids, or planets will raise concerns regarding the sustainable use of celestial bodies.

Opportunities and risks shape the path that law will have to follow in the coming years. The legal framework concerning outer space and the basic legal parameters that define what is lawful and what is unlawful in the conduct of space activities are enshrined in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, better known as the Outer Space Treaty (or OST), adopted by the UN General Assembly on 19 December 1966 and opened for signature on 27 January 1967. Some of the provisions of the Outer Space Treaty have been further elaborated upon by three subsequent instruments: the Astronauts Agreement of 22 April 1968, the Liability Convention of 29 March 1972, and the Registration Convention of 14 January 1975 (referred to by their abbreviated names). However, unlike these four treaties, the Moon Agreement of 18 December 1979 (also abbreviated), albeit in force among a limited group of States, has never gained widespread adoption due to the reluctance of most space powers to ratify it.

The treaties in question were adopted during the early days of the space era when space activities were profoundly different from what they have become today. Consequently, there have been occasional calls to modify the international legal framework governing space activities in order to bring it more in line with today's needs. However, I do not share these concerns. In my opinion, the essential features of the legal regime governing outer space are still valid today, as they protect values crucial for the international community as a whole. This is particularly true of the prohibition on extending State sovereignty over any portion of outer space or celestial bodies, coupled with the ban on appropriation by other means (Article II, OST) and for

the freedom to use outer space and celestial bodies for all States, to the benefit of all countries and of humankind (Article I, OST), as well as for the attribution of private space activities to their national States, which shall authorise and supervise private actors and bear the responsibility for their conduct (Article VI, OST). Adherence to this principle has not hindered the substantial growth of private space activities in recent decades. Still, it maintains a form of 'public' control over an environment that continues to constitute a risk for those who use it and those living below. Simultaneously, it represents a potential source of benefits that can and should be available to all humankind.

The focus should not be so much on amending the treaties but on supplementing them with new rules that can effectively regulate the new opportunities and risks that scientific and technological developments are rapidly bringing to light. When the first treaties were formulated, international law was, to a certain extent, anticipating reality. Today, however, there is the risk of lagging behind the rapid evolution of technology, possibilities, and ventures.

Recent decades have seen various attempts to address the emergence of new opportunities or threats with the adoption of new sets of rules. As convergence on treaty-making has, however, become impossible, the path undertaken has been to frame non-binding sets of soft law principles or guidelines, for which some key documents have been prepared. I mention here, among others, the Principles relating to Remote Sensing of the Earth from Space, adopted by the General Assembly in 1986 (yet, there is a pressing need to address the impact on privacy created by the growing quantity of data being collected from space); the Principles relevant to the Use of Nuclear Power Sources in Outer Space, adopted by the General Assembly in 1992; the Space Debris Mitigation Guidelines, adopted by the UN Committee on the Peaceful Uses of Outer Space (COPUOS) in 2007, and the Guidelines on the Long-term Sustainability of Outer Space Activities, adopted by COPUOS in 2019. All these standards have contributed or will contribute, in different ways, to shaping the practice of States and other actors in the relevant fields. As far as private actors are concerned, standards of corporate social responsibility would be helpful. Nonetheless, further efforts are required, especially concerning overcrowded orbits due to the proliferation of space debris, potentially endangering the continued future use of Earth orbits. Soft law may not always provide an adequate answer.

Several other sectors require regulatory action, some more urgently than others. While not aiming to provide a comprehensive overview, I will highlight a few examples. The attempts to prevent an arms race in outer space, which is essential to keeping space – as far as possible – a peaceful environment, have still not seen any decisive step forward due to a lack of agreement among the major powers. Developing rules and mechanisms for Space Traffic Management is essential to prevent the proliferation of

orbital debris and supplement existing standards. Clear rules of the road are essential to avoid accidents and conflicts of interest.

In the coming decades, sub-orbital activities will become a crucial means for developing space tourism: the experimental phase is already underway for some vehicles. Due to the unique features of these flights and the lack of a defined boundary between airspace and outer space, clarification is needed on whether space law or air law will be applicable, or indeed a combination of both. Alternatively, new rules have to be developed. Establishing rules of the road would be particularly important in this case, considering the need to demarcate and safeguard sub-orbital flights from aviation and vice versa. It will be equally crucial to develop appropriate standards to protect the environment, both on ground level and in the atmosphere.

Another critical area requiring specific regulations is the exploitation of mineral resources and water on asteroids, the Moon, or other celestial bodies. There is a growing tendency among States and experts to deny that such exploitation would breach the prohibition of appropriation of celestial bodies outlined in Article II OST. Exploiting celestial bodies could potentially prove beneficial in sustaining space missions and substituting depleted Earth resources in the distant future. However, if such activities are to be permitted, it is essential to establish specific conditions that preserve the common interests of humanity while adequately protecting the environment of celestial bodies. Denying that space is a global common[1] can only contribute to chaos.

Critical reflections and research are currently being conducted on these various topics in the hope of reaching the broadest possible agreement that will provide the best available protection for the common concerns of all humankind. While it may seem that the measures being proposed are excessively stringent and that they may impede the development of profitable industrial and commercial activities in space, I am confident that regulatory frameworks can provide robust protection for fundamental shared interests, including protecting the environment and mitigating climate change, ensuring the safety and security of space activities (which require guaranteeing peaceful use), promoting sustainability, and enabling global access to possible advancements. I am confident that pursuing these objectives would not hinder but rather promote sound and profitable economic and commercial activities. Moreover, creating a stable and certain legal framework is crucial for private activities in space.

However, international law is insufficient to provide the necessary legal certainty. International legal rules require domestic implementation, and several States have already developed at least a basic national legislation on space activities, which allows them to comply with the most fundamental requirements of international space law, such as those relating to licensing and supervision over private entities operating in

[1] See US President Donald Trump's EO 13914 of Apr 6, 2020, 85 FR 20381.

outer space. However, other States, such as Italy, still lack a proper domestic legal framework for national space activities. National laws are essential inasmuch as they implement international obligations. In their implementation, domestic legislation can help shape the interpretation of international provisions. If they converge on specific solutions, they can potentially contribute to establishing or consolidating international customary rules and developing new practices. In addition to States, at the Union level, EU institutions can also adopt regulations to supplement the national laws of their Member States. It should be borne in mind that the EU is acquiring complex systems, such as, among others, Galileo and Copernicus, whose space component is being developed by the European Space Agency (ESA) with which the EU has established a meaningful partnership. These systems play a leading role in the implementation of various EU policies. A Union-level role would be particularly beneficial in sectors such as sub-orbital flight, where uniform implementation of international standards, yet to be clarified or established, would be highly beneficial due to the necessary coordination with aviation navigation and safety standards.

As private activities in outer space expand, private international law will play an increasingly important role in identifying which courts have jurisdiction, determining applicable law, and establishing possibilities for enforcing foreign judgments in the event of disputes. This is another area where, pending the adoption of possible new ad hoc rules, research can do much to clarify the legal framework and propose innovative solutions, such as new fora for dispute settlement.

Space activities evolve rapidly thanks to continuous technological advances, presenting various social and ethical challenges to legislators and legal scholars. There is a pressing need for new rules which, while protecting fundamental societal values, will enable space exploration and the exploitation of resources for the benefit of all. These rules should provide clear pathways for the sound and sustainable development, and implementation, of new ideas in the public, industrial, and commercial sectors.

*Giovanni Tricco**

# THE UPCOMING OF IRIS²: BRIDGING THE DIGITAL DIVIDE AND STRENGTHENING THE ROLE OF THE EU IN INTERNATIONAL SPACE LAW

***Abstract***

The arrival of thousands of satellites posed in large constellations is providing the possibility to offer ubiquitous internet connection, offering connection anywhere in the world and bridging the disparities between connected and unconnected. Such opportunities pushed for the commercialisation of space, with the advent of a vibrant satellite connectivity market. However, the trend has been lately led by private parties deploying satellites in the name of self-regulation, therefore putting at risk the safety, security and sustainability of orbits in outer space. In this scenario, the EU decided to launch its governmental satellite constellation the Infrastructure for Resilience Interconnectivity Security by Satellite (IRIS²) to offer broadband internet connection and safe communication throughout Europe while at the same time offering opportunities to take the lead in the dialogue on the formation of guidelines in the deployment of such complex systems. The article introduces the reader to the benefits that satellite communication can provide for society while exploring the legal and technical challenges following the advent of thousands of satellites in orbit. Moreover, it navigates the responses required by the international community to the legal and policy challenges. Finally, it envisions a new approach that the EU can play with its space policy in order to foster the debate for a much more coherent legal response to the challenges posed by the advent of large satellite constellations.

**JEL CLASSIFICATION**: K0; K33; 014.

**SUMMARY**



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## 1 Introduction

In the fast-paced era of space exploration and technology the EU has embarked on an ambitious endeavour to bridge the digital divide and strengthen its position in the international space community through the implementation of the IRIS² constellation. This article aims to provide an in-depth analysis of the opportunities, challenges, and implications of IRIS² on the EU's role in the international scenario as well as its potential to foster connectivity and equal access to digital services for all citizens.

The article is structured in six sections, it begins with providing a background on the importance of satellite communications and the opportunities that they offer, such as addressing the digital divide, fostering economic growth, advancing technological innovation, and providing safe communications. The first section concludes by showing the major participants offering services in the satellite connectivity market. The second section provides an introduction to IRIS², its objectives, and its relevance for European industry and citizens. The subsequent sections delve into the challenges faced in terms of legal, technical, and regulatory aspects given by the establishment of different large satellite constellations in Low Earth Orbit. The article further examines the potential for the EU to leverage IRIS² as a catalyst to assert its role in international space law-making and its implications on the global space community.

The penultimate section conveys recommendations to address the legal challenges faced by the international community regarding the deployment of large satellite constellations and ensure their safe, secure and sustainable implementation in outer space. The article closes by showing that the EU is adopting a stronger stance in its space policy approach. Indeed, the EU has the potential to bridge the digital divide and strengthen its position in international space law-making through the IRIS² project if it effectively addresses the challenges and adopts strategic solutions on the wave of the publication of its Space Strategy for Security and Defence and other space law-related documents. The work tried to examine the scenario in which the EU is launching its constellation alongside calling on the need for stronger international cooperation to face the challenges posed by the launch of satellite constellations providing internet services.

## 2 Satellites as enabler for the functioning of the society

Space activities have long played a pivotal role in our society, not only as a testament to technological advancement but also as a catalyst for progress across several aspects of different industrial sectors. Indeed, operating in the unforgiving environment of outer space requires a level of reliance and resilience far surpassing terrestrial standards.

Satellites, in particular, have evolved into critical enablers for a diverse range of essential services. These orbiting assets have become lifelines, connecting people

worldwide through broadband data services and supporting various functions, such as television and news distribution, space exploration, Earth observation, and navigation.

In essence, many aspects of our daily lives now rely on the continuous functioning of satellite-based services.

The strategic importance of satellite communication and broadband services was evident in the wake of the Ukrainian conflict, where governments recognised their role in the seamless functioning of the internet and, consequently, society itself. The intervention of Space-X, which ensured the functioning of the internet network on behalf of the Ukrainian government, highlighted the critical role of satellite communication.[1]

Consequently, the intersection of space and technology has proven instrumental in addressing numerous societal challenges. The benefits derived from space activities are now widely recognised and appreciated by a vast audience, leading to significant growth in awareness surrounding the space sector in recent years.

In addition, the unfolding of new space engineering and technological capabilities has opened up exciting opportunities. We can now build and launch an increasing number of space assets equipped with advanced software and features that facilitate the collection, processing, and sharing of data. This convergence of space assets, data applications, and artificial intelligence is poised to revolutionise multiple domains, offering the potential for enhanced efficiencies and novel solutions.[2]

One crucial outcome of this merge lies in the ability of space assets to provide ubiquitous connections, supporting the proper functioning of the Internet of Things (IoT) in all facets of terrestrial life.[3] The seamless integration of terrestrial and spatial infrastructure can unlock a realm of possibilities and synergies, transforming industries and enabling unprecedented innovation.

As a testament to the importance of satellites, the European Union (EU) has decided to launch its own large constellation of satellites, named Infrastructure for Resilience Interconnectivity Security by Satellite (IRIS²),[4] in the coming years. This initiative aims to offer secure communication and develop the capability to provide internet access in every part of the continent. The deployment of large satellite constellations like IRIS² is poised to become a crucial element of success for states, enabling secure internet

[1] Amritha Jayanti, 'Starlink and the Russia-Ukraine War: A Case of Commercial Technology and Public Purpose?' (Belfer Center for Science and International Affairs, Harvard Kennedy School, 9 March 2023) <https://www.belfercenter.org/publication/starlink-and-russia-ukraine-war-case-commercial-technology-and-public-purpose>accessed 7 July 2023.

[2] Landry Signé and Hanna Dooley, 'How space exploration is fueling the Fourth Industrial Revolution' (Brookings Institution, 28 March 2023) <https://www.brookings.edu/blog/techtank/2023/03/28/how-space-exploration-is-fueling-the-fourth-industrial-revolution/> accessed 7 July 2023.

[3] PJ Blount, 'Satellites Are Just Things on the Internet of Things' (2017) 43 (3) Air and Space Law 273, 294.

[4] Commission, 'IRIS²: the new EU Secure Satellite Constellation Infrastructure for Resilience, Interconnectivity and Security by Satellite' <https://defence-industry-space.ec.europa.eu/eu-space-policy/eu-space-programme/iriss_en> accessed 7 July 2023.

connections and expanding global connectivity fighting the distance between the connected and the unconnected. However, as satellite constellations continue to expand, it is crucial for the international community and organisations like the European Union to prioritise the safety, security, and sustainability of outer space through effective regulations and collaboration.

## 3 The digital divide

Networks of satellites placed up in large satellite constellations can be a crucial element to bring broadband internet connection to every part of the European Union, strengthening the connectivity across the continent.

The ability to communicate is a fundamental human right in the United Nation Universal Declaration of Human Rights (UDHR). Every human should have the capability to access the internet to be able to communicate with comrades or business partners around the world.[5] This need has never been felt as nowadays. Nowadays, access equality is an essential humanitarian need. During the COVID-19 Pandemic, we became more dependent on Internet connectivity, not only for communication or browsing for information, but also for a wide range of important services ranging from fundamental personal and social activities to accessing government and health institutions. Despite this growing importance of connection, a large portion of the world's population remains disconnected or under-connected to Internet infrastructure.[6] According to the International Telecommunication Union (ITU), just 63% of the world's population was connected in 2021, and of the 2.9 billion of offline people 96% resides in developing countries.[7]

The gap between the connected – who can wholly benefit from the service offered by modern information and communication technologies– and the unconnected forms the Digital Divide.[8] In Europe the digital divide affects mainly rural and remote areas, where roughly just 34% of the population have at their disposal high-speed broadband connection.[9]

In Europe enhanced internet connectivity can play an essential role in preventing digital divide, isolation and depopulation by reducing the costs of delivery of both goods and services and partially compensating for remoteness. In addition, the quality of life

[5] United Nations, Universal Declaration of Human Rights, 10 December 1948, Article 19.
[6] Gunes Karabulut Kurt, Angeles Vazquez-Castro and Ejder Bastug, 'Guest Editorial: Low Earth Orbit Satellites to Enable Access Equality' (2022) 60(4) IEEE Communications Magazine 16, 17.
[7] ITU, *Measuring digital development Facts and Figures 2021* (ITU, 2021) <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2021.pdf> accessed 7 July 2023.
[8] Everett M Rogers 'The digital divide' (2001) 7(4) Convergence 96, 111.
[9] Victoria Masterson, '70% of homes in the EU have high-speed internet – but a digital divide persists' (World Economic forum, 7 September 2022) <https://www.weforum.org/agenda/2022/09/eu-high-speed-internet-digital-divide/> accessed 7 July 2023.

in rural areas would improve by allowing internet-based services such as online education, eHealth, and eGovernment. The effort would provide an opportunity for small businesses in distant locations to interact with suppliers and consumers, as well as build digital business models[10].

In addition, it is important to bear in mind that internet connectivity has become a crucial component of every country's critical infrastructure given the reliance of all aspects of economic activity, government, and social development on internet communications[11], therefore the capability of a state or organisations to provide ubiquitous connection can constitute a factor of influence in the international scenario. Moreover, the advent of the Internet of Things, with the need for all devices to be interconnected further emphasized the need for fast broadband internet connection which ensures that all people can benefit from new technologies regardless of where they are located.

### 3.1 The importance of satellite communication to fight the digital divide

Technological development achieved today by humans may be utilised to the benefit of humankind. The interplay of space and the deployment of new technologies detains the potential to reverse the paradigm of the impossibility to ensure fast connection to everyone. With intelligent satellites, we can now revolutionise the communication system and benefit from the increased data collection and processing that will result from the satellite communication (SATCOM) industry.

Today, the right to internet access cannot be adequately guaranteed since terrestrial technologies share a fundamental weakness: they fail to provide global connectivity. Terrestrial networks are also extremely vulnerable to natural catastrophes and terrorist threats. Instead, satellite access networks, particularly large-scale low-Earth orbit (LEO) satellite constellations, have demonstrated their potentiality to extend terrestrial networks to meet the aforementioned challenges.

Since the turn of the century, the relevance and necessity of internet democratisation have been generally recognised.[12] In particular, as critical responsibilities of the state are transferred as online services, it is commonly observed that the Internet becomes increasingly intertwined with democratic life; it unavoidably means that democratic citizenship relies on digital citizenship.[13] As a result, in today's interconnected world, a

[10] Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society' COM/2016/0587 final.

[11] OECD, 'The Economic and Social Role of Internet Intermediaries' (2010) <https://www.oecd.org/digital/ieconomy/44949023.pdf> accesses 7 July 2023.

[12] Peter Ferdinand, *The Internet, Democracy and Democratization* (1st edn Routledge 2000).

[13] William H Dutton, *The Oxford handbook of internet studies* (OUP 2013).

person cut off from the internet loses the capacity to give his democratic contribution to society.

Today, space is used for a wide range of civic and military purposes, and it is a highly disputed and crowded political and scientific domain. Among the numerous applications, space can be deployed to improve communications in order to democratise the internet. In today's digital age, space-based connectivity will be a strategic asset for global resilience. Furthermore, the new type of connectivity will boost economic power, digital leadership, competitiveness, and societal advancement.[14]

The idea of space communications as a democratisation factor for access to the internet has been theorized several years ago, but it was not technically and technologically feasible.[15] Today with the level of technological development of the space industry and of AI the "old past dream" is reality. Indeed, there have been attempts to operate Communications satellites in low Earth orbit (LEO) since the early 2000s; however, previous large-scale plans were cancelled or reduced due to high costs and limited demand. With increased demand for broadband service and to overcome terrestrial geographic limitations, several companies are developing constellations of satellites in LEO to provide broadband service from space.[16]

LOE satcom may provide tangible benefits to society, playing a role in expanding broadband access, in particular in rural and remote areas; particularly, bridging the gaps, swiftly expanding network coverage, and enhancing existing infrastructure. Moreover, as demonstrated in Ukraine by Space-X deployment of hundreds of LEO satellites, it allowed Ukrainians and key infrastructure to maintain internet connectivity.[17] Moreover, the expanding Internet of Things has raised the need for such communications. Indeed, space-based constellations can provide continuous coverage, allowing these internet-enabled devices to connect from anywhere.[18]

As an example, offering broadband internet connection to rural areas would improve the quality of life by allowing internet-based services such as online education, eHealth,

[14] PWC, '*Main Trends & Challenges in the Space Sector* (July, 2022) 3rd edition <https://www.pwc.fr/en/industrie/secteur-spatial/pwc-space-team-public-reports-and-articles/main-trends-and-challenge-in-the-space-sector.html> accessed 12 July 2023.

[15] Daniel M Kohn, 'Providing global broadband internet access using low-earth-orbit satellites' (1997) 29(15) Computer networks and ISDN systems 1763, 1768.

[16] John Garrity and Arndt Husar, 'Digital Connectivity and Low Earth Orbit Satellite Constellations: Opportunities for Asia and the Pacific' (2021) Asian Development Bank (ADB) Sustainable Development Working Paper Series n. 76/2021 <https://www.adb.org/publications/digital-connectivity-low-earth-orbit-satellite-opportunities> accessed 12 July 2023.

[17] Michael Sheetz, 'Elon Musk's SpaceX sent thousands of Starlink satellite internet dishes to Ukraine, company's president says' (CNBC, 22 March 2022) <https://www.cnbc.com/2022/03/22/elon-musk-spacex-thousands-of-starlink-satellite-dishes-sent-to-ukraine.html> accessed 12 July 2023.

[18] Mariel Borowitz, 'The Military Use of Small Satellites in Orbit' (French Institute of International Relations - IFRI, 4 march 2022) *Briefings de l'Ifri* <https://www.ifri.org/sites/default/files/atoms/files/m._borowitz_military_use_small_satellites_in_orbit_03.2022.pdf> accessed 12 July 2023.

and eGovernment. In 2019, 86 percent of all EU households had access to at least 30 Mbps broadband, whereas just 59 percent of rural households had this sort of connection. The effort would provide an opportunity for small businesses in distant locations to interact with suppliers and consumers, as well as build digital business models.

In addition, as a spillover effect of the new communication system, the EU will be able to establish a new kind of internet governance reinforcing its position in cyberspace. The EU's new 'status' will enable the seamless operation of key infrastructure and the continuous cooperation of citizens and public agencies in the event of emergencies and disasters. Furthermore, it would serve as a backup infrastructure for terrestrial networks as well as a stable infrastructure for places that are currently disconnected but may need communication in the event of crises and catastrophes.[19]

Consequently, considering the different benefits given by satellite communications the European Union wants to fill the gap for rural households high-speed connectivity in Europe deploying a sovereign constellation of satellites in LEO, in order to be able to provide broadband internet connection, alongside safe communication. The former will be the focus of the paper, and the latter – safe and reliable communication – will not be specifically addressed here.

Therefore, satellite broadband is poised to become an even more crucial technology for tackling the growing digital divide and ensuring the functioning of a society that is daily more reliant on digital solutions given the spreading of the Internet of Things in every aspect of our life.

### 3.2 How satellite broadband works

When a space object is launched it will position itself in an orbit, which may be of different kinds depending on the service in question. There are three major types of orbit, including the geostationary earth orbit, also referred to as a geosynchronous equatorial orbit (GEO), medium earth orbit (MEO), and low earth orbit (LEO).

This classification depends mainly – as clearly understandable by their nomination – on their altitude in outer space. GEO is located roughly at 36 000km, LEO it is encompassed between 300 to 2000km, and MEO encompasses a large range of orbits anywhere between GEO and LEO.

Satellite broadband is, as the name indicates, the provision of broadband internet service from satellites either in GEO, MEO, or LEO. Satellites use specific segments or

[19] Giovanni Tricco, Giorgia Zaghi and Maria Makurat, 'Securing Communications: what to expect from IRISS (Infrastructure for Resilience Interconnectivity Security by Satellite)' (International Team for the Study of Security, 2 January 2023) <https://www.itssverona.it/securing-communications-what-to-expect-from-iriss-infrastructure-for-resilience-interconnectivity-security-by-satellite> accessed 12 July 2023.

"bands" of spectrum—radio frequencies used to transmit signals wirelessly from one facility or device to another. The use of radio frequencies is regulated to avoid interference between users.[20]

Therefore, frequencies and orbits are used to offer determined service depending on their altitude in outer space. Satellites in GEO are positioned to be constantly above a determined area of the earth, typical services are telecommunication or weather forecast. They cover a large part of the globe; with few satellites the full coverage of the earth is ensured. On the other side, satellites in LEO or MEO can be deployed for a wide range of services but given their 'proximity' to the Earth a large number of satellites are needed to ensure global coverage.

Initially, satellite communications relied mainly upon GEO spacecraft. Technical advancement has enabled the emergence of LEO satellites, which are gradually providing connectivity services with latency and bandwidth comparable to terrestrial infrastructures.[21]

Indeed, a satellite in GEO can deliver more capacity to a specific region than non-geostationary satellites in a mega constellation that has to serve the entire globe. On the other hand, satellite constellations closer to Earth have the potential to offer low-latency solutions that can connect with terrestrial infrastructure more effectively. This means, that data will flow faster from terminals on the ground to satellites in orbit and back.

Today, the LEO satellites sector is more vibrant than ever – owing to the efforts of the private sector – which has already launched more than 3000 satellites into space in the past few years. Moreover, it is expected a significant growth for the satellite connectivity market with a triplication of its value from $4.3 billion to $20.6 billion by 2030.[22]

Therefore, this new scenario will open up incredible opportunities; however, a set of legal, technical, and ethical challenges will follow. One of the main risks to be addressed is that space orbits will become too much congested to ensure their safeness, since the orbital size available for low-orbit satellite constellations is by nature limited. The volumes available in earth orbit increase accordingly their altitude; it means that lower orbits are more prone to congestion than geostationary ones.

[20] Colby Leigh Rachfal, 'Low Earth Orbit Satellites: Potential to Address the Broadband Digital Divide' (Congressional Research Service – CRS Report, 31st August 2021) <https://crsreports.congress.gov/product/pdf/R/R46896> accessed 7 July 2023.

[21] Commission, 'Commission Staff Working Document Impact Assessment Report Accompanying the Document Proposal for a Regulation of the European Parliament and of the Council Establishing the Union Secure Connectivity Programme for the Period 2022-2027' SWD/2022/30 final.

[22] Satellite Market Research, 'Euroconsult Release its Flagship Satellite Connectivity and Video Market Report' (1 November 2021) <https://satellitemarkets.com/market-trends/euroconsult-release-its-flagship-satellite-connectivity-and-video-market-report> accessed 7 July 2023.

Indeed, proper space debris mitigation plans and Space Traffic Management frameworks will be required to ensure that space congestion does not result in the Kessler effect, whereby a certain amount of space junk or debris in space would end up in an indefinite cycle of collision rendering earth orbit inoperable.[23] As a result, the prospects provided by space applications in LEO would be unrealisable, aside from not favouring the passage of space research missions via the low orbit, which constitutes the first 'circle' around the planet Earth.

Thankfully, the fact that technology and outer space have always gone hand in hand comes to our assistance. Today, new technology such as Artificial Intelligence (AI) can play a major role in the satellite constellation sector, allowing satellites to communicate with one another in order to share data and information in real-time to prevent collisions in increasingly congested outer space. Therefore, technological progress is creating the potential to provide a diverse collection of services while also allowing the area to become more 'populated'.[24]

In light of the combination of less expensive launch systems, smaller and mass-produced satellites, better and smaller ground antennas, and novel technologies large-scale deployment of LEO satellite systems for internet access is now possible. Indeed, the synergies between land-based and space-based internet access solutions have the potential to overcome the digital divide and connect many more people to the internet.[25]

### 3.3 The hegemony of private parties in the LEO satellite market

It follows that the new kind of services offered by these new constellations of satellites can play an important role in the future of humanity, not only in offering broadband internet connection but either to ensure the safeness of such communication and the collecting of images that can result crucial – as enlighten in the Ukrainian conflict – in a war scenario. However, at this point in history, the development of such systems is still in its early stages, and few private parties can afford to have fully operational satellites in LEO constellations.

The few private parties in the front-runner in the deployment of constellations of thousands of satellites are mainly made up by the emperors of the digital world that are developing their own projects, from Musk with Space-X to Bezos with its project Kuiper of Blue origin. Therefore, the more ambitious projects are driven by the 'aristocracy' of

[23] Donald J Kessler and Burton G Cour-Palais, 'Collision frequency of artificial satellites: The creation of a debris belt' (1978) 83 (A6) Journal of Geophysical Research: Space Physics 2637, 2646.

[24] Pietro Cassará, Alberto Gotta, Mario Marchese and Fabio Patrone, 'Orbital Edge Offloading on Mega-LEO Satellite Constellations for Equal Access to Computing' (2022) *60*(4) IEEE Communications Magazine 32, 36.

[25] Internet Society, *Perspectives on LEO Satellites Using Low Earth Orbit Satellites for Internet Access* (November 2022) <https://www.internetsociety.org/wp-content/uploads/2022/11/Perspectives-on-LEO-Satellites.pdf> accessed 12 July 2023.

digital capitalism which is planning to be the first to place this new layer of the internet in outer space.

These examples may indicate that the deployment of broadband LEO satellite constellations extends far beyond the 'simple' business model of providing internet in areas that are not reached by land networks. Indeed, taking into mind the American offering, each of them takes a global strategy in order to be able to integrate earth-based and space-based data, but also presents themselves as a possible 'unique' data system with their primary services on earth.[26]

Indeed, the approach developed by SpaceX and Amazon goes one important step further in the space industrial approach establishing vertically integrated processes where the connectivity solution is part of a vertically integrated market, such as autonomous driving or e-commerce.[27]

In particular, Space-X is already offering widely its connectivity services, from March 2023 its offering roaming service to provide internet connection almost wherever in the world in particular according to them in: "*locations where connectivity has been unreliable or completely unavailable*."[28] Indeed, Space-X already has placed in LEO around 2700 satellites and plans to deploy a total of 42 000 satellites to complete its constellation.

On the other hand, Blue Origin has not yet released the lunch of its satellites that will constitute the Project Kuiper constellation. However, it obtained the approval for 3236 satellites by the Federal Communications Commission (FCC), with commercial service beginning once 578 satellites will be located in orbit[29]. In addition, it has just released its Kuiper satellite internet dished,[30] showing its commitment to be soon active in offering broadband services.

Given by nature space orbits and spectrum frequencies are finite goods – eg, there will not be space for an undefined number of constellations – therefore the time is running out for large satellite constellations in LEO and the American providers are well in a head start. Consequently, European actors must follow the trend immediately.

[26] Jean-Pierre Darnis, 'Space as a Key Element of Europe's Digital Sovereignty' (French Institute of International Relations – IFRI, December 2020) noted de l'Ifri <https://www.ifri.org/sites/default/files/atoms/files/darnis_space_europe_digital_sovereignty_2020_.pdf> accessed 12 July 2023.

[27] European Space Policy Institute, 'Rising Opportunities in the Satellite Connectivity Market: Eutalsat and One web Combination' (ESPI Executive Brief No. 60, 20 December 2022)<https://www.espi.or.at/wp-content/uploads/2022/12/ESPI-Brief-NO-60-Eutelsat-OneWeb-Combination__Final.pdf> accessed 7 July 2023.

[28] Emma Roth and Richard Lawler, 'SpaceX Starlink rolls out $200 per month 'global' satellite internet package' (The Verge, 15 March 2023) <https://www.theverge.com/2023/3/15/23641944/spacex-starlink-global-satellite-internet-portable-mobile> accessed 9 July 2023.

[29] Eli Blumenthalm, 'Amazon's Project Kuper Gets FCC approval for Over 3,200 Internet Satellites' (CNET, 31 July 2020) <https://www.cnet.com/science/amazons-project-kuiper-gets-fcc-approval-for-over-3200-internet-satellites/> accessed 9 July 2023.

[30] Emma Roth, 'Amazon reveals its squared-off Project Kuiper satellite internet dishes' (The Verge, 14 March 2023) <https://www.theverge.com/2023/3/14/23639450/amazon-project-kuiper-satellite-dish-internet> accessed 9 July 2023.

Moving to Europe, we find more traditional space companies that are participating in the LEO sector. One Web one of the only two nearly functioning global broadband LEO at the moment – alongside Space-X – in March launched 40 more satellites bringing the number of its satellites in LEO up to 582.[31] One Web stance in the sector has been further strengthened with the merger with Eutelsat in the past year. Eutelsat, one of the most respectable satellite providers, plans to integrate its GEO services with One Web LEO services to provide a multiorbital constellation in the years ahead. However, given the stake of the UK government in One Web it results likely that will not be considered for European governmental services.

SES another important European player that was a typical GEO satellite operator started to invest to offer multiorbital services, first with the acquisition of O3B[32] a MEO satellite company. Indeed, SES – before the One Web-Eutelsat merge – was the only satellite company operating the world's only multi-orbit constellation of satellites with over 55 GEO satellites and 20 O3b MEO satellites in orbit.[33] At the moment, it is under course the development and deployment of its next generation of MEO satellites with the O3B mPower satellites, which are expected to enhance SES's fast broadband offerings.[34]

In addition, given the clear run for LEO constellations and the importance of the development of a European constellation SES invested in INIO Enterprise a joint venture that seeks to take part in the development of the European constellation[35]. If the joint venture will succeed, SES will be the only satellite company with offerings from all the different orbits worldwide.

Therefore, we can assist in the efforts of the biggest European companies to foster the LEO market sector, alongside a vibrant SME industry.

However, until this day on both sides of the Atlantic, the soft engagement of public participation in these new sectors of space markets was clear. The traditional space industry driven by governments is no longer the Passepartout for the success of space missions, at least in LEO. As a result, in the years ahead there might be the risk that LEO may be overtaken by initiatives fuelled only by private interest. Indeed, if companies are left to self-regulate their activities, the deployment of hundreds of satellites may

[31] Mike Wall, 'SpaceX launches 40 OneWeb internet satellites to orbit, lands rocket' (Space.com, 9 March 2023) <https://www.space.com/spacex-oneweb-17-mission-launch> accessed 9 July 2023.
[32] Caleb Henry, 'SES Raises $1 Billion to Buy All of O3b Networks' (Via Satellite, 27 May 2016) <https://www.satellitetoday.com/telecom/2016/05/27/ses-raises-1-billion-to-buy-all-of-o3b-networks/> accessed 9 July 2023.
[33] Aaron Raj, 'SES's O3b mPOWER satellite constellation to revolutionize network connectivity' (TECHWIRE, 14 December 2022) <https://techwireasia.com/2022/12/sess-o3b-mpower-satellite-constellation-to-revolutionize-network-connectivity/> accessed 9 July 2023.
[34] SES, 'O3b mPOWER Redefining Satellite Services - Connectivity is Power' <https://www.ses.com/o3b-mpower> accessed 9 July 2023.
[35] Chris Forrester, 'SES commits to new LEO consortium' (Advanced Television, 7 September 2022) <https://advanced-television.com/2022/09/07/ses-commits-to-new-leo-consortium/> accessed 9 July 2023.

not be followed by appropriate normative safeguards that ensure the sustainability and safety of low orbits in outer space.

On the other hand, it shows that the participation of private parties is crucial for the deployment of such sophisticated and technologically complicated projects. Public-Private-Partnerships (PPP) will be crucial in the attempt of the constitution of the wide public participated constellations.

In addition, with the proliferation of projects in LEO to offer broadband and safe communication, it may form a risk for the European Union and its Member States to be designed to rely on non-European space backbones without being able to control and play a part in the many facets of the projects.

Indeed, in Europe, the debate was heated among the major satellites company on the idea of a whole European-based constellation. In 2021 SES, Eutelsat and Hispasat said – in a jointly-issued position paper – that they are prepared to participate in an EU-wide LEO scheme:

"*Eutelsat, Hispasat and SES strongly believe a European satellite infrastructure would strengthen the strategic autonomy of the EU by providing it with the ability to compete with ambitious constellation projects being deployed or planned on other continents at an accelerated pace, often benefiting, directly or indirectly, from massive governmental support*".[36]

On these premises, the European Union started to invest in the development of its own large satellite constellation in order to offer equal access to the internet to its citizens and neighbourhood, while benefiting from the opportunities given by the new infrastructure. Indeed, in February 2022 the EU proposed a regulation to establish a secure connectivity satellite constellation [37], which was finally adopted by European Institution in February 2023.[38]

## 4 IRIS²: the upcoming European Constellation

As previously mentioned, in the wake of the Ukrainian conflict governments clearly grasped the significance that space communication and broadband service can play in the seamless functioning of the internet. As a result, the risk that the last resort for the proper functioning of the Internet - and the critical infrastructures connected to it -

[36] Eutelsat, Hispanic and SES, 'Joint Satcom Operators' Position Paper European Constellation' (2021). <https://www.eutelsat.com/files/PDF/Joint-Satcom-Operators-Position-Paper.pdf> accessed 9 July 2023.
[37] Euractiv, 'EU states agree on need to build own satellite constellation' (Euractiv, 17 February 2022) <https://www.euractiv.com/section/global-europe/news/eu-states-agree-on-need-to-build-own-satellite-constellation/> accessed 9 July 2023.
[38] Commission, 'Adoption by the European Parliament of IRIS², Europe's new Infrastructure for Resilience, Interconnection & Security by Satellites' (14 February 2023) News article <https://defence-industry-space.ec.europa.eu/adoption-european-parliament-iris2-europes-new-infrastructure-resilience-interconnection-security-2023-02-14_en> accessed 9 July 2023.

should be in the hands of a single private party advanced the debate on the need for the EU to put forward a project for its European constellation providing satellite broadband and safe communication.

The proposal for the regulation establishing the constellation was presented in February 2022, and the agreement between the European Parliament and the Council of the EU was reached with a record timing within just 9 months, in November 2022. The adoption was paved by the vote in the Parliament with a record vote of 603 in favour and just 6 against in February 2023, now the approval of the text by the council is scheduled soon.

The constellation will bridge the digital divide in Europe and its partners. Indeed, it would assist in the accomplishment of the connectivity targets set out in the 2030 Digital decade.[39]

Iris[2] would provide a ubiquitous and resilient communication system to assure the internet's seamless functioning. The new broadband connection will cover the farther rural part and the dead zones of the European territory, therefore bridging the digital divide and guaranteeing the right to equal access enshrined in the UN Charter of Human Rights.

The constellation will form the third space program of the EU alongside Galileo and Copernicus. For the first time, the EU is creating an operating program in the context of a well-established commercial market in which companies already are offering connectivity services. Neither for Galileo nor for Copernicus this was the case, therefore, the approach to the development of the new programme must take into consideration this scenario.

For this reason, it will be of crucial importance for the EU to partner with private parties for the success of the constellation. The success of the deployment of the constellation will pass via the capabilities of the European institutions to coordinate the work of private parties benefitting from the synergies from the different know-how in the industry. Indeed, according to the Proposal of the Commission, the constellation will be built on a PPP.[40] It will be crucial that the EU, ESA and the European Member States lay down an appropriate framework to unfold creative PPP in order to engage the private market appropriately.

According to the commission, the IRIS[2] infrastructure will be envisioned as a system of systems, comprising the required space and ground components to provide IRIS[2]

[39] Commission, 'Europe's Digital Decade: Commission sets the course towards a digitally empowered Europe by 2030' (March 2022) Press release <https://ec.europa.eu/commission/presscorner/detail/en/IP_21_983> accessed 9 July 2023.

[40] European Space Policy Institute, 'IRIS2: The new (material) girl on the block' (ESPI - Brief No°61, 2022)<https://www.espi.or.at/wp-content/uploads/2022/12/ESPI-Brief-NO-61-Secure-Connectivity_Final.pdf> accessed 9 July 2023.

Governmental and Commercial Services. It will be made up of a Governmental Infrastructure, a Shared Infrastructure, and a self-standing Commercial Infrastructure.[41]

The cost of the constellation considering its development and deployment is expected to be approximately €6 billion; the EU and ESA will contribute respectively €2.4 billion and €750 million. The private sector will provide about €2 billion, with the remaining millions covered by European Member States.

Consequently, in order to attract private investment to reach the full ambition of the program the constellation when operative should provide for commercial offerings alongside governmental ones. Indeed, as planned by the proposal the constellation will give this opportunity to private parties that took part in setting up the constellation. Indeed, article 3(B) of the proposal states that the program shall: "*Enable the provision of commercial services or services offered to governmental users based on commercial infrastructure by the private sector in accordance with Article 7(4), including services to further develop Union and worldwide high-speed broadband and seamless connectivity*".[42]

Therefore, given the structure envisioned for the development of the European project the EU correctly recognised the importance that European companies will retain in the deployment of its large satellite constellation. In particular, it is fundamental that the EU involves European actors to nurture the European satellite market, which can consolidate its know-how – already well established in the GEO sector market – even in large constellations. In addition, the European Commission aims to ensure that the private actors involved in the projects are based in Europe and not subject to the control of third countries to strengthen the strategic autonomy of the EU.[43]

Indeed, well established European space companies welcomed positively the EU initiative, SES which may be one of the most important actors among the European space enterprises in a statement, said: "*The IRIS² constellation that was disclosed is a pivotal milestone to help determine Europe's sovereign space strategy for the decades ahead. As a European company offering satellite-based content connectivity solutions since 1985,* […]".[44]

It follows that for the success of the proper deployment of the constellation, a coherent and safe approach to space must be given by the EU in the years ahead in order to ensure a coordinated front among its member states.

[41] EU Regulation 2023/588 of the European Parliament and of the Council establishing the Union Secure Connectivity Programme for the period 2023-2027 [2023] OJ L79/1.

[42] European Parliament, 'draft Report on the proposal for a regulation of the European Parliament and of the Council establishing the Union Secure Connectivity Programme for the period 2023- 2027' C9-0045/2022 October 2022.

[43] EU Regulation 2023/588 (n 41) Art 22.

[44] Chris Forrester, 'SES supports EU LEO scheme' (Advanced Television, 21 November 2022) <https://advanced-television.com/2022/11/21/ses-supports-eu-leo-scheme/> accessed 9 July 2023.

## 5 Legal challenges facing large satellite constellations

As extensively described, space operations and services are under an everlasting transformation thanks to the technological fast-paced environment typical of the industry. However, the advent of this modern 'Space Race' did not follow the proper creation of new laws governing the new complexities.

Instead, the opening of these new opportunities in space pushed for the commercialisation of space, where space actors compete to launch services which exploit space orbits and make space congested. Indeed, as shown in paragraph 3.3, private actors, such as Starlink, Blue Origin, or OneWeb, alongside vibrant SMEs are planning to send thousands of satellites in LEO without a properly defined legal framework or guidelines in place. According to Aschbacher, the Director General of the European Space Agency (ESA), space is going to be much more restrictive in terms of frequencies and orbital slots available and the fact that Musk owns half of the active satellites means that he can make the rules himself.[45] We can say that there is an urgent need for governance to catch up with reality.

In the present era, it is imperative to acknowledge that the domain of space law remains comprehensively governed by the Outer Space Treaty (OST), widely regarded as the paramount legislative framework for regulating activities pertaining to space.[46] The OST encompasses a multitude of essential principles that form the bedrock of space law. As stipulated in Article 1 of the OST, it establishes a legal foundation for all endeavours related to the "*exploration and utilization of outer space, including celestial bodies such as the Moon*." Nevertheless, the treaty does not directly target or regulate specific activities, particularly those that have recently gained greater prevalence.[47] Alas, the prospect of amending the treaty to effectively address the novel challenges confronting the space community appears rather remote, given the different perspective among different states which will make complicated to reach consensus in international fora such as the United Nations.[48]

Therefore, regardless of this shift from a state-centric approach to a far greater engagement of private initiatives in space, the international legal framework has not seen any new crucial statutory intervention, since the past century when the international community could agree on a set of fundamental treaties – alongside the

[45] Pelly Hollinger and Clive Cookson, 'Elon Musk being allowed to 'make the rules' in space, ESA chief warns' (Financial Times, 2021) <https://www.ft.com/content/7d561078-37c7-4902-a094-637b81a26241> accessed 9 July 2023.

[46] He Qizhi 'The outer space treaty in perspective' (1997) 25 J. Space L. 93.

[47] Paul G Dembling and Daniel M. Arons 'The evolution of the outer space treaty' (1967) 33 Journal of Air Law and Commerce 419, 456.

[48] Joan Johnson-Freese and David Burbach 'The outer space treaty and the weaponization of space' (2019) 75(4) Bulletin of the Atomic Scientists, 137, 141.

OST – that would set the rules for the space race during the cold war.[49] Therefore, the current framework may appear to become increasingly outdated, and governments are looking into ways to strengthen it.

As pointed out by Freeland: "*It seems that the advent of small satellite constellations is inevitable, at least from the perspective of industry, even in the absence of clear prohibiting regulation; thus, it is important to understand the major relevant legal issues related to this development to be faced in the years ahead.*"[50]

As a result, the international community is currently facing a number of legal challenges that require an appropriate response in order to guarantee the proper functioning of constellations in LEO while preserving the sustainability of outer space. The following are the most imminent legal challenges for satellite operations: licensing and registration of space objects, which are critical given the advent of thousands of satellites in order to be cognizant of the objects floating in orbits; frequency attribution, which must be properly addressed in order to avoid interference and ensure proper communication among satellites and dishes down to earth; and the need for proper space traffic management framework and space debris removal mitigation plan to ensure smooth and safe coordination of the thousands of satellites out there in earth orbit.

Indeed, over 2000 satellites have been launched in the last three years since 2017, accounting for more than a quarter of all items launched in the preceding 60 years. It is obvious that, in terms of keeping track of all space objects, ensuring the safety, security, and sustainability of space orbits it is required a prompt answer.[51]

Notwithstanding, it is acknowledged that just a small portion of space objects are registered in the UN registry of space objects.[52] Indeed, according to NASA human-created space objects – superior to 10 cm – out there in space are over 20000, but just 7949 objects are present in the UN registry.[53]

In the next years, it is crucial that states rigorously adhere to the registration process. States must keep pace with the numerous launches expected in the years

[49] Yun Zhao, 'Space Commercialization and the Development of Space Law' in Peter Read and others (eds), *Oxford Research Encyclopaedia of Planetary Science* (OUP 2017).

[50] Steven Freeland 'Legal Issues Related to the Future Advent of Small Satellite Constellations' in *Handbook of Small Satellites: Technology, Design, Manufacture, Applications, Economics and Regulation* (Springer International Publishing 2020) 1315, 1336.

[51] Henry R Hertzfeld, 'Unsolved issues of compliance with the registration convention' (2021) 8 (3) Journal of Space Safety Engineering 238, 244.

[52] The registration convention of 1976, alongside the Outer Space Treaty of 1967 set out a framework for the registration of space objects, in order to track the space object out there and provide clear data to the space community. In addition, the first U.N. General Assembly Resolution regarding registration was the 1961 U.N.G.A. Resolution 1721 B (XVI). It paved the way for the voluntary reporting of space objects to the UN, which today still remains crucial because of the relatively few nations that have ratified the Registration Convention.

[53] National Aeronautics and Space Administration 'Space debris and human spacecraft' <https://www.nasa.gov/mission_pages/station/news/orbital_debris.html> accessed 10 July 2023.

ahead. Therefore, ensuring an appropriate registration of space objects is fundamental to construct an appropriate governance framework for large constellation of satellites.

In practice, appropriate registration permits that objects in space are identified and tracked, alongside promoting transparency, fair responsibility, and accountability in space activities. Indeed, with information about space objects publicly available, the international community can better comprehend what is happening in space and collaborate to encourage responsible space behaviour. Otherwise, in case of failure on following the registration process in the event of a collision, the process to attribute liability would become extremely challenging. This would lead to complications in attributing responsibility and addressing damages, in particular given the inherently sophisticated nature of space activities.

Moreover, regarding frequency attribution, the International Telecommunication Union (ITU) establishes a framework for frequency coordination through the Radio Regulations. These regulations outline the procedures and criteria for allocating frequency bands and coordinating their use among different satellite systems and terrestrial services. Their objective is to promote efficient spectrum utilisation, minimise interference, and ensure equitable access to frequency resources.[54]

However, the increasing number of satellite constellations and the spectrum requirements they entail pose challenges to the ITU's frequency coordination process. The existing regulatory framework may face difficulties in accommodating the sheer scale and complexity of these constellations, leading to potential conflicts and competition for spectrum resources.[55]

Therefore, proper frequency attribution is even more essential to prevent interference and ensure seamless communication among satellites and between satellites and ground-based systems. Efficient frequency management mechanisms are required to allocate frequencies in a manner that avoids conflicts and optimises spectrum utilisation.[56] Clear guidelines and procedures should be established to address the increasing demand for frequency resources and prevent harmful interference among different satellite systems forming large constellations.[57]

Furthermore, as already mentioned, with the growing number of satellites in LEO challenges the risk of collisions and the proliferation of space debris have become

[54] Roscoe M Moore III 'Business-Driven Negotiations for Satellite System Coordination: Reforming the International Telecommunication Union to Increase Commercially Oriented Negotiations over Scarce Frequency Spectrum' (1999) 65 J. Air L. & Com. 51.
[55] Audrey L Allison 'Requirements for Obtaining Spectrum and of Orbital Approvals for Small Satellite Constellations' in *Handbook of Small Satellites: Technology, Design, Manufacture, Applications, Economics and Regulation* (Springer International Publishing 2020) 1263, 1285.
[56] Mahdasi Jalali, Flor G Ortiz-Gomez, Eva Lagunas, Steven Kisseleff, Luis Emiliani and Symeon Chatzinotas 'Radio Regulation Compliance of NGSO Constellations' Interference towards GSO Ground Stations' (2022) IEEE 33rd Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC) 1425, 1430.
[57] Audrey L Allison (n 55).

significant concerns. A comprehensive space traffic management framework is necessary to regulate the movement and trajectories of satellites, ensuring safe coordination and avoiding congestion in critical orbits.[58]

In addition, space debris mitigation strategies will detain an important role in order to minimise the creation of space debris and actively remove existing ones to sustain the long-term sustainability of outer space.[59]

Governments, international organisations, and private stakeholders will have to face these legal challenges associated with large satellite constellations; they should work together to ensure the appropriate functioning and sustainability of space activities in the face of rapid technological advancements. It will be important to guarantee the success of these networks ensuring the safe deployment of infrastructures able to provide internet connection and safe communication worldwide, especially with IRIS² throughout all the European territory.

## 6 Facing the legal challenges of large constellations: between international cooperation and national laws

How should we approach all these legal challenges that are presented in front of us is a crucial step in the history of the space law-making process. Either the international community is able to answer the most imminent and compelling issues, otherwise the deployment of large constellations will put in danger the safety, security and sustainability of LEO and as a consequence of the whole outer space. While at the same time not allowing the unfolding of innovation given by space activities.

As a benchmark, the UN COPUOS[60] Guidelines for the Long-term Sustainability of Outer Space Activities might be seen as a good starting point to open the Pandora's box of the many legal questions regarding the need for a new space governance, and in particular for large satellite constellations.[61]

The resolution put forward 21 guidelines that actors involved in space activities should attain in order to ensure the sustainability of space. These include direction on governance framework for space activities, such as safety of space operations, equitable use of the radio frequency spectrum, registration, and mitigation of space debris. Moreover, they urge States and international organisations to voluntarily take action to

[58] Theodore J Muelhaupt and others 'Space traffic management in the new space era' (2019) 6.2 Journal of Space Safety Engineering 80, 87.
[59] Martha Mejía-Kaiser 'IADC space debris mitigation guidelines' in '*The Geostationary Ring: Practice and Law*' (Brill 2020) 381, 389.
[60] The United Nations General Assembly established the Committee on the Peaceful Uses of Outer Space in 1959 to govern space exploration and use of space for the benefit of all humanity: for peace, security, and development. The committee provides a unique forum for international cooperation in space law and policy.
[61] UNOOSA A/74/20, Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space 2019, para 163 and Annex II.

ensure that these guidelines are implemented to the greatest degree possible. As a result, many of the 21 guidelines address several of the points of friction that the proliferation of large satellite constellations raises in relation to international space law.

Indeed, as pointed out by the Secure World Foundations sustainability in space is: "*ensuring that all humanity can continue to use outer space for peaceful purposes and socioeconomic benefit now and in the long term*."[62] It seems clear that the commercialisation of space and – in particular – the development of large satellite constellation being one of the biggest challenges that the space community is facing that may end up in rendering earth orbit inoperable. It follows, that it would not be possible to benefit from all the services that well-established large constellations would provide for society, such as bridging the digital divide.

The Guidelines, as the result of a United Nations procedure, address States and multilateral organisations, which hold accountability for space activities performed by both individuals and organisations under their authority or control in the present international order. Sceptical views of the value of such international tools might argue that because the guidelines are optional and non-binding, private companies will disregard them unless they are incorporated into national legislation. In this regard, commercial space actors have a significant role to play in socializing the issue of space sustainability and leading by example to demonstrate their adherence to these guidelines as a minimum standard of responsible corporate behaviour in space.[63]

Therefore, in order to ensure the success in the functioning of a large constellation of satellites it is of critical importance to take into consideration the UN guidelines when considering how to approach space law-making efforts, both on behalf of governmental actors and non-governmental.

Notwithstanding, as well noticed at the moment the common stance is characterised by reluctance to conclude new international binding provisions of international space law. However, as pointed out by Israel the 'treaty statis' of space law-making in the international scenario does not imply that space-fearing actors are not involved in the creation of other kinds of regulation, such as guidelines or standards.[64] Indeed, guidelines and standards have proven to be a good option to face different challenges over the years.

However, the new complexities given by the advent of large constellations might need a more coherent and stronger regulatory approach in order to ensure their sustainable future.

[62] Secure World Foundation, 'Space Sustainability' <https://swfound.org/our-focus/space-sustainability/> accessed 11 July 2023.
[63] Peter Martinez, 'UN COPUOS Guidelines for the Long-Term Sustainability of Outer Space Activities' (2021) 8 (1) Journal of Space Safety Engineering 98, 107.
[64] Brian Israel, 'Treaty Stasis' (2014) 108 AJIL Unbound 63, 69.

As emphasised by Freeland, the current legal framework was not created with small satellite technology in mind. As a result, further regulation will most likely be required particularly at the national level. Bearing in mind that it will need a balance of sometimes conflicting interests between protecting the national or regional activities or fostering innovation, research and development.[65]

At the international level the Committee agreed to form a working group – under a five-year work plan – under its Scientific and Technical Subcommittee to continue the Long-Term Sustainability discussions in COPUOS, in order to foster their development and implementation.

However, COPUOS will have to deal with the challenge of preserving the consensus decision-making rule in a committee that is continuously growing in size. When the Committee started working on LTS in 2010 there were 70 member States. As of March 2023, COPUOS has 102 participants. As the Committee's membership grows, so does the variety of space powers, perspectives, and objectives represent by the member countries. These developments will make reaching an agreement in the Committee even more difficult.[66]

Indeed, at the time being it is not possible to avoid considering that with increasing countries joining the space club, international space legislation proves more difficult in view of diversified interests in space activities. As a result, the adoption of soft-law documents constitutes a favourable option given the impellent need for rules governing the new complexity presented by large constellations. As a second step, legislation at the national level stands out as a viable channel for the regulation of space activities; it can ensure the implementation of soft law via national laws. Indeed, COPUOS has identified space law capacity building as a main task in the new era of space governance.[67]

Therefore, the international community can adopt mainly two different directions. The international dialogue can be fostered by involving the wide members of COPOUS in the development of binding agreements or amendments of one of the 5 foundational treaties of space law.[68] However, this seems a remote option that would be accompanied by a lengthy procedure that would postpone the adoption of a much-needed governance approach to the development of large satellite constellations.

The other path would attain the modern undergoing approach with the development of soft law in the form of guidelines or standards, as well as strengthening existing ones such as the LST, by involving as many states and stakeholders as possible to ensure a common approach in the development of space standards for the governance of large

[65] Steven Freeland *(*n 50).
[66] Peter Martinez (n 63).
[67] See note 52.
[68] The treaties are: The Outer Space Treaties (1967); Rescue and Return Agreement (1968); Liability Convention (1972); Registration Convention (1975), Moon Agreement (1979).

constellations. Following the establishment of new standards, the international community should, over time, encourage their acceptance at the country level, making such rules enforceable on its national space operations.

Indeed, given the growing understanding of the importance of space operations for the future of human endeavours, the space community may remain hopeful that public and, in particular, commercial players will attain the aims of such non-binding agreements during this process. In particular, doing so would avoid leaving card blanche to private actors to self-regulate their activity during the deployment of their large satellite constellations.

In this moment, the latter option would allow the EU to play an important role in fostering this kind of international approach; the EU should ensure a coherent and common front with its Member States. Indeed, with the launch of its own large satellite constellation the EU can put out there its constellation alongside appropriate space behaviour and guidelines. Therefore, leading the adoption of a new safe, and sustainable approach in the deployment of large constellations of satellites, which for the time being have been led mainly just by private parties.

Indeed, as is customary in the formation of international consensus, fostering the discussion on certain arguments can be beneficial in bringing specific issues to the forefront in order to set the stage for the development of future normative approaches. Here it enters the role of the EU with its IRIS² constellation alongside a set of new space initiatives at the European level that will be presented in the next section. In particular, the debate in finding legal solutions at the international level might take into consideration the new approach that the EU is posing toward space matters.

## 7 A momentum for a new European approach to space law and policy

The scope of this section is not analysing the evolution of European space law and policy; rather, to consider the legal framework within the EU can take action today in order to understand where it might go in the future, given the importance of proper direction for the deployment of large satellite constellations while ensuring the safety, security, and sustainability of outer space.

Indeed, since the end of the last century, the EU has been committed to developing a European Space Policy, investing significant resources in promoting and carrying out European Space Programmes, as well as increasing the synergies of space-based applications in different EU policies. This action was bolstered further by the Lisbon Treaty with the introduction of Article 189 TFEU which includes a clear and particular competence on space titled “Research, technological development, and space.”[69] Since

[69] Consolidated version of the Treaty on European Union [2008] OJ C115/13.

the introduction of Article 189 the EU has taken a proactive approach to space matter increasingly day-by-day.

However, according to art.4(3) and art. 189 TFEU, the European Parliament, and the Council are yes entitled to adopt, on the basis of a proposal from the European Commission, regulations, directives, or decisions, provided that they are not aimed at harmonizing national legislation. It follows that harmonisation to obtain a more uniform European legal framework is not possible, even if such a framework would better promote private sector activities on the use of space, alongside enhancing competition intra-industries in Europe.[70] Therefore, Member states preferred to reserve the matter just for national law, fearing that otherwise, a de facto power transfer from the European Council to other institutions less subject to their control might occur.[71]

Indeed, respect other areas of law, where according to the principles of "subsidiarity" and "proportionality," member states would no longer be allowed to draft their own legislation if those competences had been transferred to the European level and such transfer was instrumental to ensure a harmonised regime, if necessary, by harmonising existing national regimes, here such harmonisation is not a followable path.[72]

Nevertheless, recently, the European Union has taken a strong stance in its space policy approach, the new proactive attitude is driven by several factors, including the increasing crystal-clear importance of space activities and the fierce competition raising among states and private parties to increase their space endeavours.

The announcement of the launch of its large satellite constellations, the publication of its Space Strategy for Security and Defense,[73] the publication of a Draft Opinion by the Council of the European Union on "Fair and Sustainable Use of Space", [74] and the publication of an EU approach to Space Traffic Management[75] clearly shows the importance that space bears for the Union.

The Council draft opinions are non-binding documents showing an overall political direction in order to foster the debate on specific matters. In the draft opinion on "Fair and Sustainable Use of Space" have been underlined an important point that can be considered for an attentive approach in the deployment of large satellite constellations.

[70] For a deep analysis of EU space law and policy see: Sergio Marchisio, *The Law of Outer Space Activities* (Edizioni Nuova Cultura 2022).
[71] Julién Beclard, 'With the Head in the Air and the Feet on the Ground: The EU's Actorness in International Space Governance' (2013) 19(3) Global Governance 463, 479.
[72] Frans G von der Dunk 'The EU Space Competence as per the Treaty of Lisbon: Sea Change or Empty Shell?' (2011) 66 Space, Cyber, and Telecommunications Law Program Faculty Publications 382.
[73] Commission, Joint Communication to the European Parliament and the Council European Union Space Strategy for Security and Defense JOIN (2023) 9 final.
[74] Council of the European Union, 'Draft Council conclusions on "Fair and Sustainable Use of Space' 8962/23, 5 May 2023.
[75] Commission, 'Joint Communication to the European Parliament and the Council An EU Approach for Space Traffic Management An EU contribution addressing a global challenge' JOIN(2022) 4.

First, the opinion acknowledges the fact that specific satellite orbits, especially LEO, are rapidly becoming hazardous areas due to space debris and non-manoeuvrable satellites orbiting at very high speeds. Then, it encourages the European Member States to continue the implementation of the 21 voluntary guidelines for the Long-term Sustainability of Outer Space Activities in order to achieve a European Long Term sustainable approach. It also calls for the creation of agreements regarding requirements to be fulfilled by all satellite service providers providing services for the EU and its citizens. Of particular interest, it calls to consider that:

"*The current requirement on a safe decommissioning of satellites 25 years after end-of-life might be too long; and INVITES the Commission to put forward suggestions for requirements to be discussed with Member States in order to achieve sustainability* […]".[76]

Therefore, the draft opinion includes requisites that if carried out would sustain action to ensure also safe and sustainable deployment of constellations in order to ensure the proper sustainability of orbits according to the COPUOS guidelines.

Moreover, the Space Strategy for Security and Defense is an important step for a common approach to space for matters related to international security, which is its main focus. In this regard, it lies down the basis for the creation of a future European space law. Indeed, it calls for the need: *"To enhance the level of security and resilience of space operations and services in the EU, as well as their safety and sustainability, the Commission will consider proposing an EU Space Law*".[77]

Therefore, the European Commission is considering the proposal for an EU space law. The legislative proposal should mainly address the resilience of space systems and services to ensure coordination between Member States and would be placed alongside other European cyber laws in order to be able to offer a comprehensive framework for space systems and services. In this regard, the law will focus mainly on the need for coordination to ensure the safety of space assets and their safeguard against cyber threats.

However, on the wave for a European space law – mainly focused on security and defense matters – in the future the EU might coordinate and approximate different national laws into law at the European level.

In particular, it can be said that the EU space law called in the Space Strategy for Security and Defense if enacted would circumvent the limit of Article 189 TFEU that does not permit the harmonisation of space law at the European level.

[76] Council of the European Union (n 75).

[77] European Agency Defence, 'European Union Space Strategy for Security and Defense' <https://eda.europa.eu/news-and-events/news/2023/03/10/eu-space-strategy-for-security-and-defence-to-ensure-a-stronger-and-more-resilient-eu> accessed 11 July 2023.

Indeed, as cited above according to Articles 4(3) and 189 of the TFEU the EU can adopt legislation in space matters. However, Article 189 specifically introduced a competence to create a European Space Policy which does not allow the harmonisation of Member States' laws and regulations. These constraints have been the subject of strong debates, with many claiming that the competence given to the Union was not shared, but rather a 'sui generis' parallel competence. The Space Strategy for Defence and Security does not design how the European Union would address the issue of legitimacy for the creation of such a law. Therefore, the EU institutions would have to rely on Member States' cooperation, the EU would have to convince its Member states that law at the European level would serve better the interest of the EU and its space companies.[78]

Therefore, it may follow that the EU will shift its approach to European space law-making. Indeed, if the proposal for an EU space law would succeed – as envisioned by the Space Strategy for Defense and Security – the EU may pave the way for the prospect of harmonisation in space law matters, where retained necessary closely collaborating with its Member states. As a result, it would be possible to guarantee more coordinated and coherent laws also in other facets of space law, such as coordination for matters of space traffic management, debris mitigation, registration, or spectrum frequencies. Consequently, it would be better ensured the safety, security, and sustainability of European space assets, such as satellites forming up IRIS².

For the time being – as noticed in Section 4 – given the development of IRIS² as PPP the EU should ensure to accompany the tenders for procurement with specific requirements that would ensure the safe and sustainable design, development, validation, deployment, and operativity of its constellation, such as Life Cycle Assessment,[79] appropriate spectrum frequency coordination and ensuring a coherent approach to space traffic management and debris mitigation.

As envisioned in its Joint communication on a European approach to Space Traffic Management: "*The EU should be pro-active at ensuring the development of international standards where feasible and needed and developing its own EU standards whenever appropriate.*"[80]

As a consequence, the EU in the launch of its constellation might be able to ensure the highest standards and guidelines in relation to the numerous legal challenges following the advent of large satellite constellations. The EU would act as a champion of

[78] Gilda Caso, 'The New European Union Space Strategy for Security and Defence: Perspectives and Opportunities' (2023) 22 (1) The Aviation and Space Journal 51.
[79] Thibaut Maury, Philippe Loubet, Sara Morales Serrano, Aurélie Gallice and Guido Sonnemann, 'Application of environmental life cycle assessment (LCA) within the space sector: A state of the art' (2020) 170 Acta Astronautica 122, 135.
[80] Commission, 'An EU approach to Space Traffic Management' <https://defence-industry-space.ec.europa.eu/eu-space-policy/eu-space-programme/eu-approach-space-traffic-management_en> accessed 11 July 2023.

responsible behaviour in LEO, advocating for the respect of international commitments and guidelines such as the COPOUS LST. It will be a concrete step for the EU to strengthen its position as a role model in the international scenario. In this regard, the EU if successful might leverage its capabilities in the safe deployment of the constellation leading the direction of international dialogue. It would constitute a first step in the direction of strengthening the role of the EU as a leader in the coordination of space law projects in the EU, and consequently in the international scenario.

Indeed, given the increased significance of space in the future, it will be critical for the EU to maintain a more consistent and coordinated posture in the international scenario.

It appears to be a very promising future scenario, but it is now time for new kinds of responses to ensure that the EU remains at the forefront of the development of legislative evolution in response to the emergence of new legal challenges to international space law posed by the arrival of thousands of small satellites and the technologies contained within them.

## 8 Conclusions

During the past years has come to the spotlight the importance that space communications detains for the functioning of society. Internet connectivity has become a crucial component of every country's critical infrastructure given the reliance of all aspects of economic activity and social development on Internet communications, the capability of a state or organisations to provide ubiquitous connection throughout their territory can constitute a factor of influence in the international scenario. Large satellite constellations come to our aid having the capability to provide broadband internet connection anywhere in the world, therefore ensuring that everyone can have equitable access to the same opportunities offered by the internet.

In that regard, this paper sought to show that the upcoming of IRIS² constellation provides an incredible opportunity for the European Union to bridge the digital divide and strengthen its role in the international scenario. The EU deploying a large constellation of satellites providing internet broadband connectivity can ensure equitable access to digital services for all its citizens - and close neighbours – and promote economic growth and technological innovation.

However, as shown in section 5, the success of the IRIS² project hinges upon a set of challenges, from legal and regulatory concerns to technical complexities, and the risk of collision followed by the formation of orbital debris. The EU, alongside its Member States and the International Community, must establish a robust and coherent legal framework, engage in international cooperation, and adopt innovative solutions in areas like space traffic management or space debris mitigation.

Section 6 underlines that the UNCOPUOS remain the principal and most important law-making body in space matter, however in the actual scenario it would not be capable to produce hard law in the time needed. Therefore, the best followable road is to foster the formation of soft law including the participation of different stakeholders as extensively as possible and then, encouraging the implementation of national legislation in the different states in order to make the guidelines enforceable by states over their national players acting in space. As an example, Adolfo Urso the Italian Secretary of State for industries, whose portfolio includes space, called for the need for a new Italian Space law to be adopted during the next year,[81] in order to govern the new complexity given by the proliferation of private initiatives in outer space; therefore, showing the awareness and commitments of states to act promptly in the near future.

In the last section the paper intended to underline that the IRIS² success also would offer the EU an opportunity to leverage its achievements in fostering a stronger stance in the international space community and in the law-making process, further promoting normative power in the space sector. As space activities continue to expand and evolve, the EU's leadership and promotion of international space law will have far-reaching consequences for the global space community. By successfully implementing IRIS², the EU can establish an example for responsible spacefaring nations in the deployment of large satellite constellations, paving the way for future generations to benefit from a more inclusive, sustainable, and well-regulated space environment.

[81] Antonella Salerno, 'Space Economy, Urso: "Italia protagonista, nuova legge in tempi rapidi"' (SpaceEconomy360, 11 April 2023) <https://www.spaceconomy360.it/politiche-spazio/space-economy-urso-italia-protagonista-nuova-legge-in-tempi-rapidi/> accessed 11 July 2023.

***Camilla Campodonico****

# ADVANCING SPACE ENVIRONMENTAL SAFETY

## IS CORPORATE SOCIAL RESPONSIBILITY APPLICABLE?

***Abstract***

This paper discusses hard law and soft law provisions within the legal context of space environmental protection. In a scenario where the private sector is rapidly growing, this study asks whether the corporate social responsibility could be a valuable soft law instrument in order to address the challenges derived by the increase exploration of outer space; the new space era is causing environmental hazards in space as well as pollution, and degradation.

Current space laws are not sufficient to address the complex issue of space debris and protect the space environment. The main treaty of the *corpus iuris spatialis*, the so-called Outer Space Treaty contains the keystone principle applicable in outer space; Article III - states that outer space activated must be conducted in accordance with international law- creates a pathway to apply the international environmental law regarding space activities. Furthermore, Article IX is important in the legal debate due to the interpretation of 'harmful contamination' and the due regard principle. Even if some Articles of the Outer Space Treaty can be read in accordance with the environmental protection, however, is not precise enough, the hard law has legal vacuums that need to be filled with tailored measures for outer space.

Soft law mechanisms to minimise the hazards of space debris, on orbit collisions, and to maintain its long-term sustainability have only lately been recommended by the international community as a result of the growth of space actors, especially commercial operators. The adoption of the 2019 Guidelines on the long-term sustainability of activities in outer space at Committee on the Peaceful Uses of Outer Space (COPUOS) can be seen as an understanding of the need to improve the legal protection of the space environment in order to achieve sustainability in space for the benefit of all humankind.

More specifically, this research looks at deepen our understanding of the applicability of corporate social responsibility (CSR) model in outer space for ensuring environmental safety within a sustainable strategy for outer space. Modern companies are not completely unfamiliar to 'do-no-harm' perspective. The resort to the political economy of CSR for space sustainability could be a valid innovative and complementary tool for addressing space environmental safety. Nowadays there are no biding instruments in the space law that require corporations to not harm the environment; it will be more likely to achieve these goals through soft law instruments.

The reduction and removal of space debris are now the subject of continuing discussion in international fora, although the international community has not yet established a course for future measures relating to environmental security in space.

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This study suggests applying the CSR paradigm to the setting of business and space law while considering the issues of the interaction between hard and soft law. It is expected to develop tools that maximise the industry's ability to adapt to the needs of effectively protecting the space environment.

**JEL CLASSIFICATION**: K33

**SUMMARY**



## 1 Introduction

The space sector is now booming; in the next 10 years we will witness the establishment of a permanent human presence on the moon thanks to the Artemis mission, the development of outer space tourism and, moreover the increased use of space for Earth economy.

The Space economy[1] is, in fact, growing at a fast rate, but the legal framework is now lacking behind; current hard law provision cannot be considered adequate for the space environmental protection. This paper addresses hard law and soft law provisions within the legal context of space environment's protection focusing on environmental challenges that corporations' activities are likely to bring in outer space and whether a soft law contribution, such as the CSR, could be used for a sustainable strategy.

According to us the increasing importance of these legal challenges are linked to the growing number of space players acting in an environment that is considered a finite resource,[2] there are more and more States with independent orbital launch capability and a growing number of private entities are developing privately funded space launch

[1] Simonetta Di Pippo, *Space Economy La Nuova frontiera dello sviluppo* (Bocconi University Press 2022) 72. Di Pippo refers to this new economy directed mainly to services as the new space economy; a space sector in which the private and public actors invest together; G Dezi, F Laurenti and J Emeterio, La nuova corsa allo spazio: dalla guerra tra Stati alla guerra tra miliardari, chi sono i protagonisti della conquista dell'ultima frontiera. Tra scienza e big tech, un viaggio interattivo verso i territori inesplorati (Rai News, July 2022) <https://www.rainews.it/speciali/corsaallospazio> accessed 10 March 2023. The space economy is developing so quickly thanks to the recovery and reuse of part of the vehicle, the current cost of a launch with SpaceX's Falcon Heavy is 30 times lower than that of an old Space Shuttle and 13 times lower than the average cost of the past. Also, the technology required for large satellite constellations has quickly become more reliable and compact.

[2] Antonello Folco Biagini, Mariano Bizzarri *Spazio. Scenari di collaborazione note di diritto internazionale*' (Passigli, 2013) 7; Peter Martinez, 'Development of an International Compendium of Guidelines for the Long Term Sustainability of Outer Space Activities' (2018) 43 Space Policy 13; Claudia Cinelli, *La disciplina degli spazi internazionali e le sfide poste dal progresso tecnico-scientifico* (Giappichelli Editore, 2020) 110; Simonetta Di Pippo (n1) 129.

systems[3]. On one hand this development can expand the benefits and the access to space technology while on the other it creates complex challenges linked to the operators' interactions with one another and with the policy and regulatory frameworks.

Furthermore, a huge threat directly linked to the massive space's utilisation is the environmental hazard, such as pollution and degradation raising concerns about the long-term sustainability of outer space as well as deterioration of life on Earth.[4] Such pollution, degradation and orbital congestion are linked to the increase in the number of commercial satellites launched to near-Earth space, with the vast majority being smaller satellites.[5]

Moreover, the number of space objects deployed per launch has shown a significant increase in recent years, with launches of one or two dozen objects at a time now fairly common; 2021 saw a record number of rockets carrying multiple satellites into orbit at the same time.[6] This reduces the launch cost per satellite, but often makes it more difficult to spot and track individual objects.

However, even if a single State, or even a group of States, could adopt measures to mitigate the risks of Earth's orbital congestion and outer space degradation they would not be efficient; in order to effectively do so no unilateral actions should be put in place but multilateral.[7] Pursuant to Articles I and II of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (OST),[8] outer space constitutes an area beyond the national jurisdiction; it belongs to the so called 'global commons'[9] and its legal status is characterised as 'province of all mankind',[10] which cannot be 'subject to national

[3] Simonetta Di Pippo (n1) 71. Di Pippo refers to this new development of the space sector as the new space in order to differentiate it from the old space - the space activities fully developed under the state's control and fundings.

[4] ESA Space Debris Office, 'ESA'S annual space environment report' (2022) <https://www.sdo.esoc.esa.int/environment_report/Space_Environment_Report_latest.pdf> accessed 31 March 2023.

[5] ESA Space Debris Office, 'More satellites share a ride into space' <https://www.esa.int/ESA_Multimedia/Images/2022/04/More_satellites_share_a_ride_into_space> accessed on 11 March 2023; UN, *'Our Common Agenda' - Report of the Secretary-General'* (NY 2021) 61 <https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf> accessed 21 March 2023.

[6] ESA Space Debris Office (n 5).

[7] Gennady Danilenko, 'Outer space and the multilateral treaty-making process' (1989) 4 High Technology Law Journal 217.

[8] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (1967) No. 8843 adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967.

[9] UN (n 5) 61. A global common refers to those resource domains that do not fall within the jurisdiction of any one country, and to which all nations have access. According to the Secretary General traditionally outer space is considered a global common out of the jurisdiction of any State.

[10] OST (n 8), Art I paras 1-2. However, there is not a legal definition of global common neither some mechanism to ensure the interest of mankind. Firstly, in 2021 the UN General-Secretary drafted the report Our Common Agenda, where at the paragraph 61 recognised as natural or cultural resources that are shared by and benefit us all. They

appropriation'.[11] This is, in fact, for its own nature a multilateral issue that requires a multilateral solution.

## 2 The main environmental threats to outer space

The space exploration has contaminated both space and Earth's environment since its beginning with the Space race in 1957.[12] Moreover the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) stated that 'space technology was found to represent a factor of damage to the circumsterrestrial, terrestrial and planetary environments'.[13]

There are various sources of pollution in space, from the use of products for the combustion of rockets, spacecraft propellants to radioactive contamination that could arise from nuclear powered objects as well as electro-magnetic interference.[14]

Moreover, two other important type of environmental hazards have to be considered; the backward and forward contamination; the latter one being the protection of celestial bodies from terrestrial matters; the former concerns protection of the Earth's biosphere from the contamination by extraterrestrial life forms in the course of spaceflight missions.[15]

include the four conventionally understood commons that are beyond national jurisdiction – the high seas, the atmosphere, Antarctica and outer space – all of which are now in crisis. This is not a legal definition but is a starting point for the developed of new legal mechanism.

[11] OST (n 8), Art II.

[12] Lotta Viikari, *The Environmental Element in Space Law; Assessing the Present and Charting the Future* (Martinus Nijhoff Publishers Brill Academic 2008) 29. The author analyses medical studies showing the increase in endocrine diseases and blood disorders in children living close to the space base in Baikonur in Kazakhstan; Peter Stubbe, *State Accountability for Space Debris; A legal Study of Responsibility for polluting the Space Environment and liability for Damage caused by Space Debris (Study in Space Law, 12)* (Martinus Nijhoff Publishers Brill Academic, 2017) 13; Alexander Salter, 'Space Debris; a Law and Economics analysis of the Orbital Commons' (2016) 9 Stanford Technology Law Review 224.

[13] Alain Pompidou *'The Ethics of space policy'* (UNESCO 2000) <https://unesdoc.unesco.org/ark:/48223/pf0000120681> accessed 6 June 2023.

[14] Steven Aftergood and others, 'Nuclear Power in Space' (1991) 264 (6) Scientific American 42; Peter Stubbe (n12) 13.

[15] Thomas Cheney and others 'Planetary Protection in the New Space Era: Science and Governance', (2020) 7 Front. Astron. Space Sci, Sec. Astrobiology para 2; COSPAR, 'Panel on Planetary Protection (PPP)' approved on 3 June 2021 <https://cosparhq.cnes.fr/scientific-structure/panels/panel-on-planetary-protection-ppp/#scope> accessed 23 March 2023; Furthermore the Committee of Space Research (COSPAR), to protect the space environment from harmful contamination which would threaten the scientific exploration of outer space, developed the Planetary Protection Policy (PPP). COSPAR was created after the beginning of the space race by the International Council for Science now International Science Council. The ISC has global membership of 230 organisations aiming at advancing human development within sustainable planetary and social boundaries. The objectives is to provide technical standards that, in order to safeguard and facilitate ongoing and future scientific explorations, limit the biological and molecular contamination of exploration activities in solar system's bodies and protect the Earth's biosphere by avoiding harmful biological contamination carried back by spacecraft. The COSPAR's PPP defines specific technical guideline to ensure the environmental protection of outer space: for example, for some missions' planetary protection sets limits for the

However, the main source of pollution is space debris. As noted in the Report of the Secretary-General on reducing space threats through norms, rules and principles of responsible behaviours many States consider space debris 'the most significant threat to the space environment'.[16] Moreover, a contribution to that risk is the lack of effective communication between space systems and the presence of non-functional space objects. It is also observed that the risk could have a disproportionate impact on States with new space programmes.[17]

Even if the international community is addressing the matter, there is not a hard law provision giving a legal definition of space debris; regarding this matter the UN in the Space Debris Mitigation Guidelines defines debris as a 'manmade objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional'.[18] There are other definitions of space debris given from private and public actors related to the non-functionality and valueless of the space object.[19]

The consequences of the old space exploration and economy are blocking, through piles of never-ending space junk the future uses of outer space;[20] scientific studies talk about the Kessler syndrome to show the ever growing cycle of generating debris from

level of acceptable microbiological contamination and for the probability of a spacecraft crashing on specific target bodies. The idea was that the PPP became embedded as the international standard by which contamination of celestial bodies would be avoided. Both the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) developed their own Planetary Protection Policies.

[16]UN GA, Report of the Secretary-General on reducing space threats through norms, rules and principles of responsible behaviours UN Doc A/76/77 (2021) para 12.

[17] ibid para 10.

[18] UN GA RES 62/217, Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space(22 December 2007). Scholars have been analysing the matter, among the others: Lotta Viikari (n12) defines Space Debris as a general term referring to all tangible man-made materials in space other than functional space objects, the author points out the presence of natural space debris created by meteoroids; George Hacket *Space Debris and the corpus iuris spatialis*(Editions Frontières, Gif-sur-Yvette 1994) according to the author the term debris describes a man-made object that lost operational control, including inactive payloads, operational debris, fragmentation debris and micro particulate matter; Peter Stubbe (n 12) 14, citing the Inter-Agency Space Debris Coordination Committee describes debris as a manmade object ,including fragments and element thereof, in earth orbit or reentering atmosphere, that are nonfunctional; Matteo Madi, Olga Sokolova *Space Debris Peril Pathways to Opportunities* (CRC Press 2020) - the authors address the issue of States' jurisdiction over the debris recognising the registry's State jurisdiction over it and so its approval for removing or moving the debris.

[19] See Lotta Viikari (n12) 33 for a specific analysis on the legal implications of defying a satellite valuable or valueless by the State that registered the object; Christos Kypraios, Elena Carpanelli, 'Space Debris', [2018] Max Planck Encyclopedia of Public International Law - the authors analyse the fact that all definitions of space debris are contained in soft law instruments, which do not create any legally binding obligations for States. The absence of a legal definition of space debris introduces ambiguity and calls into question the relevance of existing instruments in regulating of space debris; the draft of the 'European Code of Conduct for Space Debris Mitigation' available at <https://www.unoosa.org/documents/pdf/spacelaw/sd/2004-B5-10.pdf> accessed 17 July 2023 that defines space debris as "[a]ny man-made space object including fragments and elements thereof, in Earth orbit or re-entering the Earth's atmosphere, that is non-functional", and space object as "[a]ny man-made space system and any of its components or fragments" (pp. 13–14).

[20] Chandana Rohitha Rajapaksa and Jagath Wijerathna, 'Adaptation to Space Debris Mitigation Guidelines and Space Law' (2017) 15 (1) Astropolitics The International Journal of Space Policy and Politics 65, 76.

the collision of manmade objects that could lead to the inoperability of orbits;[21] especially the Geostationary Orbit (GEO) and the Low Earth Orbit (LEO) would be, according to these studies the most affected by debris, posing threats to our life on Earth since those regions are the main interests for the economic development of space.[22]

It is estimated that there are currently about 5465 operational satellites in the Earth orbit.[23] These satellites are operating in an orbital environment that is becoming increasingly congested; there is in fact more space debris than operational satellites- especially due to the fragmentation of existing objects. More than 30 000 pieces of space debris have been recorded and are regularly tracked by space surveillance networks.[24]

The two main events that created debris were the Chinese anti-satellite test conducted in 2007 that led to the destruction of the 1-C satellite and the creation of 150000 pieces of debris[25] and the collision between the Cosmos 2251 - a USSR inactive satellite - and the operating at that time Iridium 33, a USA satellite with the creation of 2000 pieces of debris measuring at least 10 centimetres in diameter.[26]

Furthermore, the debris does not only pose a threat to the space environment itself but also to the Earth due to the harm created by the re-entry of space objects.[27] These

[21] Donald J Kessler and Burton G Cour-Palais, 'Collision Frequency of Artificial Satellites: The Creation of a Debris Belt', (1978) 83 (A6) Journal of Geophysical Research: Space Physics 2637, 2646; Matteo Madi, Olga Sokolova (n 18) 74; Alexander Salter (n 12) 34, identifies the beginning of creation of debris in 1961 with the explosion a space vehicle. There are three main States responsible for debris; China is responsible approximately for 42%, Russia - for 25% and United States of America - for 27%.

[22] Lotta Viikari (n 12) 41, furthermore the GEO has an important role for the telecommunication and weather satellites. Not the entire GEO is important for human activities on the Earth since three-quarters of the Earth surface are covered by water. This means that only few parts of GEO are useful to human activities and so there are parts of the orbit more congested than others. The main threat is the possibility to developing countries to access these particular areas of GEO and the possible frequency interferences.

[23] See data of Statista Research Department of the University of Pisa, Number of satellites in orbit by major country as of April 30, 2022 (2022) <https://www.statista.com/statistics/264472/number-of-satellites-in-orbit-by-operating-country/> accessed 13 March 2023. The Country with biggest amount of satellites is United State with 3,433, followed by China: 541 and Russia: 172. The other States have a combined number of satellites of 1,319.

[24] ESA Space Debris Office (n 4) 19.

[25] Alexander Salter (n 12) 34; for a specific analysis about the consequences of the collision see Carmen Pardini and Luciano Anselmo, 'Assessment of the consequences of the Fengyun-1C breakup in low Earth orbit' (7th COSPAR Scientific Assembly, Montréal, Canada, 13-20 July 2008).

[26] Brian Weeden, '2009 Iridium-Cosmos Collision Fact Sheet' (Washington, DC: Secure World Foundation, November 10, 2010) available at: <https://swfound.org/media/6575/swf_iridium_cosmos_collision_fact_sheet_updated_2012.pdf> accessed 17 July 2023; Alexander Salter (n 12) 34.

[27] Alexander Salter (n 12) 75.

threats became concrete in the case of Cosmos 954, a USSR nuclear-powered satellite that crashed in Canada in 1978.[28]

As aforementioned space activities can create economic threats to human life on the Earth per se - such as health problems - and to the space industry. However, we should start to take into account the consequences of human activities to the outer space environment as forward contamination can destroy the outer space environment in an unchangeable way.[29] Due to this consideration, it is necessary to ensure that the current and future use of outer space by public and private actors is sustainable and takes into account the rights of the future generations.

The accumulation of debris shows that the legal framework for the preservation of the environment needs to be filled with specific environmental measure. An important way to address the issue of debris is through the Space Situational Awareness (SSA) since satellite's operator and crewed spacecraft need information about space object's position. There is not a unique legal definition of SSA.[30]

However, we could say that the SSA is known as the 'process of obtaining timely, accurate and transparent awareness of space operating environment'.[31] SSA plays a crucial role in ensuring the safety, security and sustainability of space exploration. It requires a network of globally distributed sensors as well as data sharing between satellite's owners.[32] The USA operates the largest network of sensor and so the most complete catalogue of space objects.[33] The second largest system is operated by Russia and consists of phased array radars and optical telescopes, most of them located in the formers Soviet Republics. Furthermore, several European countries operate in the sector

[28] Alexander F Cohen 'Cosmos 954: The International Law of Sattelite Accidents', in W Michael Reisman and Andrew R Willard (eds) *International Incidents* (Princeton University Press 1988) 68, 84 - for a more broad description of the accident and the Canadian and USSR views on it.

[29] Lotta Viikari, (n 12) 52; eg, the Moon does not have substantial atmosphere and so every minor change of the surface created by human activities has to be consider permanent.

[30] Matteo Madi, Olga Sokolova (n 18) 14 (table) the authors analyse the different definition of SSA; European Space Agency, "SSA Programme Overview", <https://www.esa.int/Safety_ Security/SSA_Programme_overview> accessed 9 June 2023 defines SSA as 'the comprehensive knowledge, understanding, and maintained awareness of: the population of space objects, the space environment, and the existing threats and risk's; EU Satellite Centre 'Space Situational Assessment (SSA)' <https://www.satcen.europa.eu/page/ssa> accessed 9 June 2023. The EU Satellite Centre defines it as 'knowledge of the space environment, including location and function of space objects and space weather phenomena. SSA is generally understood as covering three main areas: Space Surveillance and Tracking (SST) of man-made objects; Space Weather (SWE) monitoring and forecast; Near-Earth Objects (NEO) monitoring only natural space objects.

[31] Matteo Madi, Olga Sokolova (n 18) 12.

[32] Brian Weeden, 'Space Situational Awareness Fact Sheet', (Washington, DC: Secure World Foundation, May 2017) available at: <https://swfound.org/media/205874/swf_ssa_fact_sheet.pdf> accessed 10 June 2023. The ground base radar was historically the main source for SSA but also optical telescope as well as other sensor such as the ones decking radio frequency.

[33] ibid- the USA system is also known as the Space surveillance network (SSN) and it is managed by the military.

and in 2008 ESA started the SSA Preparatory Program to create a European SSA based on nationals data.[34]

## 3 A new role for States in outer space?

According to the United Nations Office for Outer Space Affairs (UNOOSA) space law is the body of law governing space-related activities. The term is most often associated with rules, principles and standards of international law appearing in the five international treaties developed under the United Nations that form the so-called *corpus iuris spatialis*.[35] In addition to these international instruments, many States have national legislation governing space-related activities due to the increase in the sector's privatisation.[36]

There are no biding instruments that directly guarantee the environmental protection in the use and exploration of outer space. The OST, in fact, does not have any specific provision that can be strictly considered for this purpose. Instead, soft law instruments have being developed regarding the mitigation of space debris and the long-term sustainability of outer space. Soft law provisions -more than hard law- seem to better encourage private actors to have an eco-friendly approach; however, it does not immediately translate to meaningful management but could lead to greenwashing.[37] There are several different reasons behind a company's decision to carry out greenwashing practices, the major one being the economic advantages. We have already seen the greenwashing practice in environmental initiatives on Earth.[38] In order to avoid

[34] Ibid.

[35] The five treaties that create the *corpus iuris spatialis* are: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies; The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space; The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies; The Convention on International Liability for Damage Caused by Space Objects; The Convention on Registration of Objects Launched into Outer Space.

[36] United Nations Office for Outer Space Affairs, 'National Space Law' <https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html> accessed 23 March 2023.

[37] Regulation of the European Parliament and of the Council (EU) 2020/852 of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 OJ L198, 22.6.2020, p 13–43 in para 11 defines greenwashing as 'the practice of gaining an unfair competitive advantage by marketing a financial product as environmentally friendly, when in fact basic environmental standards have not been met'; for more information see Magali Delmas Vanessa, Cuerel Burbano 'The Drivers of Greenwashing' (2011) 54 (1) California Management review 64, 82 <https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/14016/cmr5401_04_printversion_delmasburbano.pdf> accessed 24 March 2023.

[38] Agostino Vollero, *Greenwashing: Foundations and Emerging Research on Corporate Sustainability and Deceptive Communication* (Emerald Publishing Limited 2022) 65, 93. The author analyses the Volkswagen case. George Kassinis and Alexia Panayiotou 'Visuality as Greenwashing: The Case of BP and Deepwater Horizon' (2017) 31 (1) Organization & Environment 25, 47, it analyses the different ways in which companies can change their behaviour in order to continue with the greenwash practice, depending on the type of control of the stakeholders. The authors also focus on the importance of the visual aspect of greenwash and analyse the Deepwater Horizon case; Sharon Beder *Global spin:*

the greenwash practice it is important that States oversee private initiatives; this type of control could come, at the national level, from the CSR[39] and at the international one from the principle of due diligence; States should oblige themselves under international law to respect and protect the outer space environment; through the CSR tool States could create modules and codes of conduct in their national law, to ensure that their companies carry out sustainable actives and projects.

This chapter will analyse the biding instrument developed by the international community, particularly the OST, and both private and public guidelines created in recent years to tackle the space debris and long-term sustainability problems.

## 3.1 The legal vacuums of biding instruments from a contemporary perspective

The necessity of outer space law to regulate outer space activities commenced with the launch of Sputnik and developed within the UN;[40] in particular the COPUOS and the UN General Assembly had the merit of establishing the foundation stones that are still valuable today.[41] Proof of this is the adoption within the UN of five treaties and principles; the basic one being the Outer Space Treaty that entered into force on October 1967, and to which most of the international community is a part.[42] We also have to remember that the outer space law born in the UN is complemented by many bilateral and multilateral agreements concluded outside the international organisation.[43]

Even if written in a different historical context the OST contains the keystone principles applicable in space such as the freedom of exploration and the non-appropriation.[44] However, the *corpus iuris spatialis* does not include specific provisions for the preservation and protection of the extra-atmospheric environment. However, even if there are no clear norms that could be directly link to the protection of the

*The corporate assault on environmentalism* (Green Books Ltd; 2nd edition2002) case of General Electric case in USA is analysed.

[39] Mike Wright and others (eds) *The Oxford Handbook of State Capitalism and the Firm*, (Oxford University Press 2022) part VI.

[40] Space exploration served as another arena for Cold War competition between the USA and the USSR. The beginning of the space race was on October 4, 1957, when a Soviet R-7 intercontinental ballistic missile lunched the world's first artificial satellite - Sputnik. As a consequence NASA was created by the President of the United States Eisenhower. In 1961, the Soviet space programme took another step forward when the Soviet cosmonaut Yuri Gagarin became the first person to orbit earth. The possibility to start using the outer space for military purposed led the international community to create the OST.

[41] Peter Martinez (n 2) 14.

[42] UN GA RES 222/XXI (19 December 1966) 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies' <https://treaties.unoda.org/t/outer_space> accessed on 16 March 2023. The Number of States Parties is 113.

[43] UN Office for Outer Space Affairs 'Bilateral and Multilateral Agreements Governing Space Activities' <https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/bi-multi-lateral-agreements.html> accessed 17 March 2023.

[44] Peter Martinez (n 2) 14.

outer space environment, there are three Articles of the OST that are now considered the closest norms to regulating space environment. The first one is Article I that recognises outer space and its resources as a common good, under the principle of 'common interest of mankind in outer space'.[45] The Article at the first paragraph while using the term 'province of all mankind', reinforced the protection of the interests of both space and non-space nations; this principle implies that the exploration and use of outer space must be beneficial to humankind as a whole.[46]

The second one is Article III of the OST that states that space activities shall be carried in accordance with international law including the Charter of the United Nations. Article III is in fact defined as a gateway through which rules of the international regime can apply in outer space.[47] This implies that other branches of international law, such as international environmental law can be applied to all space activities contributing to the protection of the space environment.[48]

Furthermore, we should ask ourselves to which extent environmental law is applicable to outer space and if outer space can be considered environment.

Firstly, we have to understand what environment means. International law does not provide any definition; however, we can define it as '[t]he relationship of human beings with water, air, land and all biological forms,' or as 'the combination of elements whose complex interrelationships make up the settings, the surroundings and the conditions of life of the individual and of society, as they are and as they are felt'.[49]

Nowadays the human's activities and space are deeply linked; we greatly benefit from space technology especially in the field of telecommunication, Earth observation and also exploration. In this sense we could consider space as part of the environment and so applying part of the international environmental law.[50]

Among the international environmental law, the no harm principle is applicable,[51] namely the responsibility of States to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States, or of areas beyond the limits of national jurisdiction. The customary no harm rule, while being applicable to

[45] Art I OST.

[46] Claudia Cinelli (n 2) 128.

[47] Pierfrancesco Breccia, 'Article III of Outer Space Treaty and its relevance in the international space legal framework '(IAC-16, E7,1,2,x33555, 67th International Astronautical Congress, 2016) para. 2.3.

[48] Lotta Viikari (n 12) 120.

[49] Daniel Bodansky *The Art and Craft of International Environmental Law* (Harvard University Press 2009) 10. First international environmental law focuses primarily on the interactions of humans and the natural world. It presupposes a separation between humans and nature. Some changes are natural and beyond the purview of international environmental law while others are caused by humans and are thus susceptible to regulation.

[50] Biswanath Gupta and Tamoghna Agasti, 'The Curious Case of Article IX and Outer Space Environment' (2022) 2 (2) Journal of Environmental Impact and Management Policy 7, 25.

[51] Initially applicable only for Neighbouring States, now it can be applied to outer space. For a more specific analysis see Peter Stubbe, 'Common but Differentiated Responsibilities for Space Debris – New Impetus for a Legal Appraisal of Outer Space Pollution' (2010) 31 European Space Policy Institute Perspectives.

areas beyond national jurisdiction, is reflected in the environmental protection in regard to the *res communis* concept.[52]

Furthermore, the Third UN Conference on the Exploration and Peaceful uses of Outer Space, adopted in 1996 'The Space Millennium: Vienna Declaration on Space and Human Development' a non-binding declaration stating the need to protect the space environment and the applicability of the sustainable development to outer space.[53]

Finally, Article IX introduces the principles of cooperation, mutual assistance and due regard in the exploration and use of outer space. The principle of due regard is satisfied when States exercise their own rights without resulting in an unjustifiable interference with other States. The due regard can be considered both a self-restraint principle and a duty of care; in fact, it does not imply that any harm is a breach of international law. The country fulfils its duty of care if it implements all the expected measures - in consideration of the international responsibilities- to prevent the damages.[54] However, Article IX does not specify what can be considered a lawful behaviour making the enforcement nearly impossible.[55] From an environmental law point of view is possible to apply the principle of due regard in order to encourage States to have responsible behaviours;[56] if, in addition State practice is accumulated with the help of detailed guidelines and implementing national regulatory frameworks, the due regard would be effectively applied to space activities.

Article IX also puts other obligations on States; while studying or exploring the outer space or any celestial body, States should 'avoid harmful contamination and also adverse changes in the environment of Earth resulting from the introduction of extraterrestrial matter'. It is necessary to understand what entails harmful contamination and whether it includes protection of the outer space environment; from a first analysis the objective of Article IX is to underpin the international cooperation in carrying out space activities while protecting the celestial body from harmful contamination.

However, in absence of any specific norms we should apply the Vienna Convention on the Law of Treaties (VCLT) to evaluate the possibility of the OST to ensure the protection of outer space. According to the VCLT there are two main interpretational criteria to evaluate the applicability of the OST; the teleological and textual one.[57]

[52] ibid para 4.1; Lotta Viikari (n 12) 148 the *res communis* principle is gaining more relevance with regard to the protection of the space environment highlighting an intrinsic value of outer space.

[53] UN, Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999 , A/CONF.184/6.

[54] Lotta Viikari (n 12).

[55] Gordon Chung, 'Emergence of Environmental Protection Clauses in Outer Space Treaty: A Lesson from the Rio Principles' in Annette Froehlich (ed) *A Fresh View on the Outer Space Treaty* (Springer Cham 2018) 1, 13; John S Goehring, 'Can We Address Orbital Debris with the International Law We Already Have? An Examination of Treaty Interpretation and the Due Regard Principle' (2020)85 (2) Journal of Air Law and Commerce 309, 337.

[56] Peter Stubbe (n 12) para 4.2; Biswanath Gupta and Tamoghna Agasti (n 50) para 3.

[57] Claudia Cinelli (n 2) 120.

In relation to the textual approach, it is possible to analyse the current meaning of harmful contamination and space object; it seems possible to define space debris as a space object that has an impact on the orbital environment that could lead to a harmful contamination.[58] Regarding the teleological principle, a rational interpretation of the OST's purpose is to ensure benefits for all States in exploring and exploiting outer space. Hence, the benefit cannot be guaranteed if the environment is not protected due to the risks of overexploitation.[59]

Furthermore, it seems also appropriate to apply an evolutionary approach in order to enlarge more broadly the meaning of harmful contamination with reference to the concepts of sustainable development[60] only if there are not any contrary provisions and if the purpose and objective of the treaty are respected;[61] in this case the meaning of harmful contamination could cover the introduction of space debris and other new sources of contamination.[62]

However, certain debris is inherent to space exploration and so not all actives can be considered as harmful contamination; any debris generation has to be considered as a source of pollution but depending on the magnitude of the pollution itself a single generation of debris can be considered as harmful contamination and so be prohibited under Article IX.[63]

[58] ibid 121.

[59] Ibid.

[60] Ma Xinmin, 'The Development of Space Law: Framework, Objectives and Orientations' (United Nations/China/APSCO, Workshop on Space Law, 2014) 12; Space law's regulation, protection, and direction have been crucial to the development of outer space technologies and activities throughout history. The development of the space law needs to proceed in the same direction as the advancement of space activities and technologies. Therefore, in order to make greater contributions for the benefit of humanity as a whole, the development of the space law needs to keep up with the times; Report of the Secretary-General, 'Our Common Agenda' (n 11) 61, According to the Secretary General the main Governance arrangements for outer space, were established in a State centred era and provide only general guidance and principle on how to manage outer space and its resources. Also, due to the technological development there's the need to update the regulatory regimes in order to protect and preserve outer space; Claudia Cinelli (n 2) 121 the evolutionary approach gives the possibility to interpret the treaties depending on the historical period in which the analysis is made.

[61] Claudia Cinelli (n 2) 121.

[62] Krzysztof Niewegłowski, 'Space debris and obligations erga omnes – a legal framework for states' responsibility?' (8th European Conference on Space Debris, Darmstadt, 2021) para 4; Stephan Hobe and others(eds) *Cologne Commentary on Space Law, Volume I Outer Space Treaty* (Carl Heymanns Verlag Cologne 2009) 177; Peter Stubbe (n 12) according to the author the creation of debris must be regarded as a man-made alteration of the outer space environment, and so the production of debris constitutes a form of pollution. Furthermore it can be considered contamination due to the transformation of the space object in orbit into an undesirable element only years after its initial transfer. Furthermore it is not only the launch of the object into space a source of contamination but also the possible generation of debris in situ. The contamination needs also to be classified as 'harmful' in order to fall within the scope of Art. IX; nowadays the level of debris in orbit threats the interests of State in the exploration and use of outer space, falling again whiten the scope of Art. IX.

[63] Peter Stubbe (n 12) 166, Whether the threshold of harmfulness is crossed must be assessed against the back- ground of the individual case, as for example the destruction of the Chinese 1C satellite generated a huge increase in the debris population and so has to be considered as harmful contamination.

Nevertheless, Article IX is specific in its application when it comes to the Earth's atmosphere; the treaty puts a legal duty on States in order to address the contamination of outer space from scientific exploration. In this case Article IX states that 'States Parties to the Treaty shall conduct exploration to avoid 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'.[64] In fact, in order to consider an activity a potential change in the atmosphere of Earth the change has to be 'adverse' and caused by 'introduction of extraterrestrial matter'.[65] Any other changes to the Earth's atmosphere due to other reasons would not be covered by Article IX. Due to this consideration, it can be said that this provision does not serve as a tool to ensure environmental purposes.

Article IX also states the duty to consult in case any States parties have reasons to believe that an activity can cause potential harmful interference; two conditions have to be fulfilled; firstly, the activity should 'potentially cause harmful interference with activities of other States parties'.[66] Secondly the State must have 'reason to believe' [67] that the activity or experiment would cause potential harmful interference. However, the Article itself does not specify what activities should be considered as harmful interference neither prescribes the procedure for appropriate international consultations nor designates an agency to which States should turn for the evaluation of the proposed uses or experiments in outer space.[68] Thus, the international consultations merely depend on the subjective analysis of the particular State carrying out the space activity.

To conclude, as shown above Article IX lacks precision making in it difficult to apply and considered breached, therefore it has never been used.

We should briefly focus the attention on the Liability Convention[69] and Registration Convention[70] since neither of these two instruments can be applied to the environmental protection. The former one was elaborated on Article VII of the OST that establishes the liability of States for their activities in space but, also, for those space objects owned by the government or companies under their jurisdiction. It applies for damages caused by both the successful and failed launch irrespective of whether the space object causes damages on the surface of Earth, to an aircraft in flight or elsewhere. The main purpose of the Convention is to favour transparency and accountability of States in their space actives and ensuring compensation for possible private and property damages.

[64] Art IX OST.
[65] Ibid.
[66] Ibid.
[67] Ibid.
[68] Biswanath Gupta and Tamoghna Agasti (n 50) para 3.
[69] UNGA RES 2777 (XXVI) 1971, Convention on International Liability for Damage Caused by Space Objects.
[70] UNGA RES 3235 (XXIX) 1974, Convention on Registration of Objects Launched into Outer Space.

Article I gives a definition of damage as 'loss of life, personal injury or other impairment of health; or loss of or damage to property…', of a launching State as a 'State which launches or procures the launching of a space object; a State from whose territory or facility a space object is launched' irrespective of the principle of national responsibility under Article VI of the OST.[71]

Furthermore, the convention makes a distinction based on the location of the damages; if the damage is caused on earth, the launching State is absolutely liable. This is a very victim-oriented situation, much better than for any other international damage.[72]

However, most of the time the damage is caused in outer space, in this case the Convention is less efficient because it only states for fault liability, based on a negligent or intentional conduct of the State.

Additionally, there are two main vacuums of the space liability regime; the former one is its design; it was not created to provide compensation for environmental damage as such since is concerned with direct damages suffered by States persons.[73] The latter one is that the Convention refers only to States, specifically launching States, but not to private actors. The States are in fact the only subject of international law to which the convention is directed; in recent years with the increasing role of private actors this provision could create concerns to the launching State; however, we also have to notice that the liable State is free to recover any payable damages from private actors using its domestic law.[74]

Moreover, the lack of a precise terminology in the Liability Convention can even be interpreted to exclude all damages caused by space debris since it applies to the damage 'caused by a space object'.[75] If space debris does not qualify as a space object for the purposes of the Liability Convention, the instrument becomes meaningless in establishing liability for space activities.[76] Regardless of the definition of space object and the inclusion of the debris in the definition itself there are practical difficulties in

[71] For a more specific analysis on the relation between Article VII of the OST and the Liability Convention Bin Cheng *Studies in International Space Law* (Clarendon Press, 1998) 613.

[72] Armel Kerrest, 'Space debris, remarks on current legal issues' (ESA, 3rd European Conference on Space Debris, 2001) para 2.2.

[73] Lotta Viikari (n 12) 66. Only Article XXI can be linked to the environmental consequences of space activities. It mentions damage presenting 'a large- scale danger to human life' or seriously interfering 'with the living conditions of the population or the functioning of vital centres'. This article does not regulate liability but aspires to guarantee 'appropriate and rapid assistance to the State which has suffered the damage'.

[74] Kirsten Schmalenbach *Corporate Liability for transboundary Environmental Harm; An International and Transnational Prospective* (Spinger 2022) chapter 11.

[75] Art. I of the Liability Convention (n 62) space object are defined as: 'component parts of a space object as well as its launch vehicle and parts thereof'.

[76] Lotta Viikari (n 12) 70. The vague definition of space object creates problems linked to the definition itself of space debris, as for example in the case of little pieces of debris, as one can argue that such items are neither a space object nor a component part of one.

establishing the liability of the launching State due to the impossibility to prove that a particular piece of debris was part of a registered space object.[77]

So far, no liability claim has been processed under the Liability Convention even if several incidents involving space objects have caused tangible and considerable damages; ie the crashed of Cosmos 954 in Canada[78] but the Canadian government settled claims against the USSR outside the framework of the Liability Convention in 1981.[79]

Furthermore, also the registration convention has its relevance for the environment; the Convention obligates, according to Article II and IV, the launching States to register the launched object in a national register and also to give, 'as soon as practicable'[80] the UN Secretary General all the practical information regarding the object. All these information is kept in the UNOOSA register.[81]

One of the main limits of Article II is that it does not specify any requirements, thus establishing the rules and nature of the registry are left to the nations themselves.[82] The States practice differs in many aspects; from the time of submission of the information to the UN to the information given.[83]

The Registration and Liability Convention operate together; in case of collision the information given pursuant of the Registration Convention can be highly important in establishing the liability of the launching State. However, both Conventions have the same problems of interpretation for the launching State, space object and their concrete application.[84]

The problem with the *corpus iuris spatialis* is its general normative structure that is not enough to create a legal framework in accordance with the needs of the new space sector, especially regarding the environmental protection.

Owing to the inadequacy of aforementioned Treaties along with the difficulty of enacting new laws at the international level in the last two decades several initiatives have been launched at the international level, regarding the creation of soft law tools, to face the challenge of space safety, security and sustainability. In order to better understand the situation this article tries to give an analysis of the soft law tools that have been developed by the international community such as the Guidelines on Space Debris Mitigation and the Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities, as well as guidelines that are being developed by private actors.

[77] ibid 71.
[78] ibid para 2.
[79] Kirsten Schmalenbach (n 74) 535.
[80] Registration Convention (n 63), Art. II.
[81] Registration Convention (n 63), Art. III.
[82] Henry Hertzfeld, 'Unsolved issues of compliance with the registration convention' (2021) 8 (3) Journal of Space Safety Engineering 240.
[83] Lotta Viikari (n 12) 75. Also, there is not any type of control over the accuracy of the given information.
[84] ibid 75.

### 3.2 International Guidelines

Since the earliest days of the Space Age, the UN COPUOS has been the principal intergovernmental forum for broad dialogue on international cooperation in the exploration and peaceful uses of outer space and for the development and codification of laws and principles governing space's activities. There are currently no biding instruments in this field that require institutions or corporations to adopt a specific form of conduct in accordance with the environmentalism principles; therefore, these goals will have to be achieved mainly through soft law instruments and voluntary commitments. States, in fact, can decide to adopt guidelines and best practices regarding some areas of cooperation; neither the guidelines nor the best practices are legally binding, but we can consider them a good example of the attitude of the international community toward a topic. Furthermore, despite their non-binding status under international law, the guidelines can have a legal character in the sense that States may choose to incorporate elements of the guidelines in their national legislation.[85]

The proven inadequacy and lacuna in the primary space law treaties and principles vis-à-vis protection of the outer space environment was first flagged the 1990s in the UN COPUOS Scientific and Technical Subcommittee that only a decade later - in 2007 - led to the adoption of the Space Debris Mitigation Guidelines by the UN General Assembly.[86] This was one of the first times that a legal instrument was drafted, solely dedicated to the outer space environment gaining wide acceptance among the international community. While this was a first big step forward in the protection of the outer space environment, these guidelines cannot be considered sufficient to address all space's environmental issues. The Space Debris Mitigation Guidelines can be divided into different broad categories; prevention of the release of debris during normal operations, post-mission disposal, and collision avoidance.[87] They only address and explain various measures for the mitigation of space debris, focusing only on one aspect of the outer space environment i.e., pollution through space debris.

Even if the Guidelines constituted an important step toward in reducing the risks related to space debris, they are not sufficient in the long-term run; they do not provide a comprehensive approach considering that the environmental protection is not mentioned. Furthermore, these Guidelines are non-legally binding instruments with low

[85] Laura Byrd, 'Soft Law in Space: A Legal Framework for Extraterrestrial Mining' (2022) 71 (4) Emory Law Journal 832.
[86] UN GA Res. 62/217, 'International Cooperation in the Peaceful Uses of Outer Space', 2008, UN Doc. Res. 62/217; Peter Stubbe n 12) 233. The deliberation was held since 2022 under a multi-year work plan and since 2005 within the scope of a working group. Even if there were adopted by the UN General Assembly the Guidelines were not considered by the Legal Subcommittee a distinct UN General Assembly resolution; for a specific analysis on the history and adaptation of the debris issue of debris Chandana Rohitha Rajapaksa and Jagath K Wijerathna (n 20).
[87] Ibid.

levels of compliance and enforceability; in fact the States are the one to voluntarily implement them.[88] The instrument itself also provides that 'Member States and international organisations should voluntarily take measures [...] to ensure that these Guidelines are implemented'.[89]

The Inter-Agency Space Debris Coordination Committee (IDAC)[90] developed its own Space Debris Mitigation Guidelines with the objective of describing accepted practices for limiting the space debris. IDAC's mitigation document was adopted in 2002 and has subsequently been updated;[91] by the time of its first adoption, its Guidelines represented the first international regulatory document of its kind.

The document is more detailed than the UN COPUOS Mitigation Guidelines, containing a number of definitions and several mitigation guidelines; after defining space debris as all man-made objects in Earth orbit that are non-functional it describes the main aspects of the Space Debris Mitigation Plan that should be developed for every program and project- from the assessment risk related to space debris to the plan for disposal.[92]

Also, the Guidelines state that any project or experiment that will release objects on the orbital environment should be planned only if it can be verified that the long-term effect on the orbit is very low.[93]

In developing the UN COPUOS Mitigation Guidelines, the UN COPUOS Scientific and Technical Subcommittee based its considerations on the work of the IDAC.[94]

Finally, the International Organization for Standardization's (ISO)[95] international standards 24113 shall be considered an additional source of mitigation requirements. Shortly after the publication of the first edition of IADC's Space Debris Mitigation

[88] ESA, 'Mitigating space debris generation ' <https://www.esa.int/Space_Safety/Space_Debris/Mitigating_space_debris_generation> accessed 17 March 2023; Peter Stubbe (n 12) para 3.1.

[89] UN COPUOS Mitigation Guidelines (n 18).

[90] IADC is an international forum of space agencies for the coordination of activities related to the issues of space debris both human-made and natural. Members of the IADC are the Italian Space Agency, Centre National d'Etudes Spatiales, China National Space Administration, Canadian Space Agency, German Aerospace Center, European Space Agency, Indian Space Research Organisation, Japan Aerospace Exploration Agency, Korea Aerospace Research Institute, National Aeronautics and Space Administration, State Space Corporation, State Space Agency of Ukraine, and United Kingdom Space Agency. The IDAC purpose is to facilitate exchange and cooperation in space debris research and develop options for space debris mitigation, See IDAC Terms of Reference, No. 1.

[91] Peter Stubbe (n 12) 235.

[92] Inter-Agency Space Debris Coordination Committee, 'IADC Space Debris Mitigation Guidelines' (2020) <https://orbitaldebris.jsc.nasa.gov/library/iadc-space-debris-guidelines-revision-2.pdf> accessed 1 April 2023.

[93] Ibid.

[94] Peter Stubbe (n 12) 235; Chandana Rohitha Rajapaksa and Jagath K Wijerathna (n 20) 67.

[95] ISO website <https://www.iso.org/about-us.html> accessed 8 June 2023, ISO is an independent, non-governmental international organization with a membership of 168 national standards bodies. It was established over 70 years ago to promote standards for international trade, communications and manufacturing. The development of a standard typically takes place within one of ISO's Technical Committees and/or Subcommittees. TC20/SC14 is the ISO committee tasked with developing international standards that capture best practices for space systems and operations.

Guidelines in 2002, the ISO set up a Working Group to transform guidelines and best practices from IADC, UN, spacecraft operators and regulatory bodies into a comprehensive set of international standards as a variety of space debris mitigation standards. In 2010, Subcommittees began publishing the first of its debris mitigation standards as the ISO 24113,[96] a 'top level standard'[97] setting forth the basic measures limiting the generation of space debris and is applicable to tall phase of a space mission from the design to the disposal of spacecraft and launchers. The standards are organised in a hierarchical structure; the ISO 24113 are at the top, while below there are several lower-level international standards which describe detailed requirements and implementation measures designed to enable compliance with the high-level requirements.[98] At the lowest level in the hierarchy there are two technical reports which contain non-normative information to guide space system engineers in the standards' application. Since 2010 more have been issued with changes that reflect the technological advancement of the sector, i.e. the inclusion in the high-level requirements pertaining to collision avoidance or survivability against small debris and meteoroid impacts in the 2019 standards.[99]

An important step towards the suitability of space is the Guidelines for the Long-Term Sustainability of Outer Space Activities, non-binding Guidelines adopted in 2019, after a 10-year process, by the COPUOS.[100] They are a sign of shared awareness of the need to enhance the legal protection of space environment towards the sustainability of space in the interest of all humankind.[101] They are also intended to support States and international organisations in developing their space capabilities in a manner that avoids causing harm to the outer space environment and the safety of space operations.[102]

One of the important parts of the LTS Guidelines that needs to be analysed is the preamble. It states that the voluntary guidelines have the objective to maintain space environment safe and tries to enforce international cooperation in order to allow future generation and developing countries to use outer space without any discrimination and

[96] ISO Technical Committee 20 (Aircraft and space vehicles), Subcommittee (Space systems and operations) 14 'Space systems—Space debris mitigation requirements' 2011. The latest version was published in 2019.

[97] ISO, Store: Standards Catalogue: ISO 24113 <https://www.iso.org/standard/72383.html> accessed 8 June 2023.

[98] Hadley Stokes and others, 'Evolution of ISO's space debris mitigation standards' (2020) 7 (3) The Journal of Space Safety Engineering 325.

[99] ibid 328 for a more specific analysis on the evolution of ISO standards; for a more specific analysis of the ISO 24113 standards see Peter Stubbe (n 12).

[100] UN GA, Guidelines for the Long-term Sustainability of Outer Space Activities UN General Assembly Doc A/AC.105/C.1/L.366 (2019) Annex III; for an specific analysis on the effort of the working group of UN COPUOS to create the 2016 LST guidelines see Peter Martinez (n 2).

[101] Minna Palmroth and others, 'Toward Sustainable Use of Space: Economic, Technological, and Legal Perspectives', (2021) 57 Space Policy 5.

[102] UN COPUOS, UN COPUOS Guidelines for the Long-Term Sustainability of Outer Space Activities: Early implementation experiences and next steps in COPUOS UN Doc. A/74/20 (71st International Astronautical Congress – The CyberSpace Edition, 2020).

in respect of the principle of due regard. The COPUOS has been, in fact, stressing the importance of international cooperation for the sharing of practices linked to the implementation of the LTS Guidelines.

Moreover, there are four different categories of guidelines; the first one is policy and regulatory: this group of guidelines addresses the need for national regulatory frameworks for space activities since States are internationally responsible for the activities conducted by entities or persons under their jurisdiction. The second one is safety of space operations: these guidelines place a lot of emphasis on coordination and information sharing; this includes addressing the issues linked to the exchange of relevant information on events in near Earth space and the importance of standardised record-keeping on space objects.

The third one is international cooperation and capacity-building; contains several guidelines that address how international cooperation, information sharing, and capacity-building can be used in support of the long-term sustainability of outer space. The fourth one is scientific and technical aspects: contains guidelines that address the importance of carrying out research on the evolution of space debris and how to manage the debris population in the long-term run. The guidelines recognise a wide variety of ways in which States organise, conduct and regulate their space activities. The first point to note about implementation of the LTS Guidelines is that they are voluntary and not legally binding. However, States -that are internationally responsible for the space activities of persons and entities under their jurisdiction- may choose to incorporate elements of the guidelines in their national legislation. However, in order to achieve the maximum implementation these guidelines have to be widely implemented also by non-governmental and private space actors.

Effective guideline implementation will also require greater harmonisation, coordination and cooperation among different States of the international community in order to avoid regulatory *lacunae* when space activities are conducted across multiple jurisdictions. Another objective is that with more States reporting their implementation of the LTS Guidelines, other States will be socially pressured to do likewise and demonstrate that they are willingly protecting space's environment and ensuring sustainability of outer space. This is how international norms can become customary practice of States and so become biding instrument of the international law.

### 3.3 Private initiatives

Regarding the private sector there are currently no biding instruments that require institutions or corporations to adopt a specific form of conduct in accordance with the environmental principles. However, the commercial sector could be an important player in developing technological, financial and operational measures to address the challenges of space sustainability; if outer space stops to be secure and safe - due to the

increasing pollution- the ability to use it could be denied to all actors.[103] In the space sector, in fact, there is a need for public and private cooperation, for two main reasons; the first one is that State budgets can't afford the exploration of space;[104] the second one is the increasing interests in private actors for outer space; Space Tech Analytics published a study showing that there are 12,000 private space technology companies and 5,000 leading investors in the sector.[105]

In October 2019, the Satellite Industry Association (SIA) adopted a set of Principles of Space Safety for the Commercial Satellite Industry.[106] In September 2019, the Space Safety Coalition was established, as a coalition of several dozen companies and organisations that actively promotes responsible space activities through the adoption of international standards, guidelines, and recommended practices. In particular, the members of the organisation commit themselves to implementing the guidelines contained in the coalition's document named Best Practices for the Sustainability of Space Operations.[107] These best practices are generally applicable to all spacecraft, regardless of physical size, orbital regime or constellation size, and directly address many aspects of the LTS Guidelines.[108]

Moreover, there is also another developing research linked to the sustainability of space missions; the Space Sustainability Rating System (SSR).[109] The Space Sustainability Rating design was discussed in the World Economic Forum, and developed by the European Space Agency, the Space Enabled research group at Massachusetts Institute of Technology, the University of Texas at Austin, and BryceTech. The goal of the SSR - by fostering voluntary actions- is to ensure that satellite operators design missions compatible with sustainable standards. The SSR uses a composite indicator based on six different modules that are evaluated independently but these modules can be modified,

[103] Secure Word Foundation, 'Space Sustainability, a particle guide' 2018 <https://swfound.org/media/206407/swf_space_sustainability_booklet_2018_web.pdf > accessed 8 June 2023.

[104] SpaceTech Analytics, 'SpaceTech Industry 2021; year overview' <https://analytics.dkv.global/spacetech/spacetech_industry_year_2021_overview.pdf> 10 accessed 23 March 2023. In this research it is also showed the distribution of the SpaceTech industries; 56.4% of them in 2021 were in USA.

[105] Ibid.

[106] Satellite Industry Association, 'Principles of Space Safety for the Commercial Satellite Industry' (2019) <https://sia.org/space_safety/> accessed 27 February 2023.

[107] More information about the Space Safety Coalition, as well as the text of the Coalition's Best Practices for the Sustainability of Space Operations <https://spacesafety.org> accessed 10 March 2023.

[108] ibid. The guidelines states that the members of the association should collaborate at the international level in order to promote and apply the LST Guidelines and other international standards - such as the one on space debris - to ensure the long-term sustainability of outer space; they should also ensure transparency favouring information sharing in order to avoid possible conjunctions and other space flight safety hazard. SIA members should also monitor operational spacecraft health and status to guarantee successful disposal.

[109] Space Sustainability Rating System <https://spacesustainabilityrating.org/the-rating/> accessed 14 March 2023.

in order to assure a more precise evaluation in different analysis and also due to the technical development.[110]

The lack of clear, widely accepted technical and safety standards for responsible performances would put the long-term sustainability of space activities at risk. Unfortunately, international norms are not precise enough to handle the complex issues of space debris and environmental protection.

## 4 States, orbital environment and space-related business activities

Since the beginning of international law States were its main subject; its principles and norms were developed in order to regulate relations between States.[111] Nowadays with an increasing importance of private actors at the global level international law has been trying to overcome the legal challenges related to the non-recognition of enterprises as subject of law.[112]

This process has already happed for the Human Rights arena, and it has been discussed for the environmental international law and now, for the orbital one. However, we have to consider that there is not a unique definition of CSR and furthermore, different roles that States can play in its application.[113]

According to the UN Industrial Development Organization (UNIDO), the CSR ensures that all types of companies integrate environmental and social concerns in their interaction with stakeholders, and more broadly with the society as a whole.[114]

Another definition was given by the European Commission, according to which the CSR puts an obligation on businesses to consider how they affect the environment and society; the European Commission also underpinned the importance for companies to

[110] A rated entity will receive, based on the single score of the modules, a rating level between Bronze, Silver, Gold or Platinum. The six score that are being used are Mission Index, Data Sharing, Collision Avoidance Capability, Design and Operations Standards, External Services and Detectability, Identification and Trackability. More information available at <https://spacesustainabilityrating.org/the-rating/> accessed 8 March 2023.

[111] Andrea Gioia *Diritto Internazionale* (Giuffrè 2019) para 1.

[112] Historically companies are not a subject to international law, so, they were not held responsible at the same level as States. However, beginning in the 1980s, the fast development of commercial space enterprises which led to the privatisation of worldwide telecommunications administrations, had prompted the rapid progress of nationwide rules and regulations globally.

[113] Mike Wright and others (n 39) part VI para 1. There are five different types of relations between CSR and States; CSR as a self-government, CSR as facilitated by government, CSR as partnership with government, CSR as mandated by government, CSR as a form of government.

[114] UN Industrial Development Organization, 'What is CSR?' <https://www.unido.org/our-focus/advancing-economic-competitiveness/competitive-trade-capacities-and-corporate-responsibility/corporate-social-responsibility-market-integration/what-csr> accessed 17 March 2023.

incorporate social, environmental and human rights principles into their business strategy.[115]

Furthermore, a broader definition was given in the Guidance on social responsibility by the ISO: 'The essential characteristic of social responsibility is the willingness of an organisation to incorporate social and environmental considerations in its decision making and be accountable for the impacts of its decisions and activities on society and the environment'.[116]

We can say that the CSR strategy has a double objective; not only to meet the consumer's needs, but also the expectations of other parties such as staff, suppliers and the local community.[117]

In the past the pursuit of company objectives was thought to be sufficient for the company itself to carry out its social role - by producing wealth and creating jobs - and at the same time as a contribution to the development of the economic system in general. Nonetheless, in recent years there has been an awareness of the substantial differences and trade-offs existing between the two functions considering the growing importance of the sustainable development of industries.[118]

There are three main principles at the base of the interdisciplinary concept of CSR;[119] accountability, sustainability and transparency. Sustainability in this cases analyses at what rate resources are consumed in relation to the rate at which they are regenerated.[120] Accountability is a concept that qualifies the effects of action taken by the company; it concludes the reporting of such effects to the stakeholders that have the power to decide whether the company's actions can be justified.[121] Transparency is

[115] Commission, 'Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions' COM (2011) 681 final of 25 October 2011.

[116] International Standards Organization, ISO 26000 'Guidance on social responsibility' Lignes directrices relatives à la responsabilité sociétale' (2010) para. 2.18.

[117] UN Industrial Development Organization (n 114). There are different industries' functions; an economic one, orienting to the pursuit of profit; and social one aiming at minimising the negative impacts of the business in the community in which the company operates UNIDO usually targets one or more levels: Micro: involves direct support to companies belonging to the same sector; Meso: focuses on business support to both public and private institutions to foster the uptake CSR concepts in their sphere of influence; Macro: support government institutions in determining what public policies best support a country's private sector in its efforts to apply socially and environmentally responsible business practices. The UNIDO also developed the Responsible Entrepreneurs Achievement Programme (REAP) a tool based on the CSR that assist Small and Medium Enterprises in their efforts to implement CSR approaches methods.

[118] Vasja Roblek and others,''Corporate social responsibility and challenges for corporate sustainability in first part of the 21st century'' (2020) 10 (19) Cambio Rivista Sulle Trasformazioni Sociali 35; Ilias Bantekas, 'Corporate Social Responsibility in International Law' (2004) 22 Boston University International Law Journal 309.

[119] David Crowther, Güler Aras *'Corporate Social Responsibility'* (Bookboon.com 2008) available at <https://my.uopeople.edu/pluginfile.php/57436/mod_book/chapter/121631/BUS5116.Crowther.Aras.CSR.pdf> accessed 16 March 2023.

[120] Ibid.

[121] Ibid.

linked to the aforementioned principles as a part of the process of recognition of responsibility for the company's external effects.[122]

Examples of CSR initiatives would be internal policies such as reducing carbon footprints to mitigate climate change, improving labour policies and embracing fair trade, and making socially and environmentally conscious investments.[123]

We have to distinguish between different categories of CSR; the first one is linked to the protection of the worker's human rights while the second is the Corporate Environment Responsibility (CER) for the atmosphere's protection from pollution. The CER refers to industries' voluntarily actions to decrease their negative impact on the ecosystem and to ensure environmental protection.[124] The inclusion of sustainability in the scope of CSR is important because it integrates consideration of long-term issues whenever a corporation engages in an economic initiative; the idea of sustainable development requires, also, the duty of States to include environmental considerations into their new policies.

The same principle was used by the International Court of Justice (ICJ) in the decision concerning the *Gabcikovo - Nagymaros* Project between Hungary and Slovakia.[125] In its

[122] Ibid.

[123] Digital Marketing Institute, 16 Brands Doing Corporate Social Responsibility Successfully <https://digitalmarketinginstitute.com/blog/corporate-16-brands-doing-corporate-social-responsibility-successfully> accessed 3 March 2023.

[124] Mauricio Andrés Latapí Agudelo, Lára Jóhannsdóttir and Brynhildur Davídsdóttir, 'A literature review of the history and evolution of corporate social responsibility' (2019) 4 International Journal of Corporate Social Responsibility 7: during the 1990's, significant international events influenced the international perspective towards social responsibility and the approach to sustainable development. The most relevant include: the creation of the European Environment Agency (1990), the Rio Declaration on Environment and Development, the adoption of Agenda 21 and the United Nations Framework Convention on Climate Change (1992), and the adoption of the Kyoto Protocol (1997). The Rio Declaration, for examples, says that business has the responsibility to ensure that their activities within do not cause harm to the environment. Society expects business to be good actors in the community and increasingly society is expressing a clear need for more environmentally sustainable practices. The creation of these international bodies and the adoption of international treaties represented the first efforts, by the international community, for setting higher standards with regards to climate issues and, indirectly to corporate behaviour. Also, in the 1990's there was a growing interest in Corporate Social Responsibility, and in fact, it was during this decade that the concept gained international appeal, as the result of the international approach to sustainable development of the time in combination to the globalisation process.

[125] In 1993 the Governments of the Hungary and of the Slovak Republic submitted to the ICJ the issues regarding the implementation and the termination of the Budapest Treaty of 1977 on the Construction and Operation of the Gabčíkovo-Nagymaros Barrage System. The parties requested the Court to decide whether the Republic of Hungary had been entitled to suspend and subsequently abandon the works on the project. The project aimed at the production of hydroelectricity, the improvement of navigation and the protection against flooding. It provided for the building of two series of locks, one in Czechoslovak territory and the other in the Hungarian, to constitute a single operational system of works. As a result of intense criticism against the project in Hungary, the Hungarian Government decided in 1989 to suspend the works and later on the government decided to not continue the work. During this period, Czechoslovakia also started investigating alternative solutions; one of them, entailed a unilateral diversion of the Danube by Czechoslovakia on its territory. On 23 July 1991, the Slovak Government decided to put the operation by the above-mentioned solution.

judgment of 25 September 1997, the Court acknowledged that the concerns expressed by Hungary for its natural environment were linked to an essential interest, but that the risks invoked, were not sufficiently established in 1989, nor had they been imminent. The ICJ also noted that Hungary - when it decided to conclude the Treaty – had been aware of the situation as then known; and that the need to ensure the protection of the environment had not escaped the parties. The Court in its decision stated that States in order to ensure the environmental protection have also to consider the unchangeable damages that their action could create. The ICJ states that '[t]his need to reconcile economic development with protection of the environment is aptly expressed in the concept of sustainable development'.[126]

On the other side it can be considered that the CSR transfer at the industry level the obligation to respect the local communities through the concept of environmental sustainability.[127]

This analysis focuses on the CER and the sustainable development applicability to outer space; seen the recent research development on the subject - especially in the Human Right arena and in the environmental one[128] - it seems plausible to ask ourselves if and how the CSR is applicable to outer space.

Generally, CSR is at the heart of the question of what role a State has in its economy.[129] There are five different types of relations between CSR and States; CSR as a self-government, CSR as facilitated by government, CSR as partnership with government,

[126] International Court of Justice reports of judgments, advisory opinions and orders case concerning the Gabcikovo-Nagymaros project judgment of 25 September 1997 <https://www.icj-cij.org/files/case-related/92/092-19970925-JUD-01-00-EN.pdf> para 140.

[127] The importance of corporate sustainability has been emphasised with the creation by the United Nations of a global association - the United Nations Global Compact - of companies and NGOs that follow, in their activities, the universal principles contained in the association's framework. These define corporate sustainability as a concept that gives a company long-term value in financial, social, environmental and ethical terms. The ten principles cover the areas of human rights, environment, transparency and anti-corruption. Three of these ten principles regarding the environment; they aim not solely at protecting the environment but also at ensuring that this process increase businesses's efficiency, the development of new eco-friendly technologies, and create a social pressure to other industries to do the same. The first one is the development of a precautionary approach; precaution involves the systematic application of risk assessment, management and communication. Scientific-technological evaluation, economic cost-benefit analysis and political considerations are the factors considered when deciding the tolerable level of risks. The second one tries to promote environmental responsibility; business has to ensure that their operations do not cause harm. The third one encourages the spread of environmental protecting technologies. These technologies can be applied to reduce daily operating inefficiencies, emissions and worker exposure to hazardous materials.

[128] For a more specific analysis on Human Right see Chiara Macchi *Business, Human Rights and the Environment: The Evolving Agenda* (T.M.C. Asser Press The Hague 2022). For a more specific analysis on the outer space environmental protection see Elena Cirkovic, Minoo Rathnasabapathy Danielle Wood, 'Promoting Sustainability Value in Earth's Orbit' (73rd International Astronautical Congress, 2022).

[129] Mike Wright and others (n 39) part VI para 1.

CSR as mandated by government, CSR as a form of government.[130] However, there is not a systematically explored legal framework related to the features of the State that are relevant in terms of CSR implementation; each State, based on its own economic and political characteristics will have a different approach and interest for applying CSR standards.[131] For example, the Swiss government see its role, in respect of CSR implementation and development as a complementary one.[132] In its CSR strategy, the State Secretariat for Economic Affairs points out the government's main tasks such as supporting the development of tools for non-financial reporting and other CSR transparency initiatives, promoting the international harmonisation of non-financial

[130] ibid, in the case of CSR as a self-government there is a bottom-up process in which the role of States in minimal, they can create soft-law regulation for governance standards or labels and certification. The CSR as facilitated by government is linked to the possibility of States to encourage adoption of CSR both in a direct and indirect way, through conferences or guidelines. The CSR as partnership with government describes a multi-stakeholder process in the development of CSR standards. The CSR as mandated by government has different forms; it can form companies' self-regulation or partnerships. The last one, CSR as a form of government, refers to three types of situations; in liberal economies States chose a l*aissez-faire* approach; CSR can become a form of government or thirdly companies can function as institutional substitutes to governmental entities.

[131] ibid. Regarding the applicability of CSR at the State level, there is a huge variation depending on the type of State that we are considering. According to the authors there are different features that shape State's action in economy and so in applying CSR; based on these features we can divide States in four different types: regulatory State, development State, welfare State, prefatory State. The regulatory States use indirect mean of intervention, and it is highly unlikely they will intervene with direct means; they do have the capacity to intervene but decide not to. Developmental and welfare state are more likely to use direct means; both these States have the capabilities. The predatory State may not directly pursue any specific CSR norms, making them all voluntary and bottom up; usually because they lack capacity such as profession public service. There is also to notice the importance of politics in these scenarios. Regulatory States can be expected to follow neo-liberal ideas that refrain from pursuing public goods but focus on the private one while maximising the welfare. The welfare States as well as the development States are associated with the pursue of some form of public good the predatory ones pursue private interests and use the States' apparatus only to do so. Based on these differences the authors predict a type of outcome for CSR implementation as well as different stakeholder power and legitimacy. As an example, the authors analyse different situations: the United Kingdom can be considered a regulatory State that has moved to promoting CSR standards based on a bottom-up collaboration. On the other hand, the USA, another regulatory State has tried an approach based on a top-down mandatory regulation in different areas of CSR before the Trump Administration. An example of a welfare State is the Netherlands, in which CSR's standards are facilitated by the government via different means, i.e. providing guidelines on CSR implementation, facilitating the adoption of ISO standards. More in general Western European welfare States have become more active in promoting CSR. For the developing State there is a high probability of market deficiencies that the private sector covers with CSR. An example is the Brazil with tight relations between the State (through the Brazilian National Development Bank) and companies; on one hand business are dependent on the State support and on the other the institutional weakness of the government makes companies more efficient providing public goods and social policies. Finally, an example of a predatory State is Nigeria and oil extraction during 1950s-80s. The Nigerian government failed to implement CSR due to the dependence of the State from oil extraction and the opportunistic relations between businesses and government officials.

[132] Samuel O Idowu and others *Corporate Social Responsibility in Europe, United in Sustainable Diversity* (Springer 2015) 155.

reporting, participating at the international level in international organisation for developing an international framework condition for CSR.[133]

### 4.1 Is corporate social responsibility applicable to outer space environment?

The progresses made in the scientific and technologic sectors will facilitate access to remote areas of outer space and also, the exploration and exploitation of resources will lead to an increase of private investments.

There is, in fact, a need for sustainable corporate governance in outer space. As above mentioned, nor the *corpus iuris spatialis* nor the soft law instruments are specific enough to regulate outer space activities.[134] Hence the need is on the one hand, to develop new tools but on the other, to adapt existing legal instruments in order to achieve space sustainability and environmental protection. One possible tool that has to be considered is the CSR.

The CSR could and should be applied in outer space for two main reasons; the first one is the privatisation of the sector; the governmental parties, in fact, are now outnumbered by private ones. Also, the economic space sector is increasingly growing and a lot of States are starting to regulate, at the national level, their space sector to increase foreign investments and expand or create a well-developed space industry.[135]

The second reason, deeply linked with the first one, is that CSR can help companies to develop standards of responsible behaviours in areas where international law regimes have yet to be developed; as showed before, the *corupus iuris spatialis* and the UN Guidelines do not pay enough attention to the environmental protection and sustainable development.

Analysing the *corupus iuris spatialis* a major role in order to apply the CSR concept to outer space can be played by Article VI of the OST.[136] Art. VI imposes two important obligations upon States: an obligation to bear international responsibility for national activities in outer space, whether carried out by governmental or non-governmental entities, and an obligation for the appropriate State to authorise and continuously

[133] ibid 158; For a more specify analysis on the different reason that led companies to implement CSR standards see Ian Christensen, 'Applying Corporate Social Responsibility Principles in the Space Sector' (Reinventing Space Conference, London, 2016).

[134] Thorbjørn Waal Lundsgaard, 'CSR in Space Corporate Social Responsibility Principles for the Space Industries' (2020) 1 Oil, Gas and Energy Law; Margarita Chrysaki, 'The Sustainable Commercialisation of Space: The Case for a Voluntary Code of Conduct for the Space Industry' (2020) 52 Space Policy 8.

[135] Stefan Ellerbeck, 'The space economy is booming. What benefits can it bring to Earth?' (World Economic Forum, 19 October 2022) <https://www.weforum.org/agenda/2022/10/space-economy-industry-benefits/> accessed 27 March 2023.

[136] Elena Cirkovic, '#SpaceWatchGL Opinion: Corporate Social Responsibility in Outer Space', SpaceWatch.Global 2021 <https://spacewatch.global/2021/03/spacewatchgl-opinion-corporate-social-responsibility-in-outer-space/> accessed June 6 2023.

supervise private space activities.[137] Focusing on the first one all space activities can be considered national actives and so the CSR should be applied regarding companies' actions in space over and above their legal obligations.[138]

Since the CSR is soft law, the government's States should play a crucial role in raise awareness among both companies and stakeholder of the importance of CSR; from the society point of view, more the State can inform of the environmental challenges that business have to overcome, more likely there will be a growing attention on developing solutions to tackle the issues.

On the other hand, government provides, also, information to the companies about the vital role of applying CSR. The government should also create annual reports about the nation-wide application of the CSR, while also developing guidelines that address the main concerns and major problems of industries to ensure a broader applicability.

It is important to create a Code of Conduct,[139] periodically review to ensure its own effectiveness, to keep the focus on the matter and also, update the standards due to the technological development. A voluntary Code of Conduct for space could guarantee companies' responsible behaviour while offering a non-legislative governance ensuring sustainable development, including in space activities.[140]

The development of State issued guideline could create, in the long run a minimum legal standard at the international level, so that the international legal gaps could be filled.[141]

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[137] Luca Erhart, Maria Boutovitskai, 'Transforming Article VI of the Outer Space Treaty into an Effective Mechanism of Space Debris Mitigation' (Proc. 8th European Conference on Space Debris, Darmstadt, Germany, 20–23 April 2021, published by the ESA Space Debris Office). Article VI OST does not only lead to regulatory responsibility, it will also lead to liability for any damage caused by the wrongful conduct.

[138] Elena Cirkovic (n 136).

[139] Margarita Chrysaki (n 134), defines a Code of Conduct as "Principles, values, standards, or rules of behaviour that guide the decisions, procedures and systems of an organisation in a way that (a) contributes to the welfare of its key stakeholders and (b) respects the rights of all constituents affected by its operations". The Code of Conduct can become a tool for setting out the organisation's values, responsibilities, behaviours and obligations. Furthermore, they can become an asset for the company in developing sustainable decisions.

[140] ibid.

[141] An example of a draft of Code of Conduct is the EU one European Union, 'Draft International Code of Conduct for Outer Space Activities' (2014) <https://www.eeas.europa.eu/sites/default/files/space_code_conduct_draft_vers_31-march-2014_en.pdf> accessed 1 April 2023. This Code of conduct or the mitigation of space debris was never adopted. Is a soft law instrument, non-legally binding and its scope is to guarantee the sustainability of all outer space activities involving all launches both to the orbit and beyond. The Code recognises the freedom to explore outer space to all States in accordance to the international accepted practice, standards, *corpus iuris spatialis*- but not the Moon agreement- and the United Nations Charter. The Subscribing States have to refrain from activists that could create damages of space objects in order to minimise space debris. Two important principles described are the cooperation and mutual assistance ones that aim at notifying all States of actives related to possible collisions, manoeuvres, launches and malfunctioning of space objects. It established also the consultation mechanism. Also, annually the States are invited to share with the other subscribing States all their strategies that could affect the security and sustainability of outer space.

States could encourage transparency that through the regulation of monitoring and reporting makes companies often subject to accountability measures and helps widening social responsibility practice in the way the businesses are run. The transparency of quality standard and processes will have a peer pressure effect leading competitors to respect CSR standards and gain more social acceptance in the market sphere. Also embracing socially responsible policies can attract and retain customers that is essential for a long-term success of any company.[142]

## 5 Conclusion

As demonstrated in this paper, there is an urgent need to pave the way for the reduction of space debris, on-orbit collisions, and unsustainable space operations. The *corpus iuris spatialis* is not enough for these objectives, especially because it was created in a period where there were only two Space powers and in which the space environment was not the main concern.

Furthermore, today we live in a time where private actors outnumber the public ones; this situation led only to the development of soft law regulatory measures because private actors could be more willing to implement them as for example the 2019 Guidelines on the long-term sustainability and the Space Debris Mitigation Guidelines.

Regarding the development of space sustainability the adoption by States at the COPUOS level of international standards can be read a sign of the growing willingness to legally protect the outer space environment in the interest of all humankind.

To conclude, all countries, at the national level, must establish and implement relevant regulations in order to share information about space debris and other operations that could harm the space environment. Thorough the CSR States could ensure that business use and explore outer space without compromise its environment; also, thanks to the CSR guidelines businesses will have to be more transparent and accountable for their behaviour while also creating confidence building measures that ensures a more responsible activities.

[142] Margarita Chrysaki (n 134), A positive corporate reputation has a significant impact on a company's ability to compete successfully, and the public opinion plays a major role in it. For example, in Europe protecting the environment appears to be one of the most important points of the society agenda calling companies for responsible behaviours. Since the public opinion is now highly concerned about Earth's pollution likewise it will have similar concerns about space pollution.

***Alban Guyomarc'h****

# PROPERTY ON SPACE RESOURCES: THE SEARCH FOR A TERMINOLOGY

## A FOCUS ON THE MOON AND ITS MINERAL RESOURCES[1]

***Abstract***

By the end of one or two decades, several competing lunar bases will be installed or in the process of being installed, most probably located around the Moon's South Pole and its water resources. By the end of three decades, companies will probably be extracting resources from the moon with a commercial and lucrative objective. But already on Earth, some states are taking the lead and intervening in the regulation of this future exploitation. Of these, the United States and Luxembourg admitted the existence of property rights over space resources through national laws in 2015 and 2017, in each case assuming the compliance of the resulting provisions with existing international law and more particularly with Article II of the Outer Space Treaty, dedicated to non-appropriation.

Our article seeks to analyse that appealing hybrid notion of space property in a strategic legal and geopolitical environment that is in the process of renewal. Indeed, space is undergoing a paradigm shift with a synchronous movement of nationalisation and privatisation. A global legal pluralism obliges space stakeholders to adopt a multiple-front strategy when dealing with legal questions arising out of new space activities, placing new space law interrogations that have arisen at the right level of normativity *ab initio*.

As for the latter, it will be seen that space property is not so much a concept of public international law but of private international law – we suggest space property is a domestic law regime coordinated in its international dimensions by private international law – and that it is only by understanding it as such that its effects can be deployed beyond the mere creation of a space market to constitute an embryo of decentralised governance of space resources. However, one issue of public international law remains necessary to ensure the full effectiveness of space property: the coordination of occupations. The coordination of occupations and the organisation by law of a space resources economy based on property are in fact of different orders. To circumvent this issue by a questionable opposition between commons and property of space resources is to undermine the legal security of the exploitation of these resources, which is at the very foundation of the Luxembourg and American legislative efforts.

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[1] Unless otherwise stated, translations from French to English and the underlining of certain quotations are by the author. When the translation is the one of a particularly technical text, the original French version is proposed in footnote. The websites were last consulted in April 2023.

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**JEL CLASSIFICATION**: K11; K33; K32; K23; K00

**SUMMARY**



## 1 Introduction

*"In our field of research, a new problem can be a result".*
Paul Valéry[2]

When it comes to the forthcoming return of a few space powers to the Moon, what should attract the attention of the jurist is not so much the destination itself but the willingness to exploit its resources.[3] It is no longer a question of a few astronauts surviving for some days on the Moon, but rather of contemplating a permanent installation with sustainable expansion on the Selene ground. The *«envoys of mankind»*[4] and their robots will be given the mission of extracting, collecting, exploiting, using[5], and eventually reselling the resources available *in situ*. And although under the banner of space-mining, a diversity of projects with protean techniques co-exist[6], the goals are well known: the use of frozen water at the poles of the natural satellite, the production of liquid propellants from this water and from regolith, and the extraction of metals deposited on the Moon by various celestial bodies that have crashed there over the past

[2] Paul Valéry, *Cours de Poétique, Tome I - Le corps et l'esprit, 1937-1940* (Gallimard 2023). In French : *«Dans notre genre d'étude, un embarras nouveau est un résultat»*.
[3] Our article focuses on space mineral resources, particularly those on the Moon. However, a debate on the ownership of space data also needs to take place, especially as the exploitation of such data, particularly in synergy with that of mineral resources, is much closer in time.
[4] Outer Space Treaty, UNOOSA 2222 (XXXI) 1966 Art. V.
[5] Exploiting and using relate to two different elements to the extent using may also relate to the process of refining and processing resources to obtain a product from the said resources.
[6] For the purposes of convenience, the term space-mining is considered here as equivalent to space resource capture. However, we agree with the authors quoted below when they refer to the confusion that exists in the contemporary debate on the subject. The infrastructures needed for the extraction and processing of resources will be different according to the evolution of technology and demand and their imposing size correlates with the large quantity extracted. The question of commerciality is also at stake in these confusions: a true Rubicon of the debate around ISRU and its law, it changes the parameters from as scientific/life-support use, the legality of which is not in doubt, and commercial cost-effective use, a debate occupying entire libraries on the trade in space resources. See on this subject Zac JS Wager and others, 'Defining the Notion of Mining, Extraction and Collection: A Step toward a Sustainable Use of Lunar Resources' (2022) 201 Acta Astronautica 592; Eytan Tepper, 'Structuring the Discourse on the Exploitation of Space Resources: Between Economic and Legal Commons' (2019) 49 Space Policy 101290.

billion years. As we briskly enter the second age of space exploration[7], the Moon is no longer just a territory to be explored but also an ore deposit to be exploited. And from this dialectical tension between exploration and exploitation, a profound change in space law will undoubtedly emerge, moving, like other international spaces laws, from a *"law of movement"* to a *"law of control"*.[8]

But we are not yet back on the Moon. And although the first sale of regolith by the company *iSpace* to NASA is expected soon[9], the first manned missions to the satellite's ground will not take place before the flight of Artemis III in 2025 (for an optimistic prognosis). The exploitation of space resources on a substantial scale is unlikely to be a reality for at least a decade. However, this has not prevented some States from taking the lead and intervening in the regulation of this future exploitation. Of these, the United States and Luxembourg admitted the existence of property rights over space resources through national laws in 2015[10] and 2017[11], in each case assuming the compliance of the resulting provisions with existing international law and more particularly with Article II of the Outer Space Treaty, dedicated to non-appropriation. In addition to the two States, the United Arab Emirates and Japan have also adopted national regulations on space resources.

Numerous motivations were at play in the domestic enactment of these standards. We shall have the opportunity to return to these strategic considerations in the section 2 of our article. But the choice of resorting to national laws to set up a regime for the exploitation and appropriation of space resources, admittedly modest at present but nonetheless existing, is characteristic of the most important contemporary mutation in space law: the synchronous movement of privatisation and nationalisation that runs through the field. We shall discuss this further, but it should be observed that this synchronous movement, insofar as it leads to a diversification of the sources of space law, places the framework and governance of the second space age under different auspices and renewed legal strategies compared to the last century.

[7] In the words of William E. Burrows in his monograph on the history of space in the 20th century, This New Ocean. Indeed, in our view, contemporary space activities and operations are undergoing a reconfiguration that goes far beyond the New Space while including it in the scope of these same reconfigurations. The second space age includes, in a non-exhaustive way: the renewal of the structures of the space economy by the New Space, the emergence of new space powers in the South, the return of a bloc dynamic after a multipolar post-Cold War period, the emergence of new practices in the conduct of a multilateral dialogue in space affairs and in the elaboration of international space law, the opening of space to non-space. William E Burrows, *This New Ocean: The Story of the First Space Age* (Modern Library 1999).

[8] In the words of the French jurist Denis Alland, who was interested in the evolution of the law of the sea. *In* : Denis Alland, 'La Représentation de l'espace En Droit International Public' [1987] Archives de Philosophie du droit163.

[9] At the time of writing, April 2023. For more information:'Ispace Receives License to Conduct Business Activity on the Moon from Japanese Government' [2022] <https://ispace-inc.com/news-en/?p=3829> accessed 30 March 2023.

[10] US Public Law 114-90 on Commercial Space Launch Competitiveness Act, 25 Nov. 2015 (US Space Act) Pub. L. No. 114-90, 129 Stat. 704.

[11] Law of July 20th 2017 on the exploration and use of space resources, JOURNAL OFFICIEL du Grand-Duché de Luxembourg MÉMORIAL A - 674 du 28 juillet 2017.

It is against this background that must be appreciated the inclusion in space law of a hybrid[12] legal notion, "*property of space resources*". The use of a traditional institution of Western law is not trivial or meaningless. It can only appeal to the lawyer, and even more to the privatist than to the publicist.

With the Moon in mind, our article seeks to analyse space property in a strategic legal and geopolitical environment that is in the process of renewal. Our first section **(Sec. 2)** attempts to insert the question of how the exploitation of space resources should be regulated into this renewed landscape. Based on its conclusions, we will demonstrate that this renewed diversification of the sources of space law presents an opportunity to envisage a multi-level governance of space resources by distributing the questions arising from the exploitation of space resources to the right normative level **(Sec. 3)**. It will be seen that space property is not so much a concept of public international law but of private international law and that it is only by understanding it as such that its effects can be deployed beyond the mere creation of a space market to constitute an embryo of decentralised governance of space resources. However, one issue of public international law remains necessary to ensure the full effectiveness of space property: the coordination of occupations[13]. The coordination of occupations and the organisation by law of a space resources economy based on property are in fact of different orders. To circumvent this issue by a questionable opposition between commons and property of space resources is to undermine the legal security of the exploitation of these resources, which is at the very foundation of the Luxembourg and American legislative efforts. This is all the truer since 1979 and the failure[14] of the Moon Agreement, the literature on the commons has evolved and no longer covers the same realities as then.

## 2 Space resources at the heart of a multi-front legal strategy

Today, the legal strategies of space stakeholders and the foreign legal policies[15] of States in outer space policy have changed. The space lawyer of the 21st century is moving from chamber music to orchestra and must become a conductor capable of harmoniously - ie strategically - mobilising the various sources of law concerned with

[12] On the justification of this label, see Sec.3 below.
[13] By this notion, we relate to the fact that in a limited space, ie hereafter, the Moon and more specifically its poles, it is necessary, in the event of the installation of several competing bases, to ensure that they communicate both on their locations and the area they tend to be considering as occupied by their base. It is even more necessary to do so since access to resources highly depends on where one installs its base. It is about deconflicting competing and divergent interests in a limited space in favor of the security of the strategic missions and assets at stake.
[14] Fabio Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies: A Proposal for a Legal Regime* (Martinus Nijhoff Publishers 2009) 39; Carl Q Christol, 'The 1979 Moon Agreement: Where Is It Today' (1999) 27 Journal of Space Law 1. This article, notably starting with a noteworthy quotation from Hughes Mearns, "*As I was going up the stair I met a man who wasn't there. He wasn't there again to-day. I wish, I wish he'd stay away*". Bin Cheng, *Studies in International Space Law* (Clarendon Press , Oxford University Press 1997) 160,162.
[15] As defined in Guy de Lacharrière, *La Politique Juridique Extérieure* (Economica 1983).

space, encompassing the spectrum from international law to national law, including private and hybrid sources.[16] And, contrary to the historical trend, it is no longer even certain that it is up to international law to set the pace… In this respect, it can be said that the law of the second space age is a law of *"global legal pluralism"*.[17] This new pluralism transforms the legal strategies of the actors who must now play *"on multiple fronts"*[18]: and the issue of regulating the exploitation of space resources is a typical example, with the mobilisation of international law, national law, and hybrid sources, together and in relation to each other. And *in fine*, it is especially this last point, the relations between norms, which will constitute the crucible of the questionings of space law of tomorrow and the day after tomorrow: the interactions[19] between the various levels of normativity (international, transnational, national, contractual) more than these levels of normativity considered in themselves; on the condition, however, of placing the legal questioning at the most adapted scale right at the beginning of the questioning.[20]

Space resources law is an emerging topic of the highly composite field of space law.[21] It is characteristic of this new momentum of pluralism of the sources within the subject. Indeed, it lies at the (conflicting) interaction of international and national law. Yet if public international law is no longer the main forum for debate, it is because with the resumption of a certain global economic competition for New Space[22], law has been

[16] As the Artemis Accords (Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes <https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf> accessed 26 June 2023).

[17] The notion has admitted several meaning through continental and anglo-saxon debates. We tend here to relate to the definition given by Jean-Sylvestre Bergé in *L'application Du Droit National, International et Européen* (Dalloz 2013). *"Global legal pluralism"* is defined as *"a particular form of legal pluralism, induced by the phenomena of globalisation of law and its different variations (globalisation, transnationalisation, fragmentation, regionalisation, etc.). Even if this pluralism does not escape forms of standardisation/domination, it describes the multiplication of the places where law is made and applied (...). Several laws developed in a national, international, or European environment are likely to be applied together to a given legal situation"*. See also: Ralf Michaels, 'Global Legal Pluralism and Conflict of Laws' in Paul Schiff Berman (ed), *The Oxford Handbook of Global Legal Pluralism* (Oxford University Press 2020) <https://academic.oup.com/edited-volume/34238/chapter/290315445> accessed 13 April 2023.

[18] ibid 72. The *"multi-front strategy"* is defined as follows: *"The ultimate point of the multi-level comparison must enable the lawyer to define a legal strategy. Roughly speaking, he must determine whether the resolution of his case requires the opening of one or more fronts of discussion in different legal contexts (...). In complex cases where the political, social, and economic stakes are high, it is common for several fronts to be opened at the same time in different legal contexts. Each context often has its own particularity, so that the use of several contexts reflects a plurality of objectives. The means of action present in the different contexts are not necessarily the same. The time to implement them is not the same. The opening up of several fronts can thus be based on a logic of competition between the contexts present in the hope that they will interact with each other"*.

[19] P Blount, 'Renovating Space: The Future of International Space Law' (2011) 40 Denver Journal of International Law & Policy.

[20] See, infra, the case of space property.

[21] Or, to use Mireille Couston's expression, *"a median legal space that gathers in its confluence singularities as different in substance as in form"*. (*in* M Couston, 'Défis et perspectives pour le droit spatial du XXIe siècle' (2002) 3 Revue Française de droit aérien et spatial 256.

[22] New Space is a catch-all term with a variety of meanings. We define it by the conjunction of three dynamics, limited to the Western space sectors: (i) the diversification of space financing sources, (ii) the transfer of innovation

leveraged as tool of economic rivalry. National space laws have thus become, more than ever, a support for the national economic strategies of space-faring nations.[23] Destabilisation of the international framework (2.1), ascendancy of the national framework (2.2): the exploitation of space resources has not escaped this contemporary dialectic of space law.

### 2.1 The international strategic front: overcoming the uncertainties of positive law

If international law is no longer the main forum, it is because it has been deemed uncertain or even hostile[24] by the proponents of space resource exploitation. But it should be remembered that uncertainty is not silence and that international space law remains important and relevant to the second space age.

When, in the elaboration of a space legal strategy, the international strategic front is involved, it is obviously the major space treaties that are primarily consulted; the five leading texts of the *corpus juris spatialis*, ie the Outer Space Treaty (1967), the Agreement on the Return of Astronauts and the Restitution of Space Objects (1969), the Convention on Liability for Damage Caused by Space Objects (1972), the Convention on the Registration of Space Objects (1975) and, finally, the Moon Agreement (1979). They are the result of a prodigious legal effort carried out in less than thirty years in the midst of the Cold War and laying the foundations of international space governance. However, of the five texts, it is mainly the first and the last that we are interested in, the Outer Space Treaty (hereafter, OST) and the Moon Agreement, insofar as they directly address the issue of the global status of the Moon and celestial bodies, either partially as in the case of the former, or entirely as in the case of the latter.

The main reason for mentioning the Moon Agreement here is to dismiss it. Indeed, even though it contained a very useful embryo of lunar governance, it did not meet with the expected success since no space power took the trouble to sign it, or for the few that did sign it (such as France), to ratify it. If it did come into force, it was only because of the credit granted to it by a few States with a more limited space commitment. Among the reasons regularly put forward to explain this failure are the principles set out in Article 11 of the agreement. These enshrined the Moon as the common heritage of mankind[25] and proposed a broader formulation of the non-appropriation principle than the one found in Article II OST. But in the end, and contrary

risk from the public to the private sector, (iii) the rise of services in the space sector. See also: Philippe Clerc *et al.*, 'L'insertion des activités spatiales dans la sphère économique' (2021) 102 Entreprises et histoire 172.

[23] Lukas Rass-Masson, 'Stratégies étatiques et lois nationales dans le droit international de l'espace' in Clémentine Bories and Lucien Rapp (eds), *L'espace extra-atmosphérique et le droit international* (Pedone 2021).

[24] Frans von der Dunk and Henry R Hertzfeld, 'Bringing Space Law into the Commercial World: Property Rights without Sovereignty' (2005) 6 Chicago Journal of International Law 81.

[25] This is not insignificant when one considers that the Agreement was negotiated in parallel with the Montego Bay Convention on the Law of the Sea.

to what has sometimes been reported, the Moon Agreement was not hostile to the exploitation of space resources: it should be noted that it is the only one of the five space treaties to mention literally such exploitation[26], while supporting the importance of the benefits that could be derived from it. Put simply, to take up the dichotomy proposed in a French treatise on public international law[27], the agreement shifted the Moon from a negative to a positive internationalisation, from a simple common to a common heritage of mankind - a positive internationalisation that was nonetheless partial[28], insofar as the agreement postponed the elaboration of a complete governance regime for the exploration and exploitation of the Moon.[29] And yet, it was this shift of status that caused the West to fear too many constraints on the economic exploitation of the Moon and other celestial bodies, and that led the East to note the difficult compatibility of the notion of the common heritage of humanity with Soviet law.[30] Thus, historically, the Moon Agreement started off on a fragile basis, and the subsequent developments did not improve its situation.

As the moon re-emerged on the agendas of the Chinese and American space agencies in the late 2010s, the United States took care to recall its interpretation of the Moon Agreement. To this end, notably, an Executive Order from the White House dated 6 April 2020[31] reiterated that the country did not consider the Moon Agreement to be customary international law, taking care to secure the lack of scope bestowed on it by the world's leading space power. Moreover, by announcing a few weeks later the release of its own Moon agreement mechanism, the Artemis Accords, the United States completed the process of limiting the influence of the 1979 Agreement while remaining within the bounds of international law by referring explicitly to the OST. Being a constellation of bilateral agreements[32], the Artemis Accords now[33] include twenty-five State Parties from all continents and remain open for signature. Thus, shortly after signing the Artemis Accords, Saudi Arabia withdrawn from the Moon Agreement. The Moon Agreement has been in force since 11 July 1984, but even as a positive law, its influence remains limited for all the reasons mentioned above and at best it is a source of influence or

[26] Once in the preamble, twice in Article 11. To quote the preamble: *"taking into account the advantages which may be derived from the exploitation of the resources of the Moon and other celestial bodies"*.
[27] Mathias Forteau, Alina Miron, and Alain Pellet, *Droit International Public* (9th edn LGDJ 2022) 1724. See also: Cheng (n 14) 436.
[28] Frans von der Dunk, 'The Dark Side of the Moon - The Status of the Moon: Public Concepts and Private Enterprise' (1998) 40 Proceedings of the International Institute of Space Law 119.
[29] UNOOSA RES 34/68 (1979) art 11.5.
[30] Christol (n 14) 11.
[31] Executive Order 13914 on "Encouraging International Support for the Recovery and Use of Space Resources" E.O. 13914 of Apr 6, 2020 (85 FR 20381).
[32] It is also possible to relate the Artemis Accords to *minilateralism*, see: Alexandre Chazelle, 'Le Minilateralisme Un Second Souffle Pour Le Multilatéralisme Dans La Régulation Économique?' (La régulation économique, entre bilatéralisme et multilatéralisme Demi-journée de Versailles, Versailles, 8 April 2022) <https://www.sfdi.org/wp-content/uploads/2023/01/Alexandre-Chazelle-Le-minilateralisme-un-second-souffle-pour-le-multilateralisme-dans-la-regulation-economique.pdf> accessed 10 June 2023.
[33] As for June 2023. The last one being Spain.

inspiration for the multilateral governance of the Moon. Let us therefore venture to say that the number of major space treaties in the *corpus juris spatialis* should perhaps be limited to four.

We must then fall back on the 1967 Treaty, as international law has not yet said its last word. But, after all, it is a matter of falling back on the main international convention on space law, a veritable *magna carta* containing all the major principles governing the field. Resulting from a multilateral negotiation dominated by the United States and the USSR[34], it came into force ten years and a few months after the launch of the first Sputnik satellite and only two years before the first human arrived on the Moon. It was the latter that invited the States to complete the negotiations, as the imminence of the small step for a man (but a large one for mankind) made it urgent to affirm in the Treaty the major principles governing the conquest of space. It is Article II OST, combined with Article I OST on the freedom of use of space, which will be the source of discord in the debates on the international framework for the exploitation of space resources. And it is appropriate to adopt the future in this regard, because when the treaty was drafted, space resources and their exploitation belonged to the prospective imagination. The international law that emerged from the Cold War is therefore more a law of exploration than a law of exploitation. Indeed, this distinction is not without impact on how international law is contemporarily able to cope with new activities emerging in the space sector: navigation in this *"new ocean"*[35] was at stake, with these new ships that were space objects, manned and unmanned. Hence, the first[36] and foremost issue of space law historically was the one of a right to overfly.[37] As for most international spaces law, the first task was the one of regulating movements and circulations, not occupations.[38]

When questioning space resources and space property, one shall focus on Article II of the OST. Quoting the text "*Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means*". By prohibiting the national appropriation of outer space with a relatively ambiguous formula, Article II of the 1967 treaty has generated endless debates on its scope (one author does not hesitate to call it *"limping"*[39]): the worm was in the fruit. In an article published two years (only) after the space treaty, Stephen Gorove analysed:

[34] Cheng (n 14) 156.
[35] Burrows (n 7).
[36] As demonstrated, notably, in Chap. 1 of Albert K Lai, *The Cold War, the Space Race, and the Law of Outer Space: Space for Peace* (Routledge 2021).
[37] ibid.
[38] Alland (n 8).
[39] Marco G Marcoff, *Traité de Droit International Public de l'espace* (Editions universitaires de Fribourg 1973). In French: «*boiteux*».

> *"Even a perfunctory glance at this provision seems to suggest a number of fundamental questions which will have to be resolved if man's spatial explorations are to take place within a framework of law and order and with a minimum of friction. The first question relates to the subject matter of appropriation, that is, what can or cannot be appropriated. The second query involves the meaning of "national" appropriation in contradistinction to "nonnational," such as, individual, or international appropriation. The third inquiry centers around the meaning of the concept of appropriation. Finally, the fourth question, which is incidental to the third one, is whether there is any room for the exercise of some form or degree of sovereign authority, use or occupation which would be permissible despite the prohibition of Article I."*[40]

Admittedly, it is also incumbent on the jurist to interpret the norms in the face of doubts and uncertainty, but it must be said that the four questions arising from Stephen Gorove's *"perfunctory glance"* concern almost each of the major terms of the article in its entirety. Indeed, the most fundamental questions are the first two, since contemporary debates around Article II crystallise around its *ratione materiae* scope – ie in the case of celestial bodies, is it space as a surface that is targeted? or space as a three-dimensional entity, thus including the resources of the soil and subsoil? – and its scope *ratione personae*, between applicability or not to the appropriation of private persons. To these four questions, one can add a fifth, which would consist in asking whether there is not, despite everything, a place for certain spatial properties in this article. For if national appropriation is prohibited, all other forms of appropriation are not.[41]

Another pitfall of Article II can be highlighted. Indeed, it would have been methodologically interesting to split the non-appropriation principle into two sub-principles, depending on whether it is the vacuum of space or the ground of celestial bodies that is targeted. Both the imaginations and the legal interpretation are not the same depending on whether a ground is involved. And the non-appropriation of a moving position of a space object – apart from geostationary orbits, for which the debate is well known – makes virtually no sense.

*In fine*, it is the behaviour of the States which enables us to partially answer the question of the real scope of Article II. Thus, interpretations of Article II from the perspective of Luxembourg and the United Sates might enlighten us but limiting their

[40] Stephen Gorove, 'Interpreting Article II of the Outer Space Treaty' (1969) 37 Fordham Law Review 349.
[41] Léopold Peyrefitte and Patrick Courbe, *Droit de l'espace* (Dalloz 1993).*"If all national appropriation is prohibited in outer space, this does not mean that the right of property itself is abolished in outer space".*

relevance to that of interpretations resolutely favourable to the exploitation of space resources. The scope of these two examples is then limited, but important nonetheless insofar as they involve States that will play an active role in the field concerned. When United States and Luxembourg recognise property rights over space resources, they are careful to assert the conformity of this recognition by providing that there is no territorial claim or proclamation of sovereignty on their part. The United States does this in section 402 of the Space Act of 2015 and Luxembourg in its referral to the Luxembourg Council of State on its draft law on space resources, a draft that became a law that came into force in 2017. Thus, it can be considered that in both cases there is an interpretation of international law by this unilateral act that is the national space law. Article II *may* therefore be seen first and foremost for what it might be: a deactivation of sovereign territorial claims[42] through a passive internationalisation of the space in question.

If one reduces Article II to this function, one may therefore legitimately ask whether Article II is indeed the most important issue at hand. In fact, the problem could rather be asking to what extent OST copes with exploitation of outer space, especially in the absence of any mention of the term *"exploitation"* of outer space that could help clarify. Article VI provides for the participation of *"non-governmental organizations"* (ie national enterprises) in space activities, the charitable nature of which may be questioned, and it is also possible, to place this exploitation under the banner of freedom of use from Article I. But from this absence *expressis verbis* of the exploitation of space and of its resources, some have thought it necessary to deduce a silence on this subject. This is the case in Luxembourg, for example, in the referral by its government to the Council of State of the Grand Duchy. It clearly states that *"while the legal status of the territories of the celestial bodies themselves is defined by [Article II of the Space Treaty] - namely that there is no room for national appropriation - the status of the resources is not dealt with, nor even addressed".*[43]

However, the cleverness of the OST drafters consisted in proposing, rather than precise rules and detailed regimes, principles which would allow, by their generality and flexibility, to follow the technological and political evolutions of space, without becoming obsolete in a few decades. It is therefore a denial of both the interpretative capacity of lawyers and the possible scope of these articles to take a literal silence for a total silence. No, OST is not silent on the exploitation of space resources. The full mobilisation of the governance framework it imposes is relevant, and it has proven its worth over the past six decades. Namely, this framework proposes the

[42] See, notably: Stephan Hobe and others (eds), *Cologne Commentary on Space Law, vol I* (Heymanns 2009).
[43] Saisine du Conseil d'Etat Luxembourgeois par Guy Arendt, Ministre d'Etat, Secrétaire d'Etat à la Culture , en date du 15 novembre 2016 <https://data.legilux.public.lu/filestore/eli/etat/projet/pl/10240/evenement/OpinionConseilEtat/1/doc/1/fr/pdf/manifestation/eli-etat-projet-pl-10240-evenement-OpinionConseilEtat-1-doc-1-fr-pdf-manifestation.pdf> p. 9.

carrying out of activities and operations in an internationalised space under the responsibility of States that have authorised such activities and operations, and that have registered space objects under their jurisdiction and control, regardless of the commercial or non-commercial nature of such activities and operations. Armel Kerrest[44] also points out that a *bona fide* interpretation combined with the *effet utile* of the provisions of the space treaty necessarily leads to the identification of rules, or at least principles, governing the exploitation of space resources, even if the treaty does not mention them *expressis verbis*. Indeed, to those who argue that the lack of precision in the prohibition of resource exploitation makes it lawful[45], the author counters that a *bona fide* interpretation of the Treaty, and of its preamble and Art. I, can only make the lawful exploitation of the said resources conditional on the establishment of an *"international agreement"* or an *"international body representing humanity"*.[46] He goes on to state that *"Article II would be meaningless if this prohibition on appropriation did not contain a prohibition on the appropriation of mineral resources"* because otherwise *"this prohibition would not cover anything practical"*. Armel Kerrest goes even further when he notes that the behaviour of States that allocate property rights over space resources is the behaviour of a sovereign, which would not be in conformity with Article II of the space treaty. Without having to agree with the author's interpretations, it should at least be seen as an opportunity to make the provisions of the treaty, which are far from having said their last word, eloquent.

Furthermore, we suggest that if the issue of private property of space resources is not directly addressed in public international law, it may be because the issue should not be of direct interest to the latter. For when the global legal pluralism described above determines the parameters for the development of a legal strategy, it invites the distribution of legal questions to the most effective level of normative intervention. Let us already note that if it is necessary for public international law to coordinate the occupations on this common that is the Moon, it is up to domestic law in general - associated with private international law - to be interested in space property in the first place.

[44] Armel Kerrest, 'L'appropriation des ressources minérales des corps célestes' in Philippe Clerc and others (eds), *Le droit entre ciels et terres: mélanges en l'honneur du professeur Laurence Ravillon* (Éditions A Pedone 2022).
[45] ibid. *"According to this theory, there should be an express prohibition as if the prohibition of appropriation obviously did not include the prohibition of the major practical consequence of the sovereignty claim"*.
[46] ibid. *"Even if it is clear that the notion of the prerogative of all mankind is different from that of the common heritage of mankind which has been used in Article XI of the Moon Agreement and in Part XI of the Law of the Sea Convention, the fact remains that an appropriation by companies belonging to the richest States of the resources of the celestial bodies cannot be carried out in accordance with these principles if no international agreement is adopted and if no international body represents all mankind"*.

## 2.2 The national strategic front: enabling the legal systems to exploit space resources

Indeed, it is through national law that the issue of space property has reappeared with the greatest fanfare.

But first it must be remembered that national law is not a new source of space law. Very early on, the States involved in the space race armed their legal systems with internal provisions on the subject - this is notably the case, to mention only a few *"pioneer States"*[47], The United States in 1958, Norway and Sweden in 1969 and 1982, and the United Kingdom in 1986. Since the end of the Cold War and the rise of the private space sector, the number of such national space laws has continued to increase. It is, according to one author, *"the fastest growing area of space law"*.[48] Today, about thirty States have national space laws. Traditionally, the existence of such laws is justified by two arguments.

The first is from the regime stipulated in Article VI OST, making States responsible for national space activities.[49] While the latter did not commit themselves to adopting national space laws, they had to provide for the conditions under which they would authorise and then supervise the space activities for which they would be responsible.

The second argument generally put forward relates to the rise of a private space sector: if the *corpus juris spatialis* is not directly applicable to it, the burden falls on the States under whose aegis the companies are placed to guarantee compliance with the international framework resulting from the treaties. This bridge from the international to the national would, according to one author, be the crucible of the stability of the major principles of international space law. We must therefore agree with Simone Courteix when she states that, basically, *"the multiplication of space activities could have been envisaged solely from the angle of public international law if it had not involved private companies"*.[50]

The combination of the two traditional arguments (Art. IV/relay of the international to the national) can be seen in the areas commonly covered by laws on space operations: the definition of space activities for which the State engages its responsibility, the authorisation and granting of authorisation, the conditions of registration and its effects as well as the liability and insurance regimes.

For States wishing to engage in the exploration and exploitation of space, national space laws have always been a prime strategic enabler. They provide a stable framework

[47] Irmgard Marboe, 'National Space Law' in Frans von der Dunk (ed), *Handbook of space law* (2017th edn, EE Elgar 2015).
[48] Paul Stephen Dempsey, 'The Emergence of National Space Law' [2013] Annals of Air and Space Law 303.
[49] See, notably: Annette Froehlich and Vincent Seffinga, 'Rationale for the Enactment of National Space Legislation' in Annette Froehlich and Vincent Seffinga (eds), *National Space Legislation : A Comparative and Evaluative Analysis* (Springer International Publishing 2018) <https://doi.org/10.1007/978-3-319-70431-9_2> accessed 24 March 2023.
[50] Simone Courteix, *Droit de l'espace*, Répertoire de Droit International (Dalloz 1998).

as a concrete legal manifestation of their strategic ambitions.[51] And ultimately, as long as national space laws simply acted as a bridge between the international obligations of states and their private space sectors, no major problems emerged.

The situation changes, however, when national space laws move away from their traditional objects to apprehend new legal grounds, sometimes in a relative rupture[52] with positive law. As a matter of fact, contemporary changes in the space economy, supported by the political theme of *New Space*, have been accompanied by an evolution of the motivations on which national space laws were based[53], colouring them with a certain economic opportunism.[54] The legislative or regulatory intervention of States in the space sector was then built on the idea that it made it possible *"to achieve a break with international law in order to create a normative environment more favorable to the development of commercial space activities"*[55]. The American Space Act of 2015 or the Luxembourg Space Resources Act of 2017 are the models of this new space law serving above all an industrial and economic policy, even if it means partially breaking with the principles derived from the *corpus juris spatialis*.[56] In the same vein, we can also mention the consultation launched in France at the beginning of 2023 by the three Ministries of Research, Economy, and the Armed Forces on *"adapting the framework for authorising space operations to the challenges of innovation and the New Space"*.[57] The first question put to the operators in the context of this consultation is interesting to note: *"What advantages do you derive from placing yourself under the aegis of the LOS* [Loi sur les operations spatiales]*? What adjustments would be necessary to further encourage the establishment of space activities in France?"*[58]. This question affirms the industrial role of attractiveness and economic policy that space nations recognise in their national laws. It is also worth noting the claimed aim of the renovation of French space law announced by the ministries concerned: *"the updating of space law will enable French operators to develop their activities in a legally controlled context while remaining competitive"*[59]. From relaying the international obligations of States to national companies to securing an innovation ecosystem in the context of international economic competition, the functions of national space laws have evolved. In the new space age, space law is becoming a weapon of economic warfare. Indeed, the

[51] Rass-Masson (n 23) 140.
[52] ibid 142.
[53] P Blount, 'Renovating Space: The Future of International Space Law' (2011) 40 Denver Journal of International Law & Policy 515 <https://digitalcommons.du.edu/djilp/vol40/iss1/28> accessed 15 April 2023.
[54] Dempsey (n 48).
[55] Rass-Masson (n 23) 142.
[56] V. *infra*.
[57] The joint press release of the three ministries <https://www.enseignementsup-recherche.gouv.fr/fr/consultation-aupres-des-operateurs-spatiaux-sur-les-enjeux-du-new-space-89083> accessed 15 April 2023.
[58] ibid.
[59] ibid.

reinforcement in France, since July 2020, of the role of the Ministry of Economy on space affairs tends to serve our argument.

Whereas, in the past, national space laws were the vehicle for the stability of international space law, the economic instrumentation of these laws may, on the contrary, lead to instability and insecurity of the international framework, through the multiplication of potentially divergent interpretations of what is permitted or not to do in this international space that is outer space. For it would be foolish to consider that laws only concern the legal order that enacts them: governing activities that are international in nature, they enrich the law of space activities with both extraterritorial and extraterrestrial scope. To quote PJ Blount "*as domestic law develops and defines items such as best practices for space flight providers, these developments can have influence at the international level*"[60]. Space law is now polycentric[61], and this polycentricity should lead the actors to a multi-front strategy as mentioned above. Among these, the national strategic front plays a major role, both economic and legal.

From this strategic front, some space-faring nations have decided to regulate, albeit in a superficial way, the exploitation of space resources since the second half of the 2010s. The two most cited examples are the United States of America, with the Space Act of 2015 and Luxembourg, with its Space Resources Act of 2017. An investment policy in the space resources sector has accompanied the Luxembourg project: regulation and economic policy go hand in hand. In both above-mentioned texts, companies under the national umbrella are recognised as having a right of ownership over the extracted resources - even if in the American case, the right of ownership is not directly mentioned, this is nevertheless the objective when in paragraph 51303 it is stated:

> *"A United 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.''*

The Luxembourg version, on the other hand, is more summary. Before specifying the principles governing the granting of Luxembourg's authorisation for the exploitation of space resources in the rest of the articles, the very first one states straightforwardly:

> «*Space resources are capable of being owned.*»[62]

[60] Blount (n 19).
[61] Lucien Rapp, 'From Space to Spac' in Clémentine Bories and Lucien Rapp (eds), *L'espace extra-atmosphérique et le droit international* (Pedone 2021). Eytan Tepper, 'The Big Bang of Space Governance: Towards Polycentric Governance of Space Activities' (2022) 54 New York University Journal of International Law and Politics 485.
[62] Article 1 is quoted here from its translation by Luxembourg in the English unofficial version of the law they propose on the *legilux* website. Its original French version is: *"les ressources spatiales sont succeptibles d'appropriation"*.

Besides, the *ratione personae* scope of application of the two laws should also be noted, as they demonstrate the willingness to accompany the emergence of a national space resources ecosystem by personally conditioning the grant of authorisations. On the Luxembourg side, Article 4 makes the possibility of coming under its umbrella conditional on being a "public company limited by shares, or a corporate partnership limited by shares or a private limited liability company of Luxembourg law or a European Company (société européenne) having its registered office in Luxembourg". Some space-mining start-ups of foreign origin did not hesitate to open a subsidiary in Luxembourg. The scope ratione personae of the US law adds two criteria of applicability: to US citizen natural persons and, more importantly, to entities created abroad but controlled by an American. Indeed, to understand the term "US citizen" mentioned in paragraph 51303 of the Space Act, one must go to paragraph 50902 of Title 51 of the US Code, a title dedicated to national and commercial space programs. The US citizen, the one who is *"entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained"*, is defined there as: *"an individual who is a citizen of the United States"*, *"an entity organized or existing under the laws of United States or a State"*, or *"an entity organized or existing under the laws of a foreign country if the controlling interest (as defined by the Secretary of Transportation) is held by an individual or entity"* described in the first two categories.

It is noteworthy that in both acts, the aim was to use the law to encourage the formation of an ecosystem of innovation around space resources. And to do this, the consecration of a property right on the extracted resources seemed to be the preferred path - even if it meant postulating the conformity of the said property right with public international law. For, even if it means getting ahead of the analysis of space property to which the last part of our section 3.2 is devoted, the consecration of space property must above all be seen as an industrial policy. One can only be surprised at the relatively premature nature of this consecration: after all, there is for the moment no extraction of a significant quantity, nor any transaction of resources or products of resources that would justify the urgency of guaranteeing property; and one can legitimately wonder if these national provisions will remain really satisfactory when the economy of space resources will be fully space-based and not only terrestrial as it is at present, and when the extracted resources will no longer be counted in kilos but in tons. In the same vein, what about the possibility of discovering an alloy or resource on the Moon such that the extraction of just a few kilos would be enough to meet the needs that led to its discovery?[63] Moreover, even if what is under the banner of space mining seems uncertain, one can only wonder about the choice made to limit the interest of

[63] Our knowledge of the Moon's geological catalogue, beyond its surface, is extremely limited. This catalogue will provide invaluable information for scientific understanding and the economic development of lunar resources.

these laws to the final product of the exploitation of the resources, namely the resource itself, when, fundamentally, it is a whole chain of value and a multiplicity of infrastructures that make it possible to achieve this result. Indeed, space mining supposes almost all of what is necessary for mining on earth: extraction infrastructures and machinery, transportation, storage, refinement facilities; all of which having to be launched form Earth, maintained, and managed; the overall also using geolocating and telecommunications. Earth mining laws should extend to many more subjects than the mere economic value of a resource. But property is an essential institution for the creation of a market, and the two articles mentioned above, the American and the Luxembourg one, come to *encode in capital*[64] the chunks of infinity that will be taken from the Moon and elsewhere in a few years.

More precisely, it is the general economic enforceability of space activities that is at stake. As Lukas Rass-Masson states:

> *"Commerciality thus constitutes a new impetus for space exploration. This is, moreover, not very surprising, since it makes it possible to mobilise new means, which allows to respond to the challenge of the scarcity of public resources available to cope with the immensity of the necessary investments. Yet the idea of commerciality is not neutral with regard to the sources of law. It implies, as in the case of investment, the search for a legally legitimate benefit by the economic operator. And where the benefit sought by the State may be prestige, even if the strategic and military dimension is never far away either, the benefit by the commercial operator is pecuniary: he acts with an assumed lucrative purpose, which enables him to attract and mobilise capital with a view to the expected economic gain. And this profit that the operator seeks to derive from his activity must indeed be realised in a national law, to be opposable to the other economic actors of the market in question and to serve as an element of exchange".*[65]

[64] Katharina Pistor, *The Code of Capital: How the Law Creates Wealth and Inequality* (Princeton University Press 2019).

[65] Rass-Masson (n 23) 145. French original version : *«La commercialité constitue ainsi une nouvelle impulsion de l'exploration spatiale. Ce n'est d'ailleurs pas très surprenant, tant elle permet de mobiliser de nouveaux moyens, ce qui permet de répondre au défi de la rareté des ressources publiques disponibles pour faire face à l'immensité des investissements nécessaires. Or, l'idée de commercialité n'est pas neutre au regard des sources du droit. Elle implique, comme pour l'investissement, la recherche d'un bénéfice juridiquement légitime par l'opérateur économique. Et là où la retombée recherchée par l'État peut être le prestige, même si la dimension stratégique et militaire n'est jamais loin non plus, la retombée par l'opérateur commercial est pécuniaire : il agit dans une finalité lucrative assumée, qui lui permet d'attirer et de mobiliser des capitaux en vue du gain économique escompté. Et ce bénéfice que l'opérateur cherche à retirer de son activité doit bien se réaliser dans un droit national, pour pouvoir être opposable aux autres acteurs économiques du marché considéré et lui servir d'élément d'échange.»*

However, it is not certain that the legal - and therefore economic - certainty afforded by these national space laws is guaranteed. The analysis of the Luxembourg Council of State is enlightening in this respect. In their opinion on the first draft of the Grand Duchy's law on space resources[66], the councillors made a demanding criticism of the government project. They expressed their doubts as to the opposability of property titles relating to space resources to third-party legal systems; this question is more important insofar as it is emphasised that Luxembourg does not have autonomous launch capacities and will therefore have to launch from a third-party State.[67] The Councillors of State are also doubtful as to the extent to which Luxembourg will be able to ensure the international scope of the exploitation permits, and how the areas from which the resources will be exploited and will be protected. The Luxembourg government has nevertheless adopted its law on space resources, with almost no major changes between the first draft (the basis for the Council of State's referral) and the corrected version currently in force.

The Council of State's questions, which we did not mention in extenso[68] are legitimate. They are those that naturally arise when the regulated economic activity takes place in an international space and by means of resources that can be considered at least as internationalised. The absence of an immediate response to these questions clearly demonstrates the primary nature of these national laws on space resources: to secure *ab initio* a market by guaranteeing the economic legal enforceability of the activity at stake.

The preceding discussion should allow us to reach two conclusions. The first conclusion is that the ambiguities of the US and Luxembourg domestic provisions, and the uncertainties as to what space mining projects, which are otherwise in their nascent

[66] Avis du Conseil d'Etat du Luxembourg n°51.987 du 7 avril 2017 portant sur le Projet de loi sur l'exploration et l'utilisation des ressources de l'espace <https://conseil-etat.public.lu/dam-assets/fr/avis/2017/07042017/51987.pdf> accessed 15 April 2023.

[67] We will return to this important issue in our third section.

[68] To quote those we mentioned earlier: *"The fact remains that, even if it shares the position of the authors of the bill as to the possibility for a private person to appropriate and thus be recognised as having legal title to resources extracted from celestial bodies, following the example of the US legislature, The Conseil d'Etat wishes to highlight certain consequences of such recognition which may further weaken the "legal certainty" (to use the words of the authors of the draft law) necessary for persons wishing to invest in the exploitation of outer space resources. If Luxembourg puts in place a regime recognising a person's ownership of outer space resources, how can it ensure that other states will recognise the related title? This is more so since operators duly authorised in accordance with the provisions of the forthcoming law will necessarily have to use space launchers taking off from the territory of other States or landing on territories over which Luxembourg does not exercise any sovereignty. (...) In the same vein, how can we protect the areas over which these operators extract resources from outer space? Such protection could lead to a kind of sovereignty claim, which is prohibited by the Space Treaty, and violate Article I of the Treaty, which states in paragraph 2 that "outer space, including the Moon and other celestial bodies, may be explored and used freely by all States without discrimination on equal terms and in accordance with international law, all regions of the celestial bodies being freely accessible." Other questions as to the recognition of title to the resources of outer space will necessarily arise, such as the determination of competent jurisdictions and the recognition of such judicial decisions in other States."*

stages, entail, must be treated with caution when it comes to understanding the scope of the national space laws. The second, repeated several times, is that economic motivations have outweighed legal ones in the enactment of national space resource laws.

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The new legal pluralism in space law could appear as a harmful fragmentation of the subject: in reality, it can be analysed as an opportunity for the efficiency of spatial governance. By opening several strategic fronts, pluralism makes it possible to distribute questions at the right normative level.

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## 3 The governance of space resources from global legal pluralism

In this respect, regulation of the exploitation of space resources provides an interesting example of a pluralism that can be described as distributive. Indeed, the two major questions that arise in connection with the exploitation of space resources, ie the coordination of occupations and the organisation by law of a space resources economy based on property, are in fact of different orders. The first is concerned with public international law, the second with national or private international law. And these two questions, even if distinctly distributed, are not hermetic: a question of public international law, the coordination of occupations, remains necessary to ensure the full efficacy of space property in national/private international law. It is this distributive pluralism that makes it possible to overcome a questionable opposition between the commons and resource property, which undermines the legal certainty of resource exploitation.

This section proposes to outline this approach in terms of distributive pluralism, applied to the law of space resource exploitation. It is then up to public international law, possibly through the prism of the commons, to coordinate occupations **(3.1)**; and to domestic law and private international law to coordinate uses through space property **(3.2)**.

### 3.1 Coordinating occupations in public international law: the commons and the Moon

Whether or not the coordination of occupations on the Moon is done through public international law or through a simple multilateral dialogue, or whether it uses the conceptual framework of the commons, coordinating will be a *de facto* necessity. The Moon is paradoxically small, and the areas of interest in terms of resources are even

smaller. The Moon's poles, especially the southern pole, are targeted because of their wealth of frozen water – an essential resource for any space mission. The presence of several space powers in such a small space – just a few hundred kilometres[69] – with major competition for positions and resources, presupposes minimal information or cooperation on the distribution and location of missions. The tensions that emerged following the proposal of the safety zone concept in the Artemis Agreements are a clear example. The paradoxical smallness of space and the immediate terrestrial consequences of a space conflict had already been understood by the Americans and Soviets in their time when the need for common rules for the exploration and use of space emerged early on.

But asserting that coordination will be necessary and discussing its contours are two different questions. And it is this second question that the international strategic front of a pluralist legal strategy must answer.

Yet, when it comes to debating what law says about the nature of outer space – because that is what the question is really about - a series of concepts are regularly invoked, sometimes taken from Latin (and, as we say in French, *"à en perdre son latin"*), sometimes translated into the vernacular: *res communis, res nullius, territorium nullius*, commons, the common heritage of mankind, the international commons, etc. Most often, two synchronous movements are at work. On the one hand, it is an interpretation of the treaties, since it should be remembered that none of these terms is found *expressis verbis* in the *corpus juris spatialis*[70] (except for the common heritage of mankind enshrined in Article 11 of the Moon Agreement) which prefers the ambiguous *"province of mankind"*. On the other hand, these interpretations use legal concepts with uncertain contours but with a certain prescriptive[71] vocation when applied to the places they designate. This last movement can easily be seen in the use made by certain authors of a gradation in the common, from the simple international space to the common heritage of mankind, via the *res communis* and then the international commons[72]; this gradation in the commons is further embodied in the progressive

[69] Antonio Salmeri and Peter Weiss, 'The Apple of Discord or The Fruit of Salvation? A Dialogue on the Practical and Legal Aspects of Safety Zones on the Lunar South Pole' (73rd International Astronautical Congress (IAC), 18th – 22nd September 2022).

[70] For a critical perspective on the usage of the various expressions, see: Henry R Hertzfeld, Brian Weeden and Christopher D Johnson, 'How Simple Terms Mislead Us: The Pitfalls of Thinking about Outer Space as a Commons' (66th International Astronautical Congress (IAC), 12-16 October 2015). For an historical perspective on the use of the commons in international law: Charlotte Ku, 'The Concept of Res Communis in International Law' (1990) 12 History of European Ideas 459.

[71] Or, at least, "normative" see: John Goehring, 'Why Isn't Outer Space a Global Commons?' (2021) 11 Journal of National Security Law and Policy 573.

[72] This is emphasised, for example, by Bin Cheng in his classic Studies of international space law when he states: "While territorium extra commercium and territorium commune humanitatis share the same characteristic that they cannot be territorially appropriated by any State, they differ in that the former is essentially a negative concept, whereas the latter is a positive one. In the former, in time of peace, as long as a State respects the exclusive quasi-territorial jurisdiction of other States over their own ships, aircraft and spacecraft, general international law allows it

addition of barriers and protection to the exploitation and management of said commons. Even if the outright prohibition of exploitation, in the end, is almost never completely on the agenda: these regimes are above all a framework for extractivism.

The main problem is that the prescriptive mission is above all that of concepts whose contours are currently uncertain and for which no real consensus seems to be emerging. Furthermore, some authors also note a series of confusions: between the commons in the economic sense and in the legal sense[73], and between the qualification of the designated space and the resources found there.[74] As Eytan Tepper accurately points out, the debate around the space commons could not be satisfactory *"in the absence of a structured discourse"*[75] on the issue that would clarify the primary terms of the debate. For in *"Space as a common"*, the doubts concern both the first and the last word. Is it indeed all space that is concerned? Or would it not be better to distinguish the void from planets, natural satellites, and other celestial objects? One must agree with the above-mentioned author[76]: it makes no sense to call all of space a common in one block. Some space commons are less common than others and the Moon or Mars, or LEO/GEO positions should be analysed separately. This is also the case, for example, of lunar water – because if in the commons approach one can distinguish between the parts of space concerned, one must also distinguish between the resources concerned. We are not facing the same issue for a limited resource that will be needed for most future lunar missions, namely water, as other mineral resources are more abundant and whose utilisations is variant through mission plans. In addition, sometimes, the debate around the space commons compares space resources to fishes in the open sea.[77] However, space resources are neither renewable nor practically infinite[78], as access to them is not the same from a few days' journey to the Moon as it is from several months' distance to Mars.

to use the area or even to abuse it more or less as it wishes, including the appropriation of its natural resources, closing large parts of such space for weapon testing and military exercises, and even using such areas as a cesspool for its municipal and industrial sewage. The emergent concept of the common heritage of mankind, on the other hand, while it still lacks precise definition, wishes basically to convey the idea that the management, exploitation and distribution of the natural resources of the area in question are matters to be decided by the international community (or simply by the contracting parties? as in the Moon Treaty!) and are not to be left to the initiative and discretion of individual States or their nationals", Cheng (n 14) 436.

[73] For instance in: Jean-Louis Combes, Pascale Combes-Motel and Sonia Schwartz, 'Un survol de la théorie des biens communs' (2016) 24 Revue d'économie du développement 55, Tepper (n 6); Samantha Besson, 'Des « biens publics » internationaux : (p)oser la question institutionnelle | Collège de France' (Collège de France, March 2022) <https://www.college-de-france.fr/agenda/cours/le-droit-international-face-la-distinction-publicprive/des-biens-publics-internationaux-poser-la-question-institutionnelle> accessed 9 April 2023; Goehring (n 71).

[74] Tepper (n 6).

[75] ibid.

[76] ibid.

[77] Franz Schilling, 'Fishing in Outer Space - The Luxembourgish Interpretation of the Appropriation of in-Situ Ressources' (2019) 2 ZLW 248.

[78] Carol R Buxton, 'Property in Outer Space: The Common Heritage of Mankind Principle vs. the First in Time, First in Right, Rule of Property' (2004) 69 Journal of Air Law and Commerce 689.

This lack of a structured discourse, confusing more specifically the notion of an economic common with a legal common, has already had repercussions in positive law. Indeed, in an Executive Order of 6 April 2020[79], the White House clearly positions itself against an interpretation of space as a global common:

> *"Americans should have the right to engage in commercial exploration, recovery, and use of resources in outer space, consistent with applicable law. Outer space is a legally and physically unique domain of human activity, and the United States does not view it as a global commons[80]. Accordingly, it shall be the policy of the United States to encourage international support for the public and private recovery and use of resources in outer space, consistent with applicable law."*

As John S. Goehring stresses[81], the White House decree did not take the time to grasp the complexities and nuances of the notion of the commons by relaying the American opposition to Article 11 of the Moon Agreement that we mentioned in Section 2 of our article. For the same author[82], the global commons here refers to an economic understanding of the commons seen as a constraint to free economic exploitation. In fact, this is the whole point of the quoted excerpt from the Executive Order: to underline and then deactivate the opposition between a logic of commons and a logic of exploitation. However, this opposition does not have to be the case, as reflections are emerging today on the development, within the international commons, of regimes for the exploitation of the resources they comprise, with various already existing precedents.[83] Added to these points are the potential geopolitical threats and instabilities which result from this US unilateral declaration.[84]

In essence, it is perhaps the most cursory analysis of the facts that can only lead to the conclusion that space is an international common. In its most summary definition, outer space as an international common refers to cases of international spaces to which access cannot be restricted and where activities are conducted freely, these spaces being above all not subject to the sovereignty of States and where such sovereignty is

[79] Executive Order on Encouraging International Support for the Recovery and Use of Space Resources 2020.
[80] The "s" to *commons* is not a grammatical mistake by the author but originates from the executive order.
[81] Goehring (n 71).
[82] ibid.
[83] Fabio Tronchetti, 'Legal Aspects of Space Ressources Utilisation', *Handbook of Space Law* (2017th edn, EE Elgar 2015).
[84] Fabio Tronchetti and Hao Liu, 'The White House Executive Order on the Recovery and Use of Space Resources: Pushing the Boundaries of International Space Law?' (2021) 57 Space Policy 101448.

outright prohibited.[85] This definition can easily be found in official statements by US government agencies, particularly defence agencies. Furthermore, on the Common Heritage of Mankind debate, it must be noted that between its first appearance in international law across the first two thirds of the 20th century to until now, the said notion has evolved towards a commercial-compatible approach as demonstrated by Fabio Tronchetti.[86] A balanced compromise is now proposed between the needs of cooperation between developed and developing countries, all in favour of "[attractivity] *for enterprises from developed states to be an incentive for commercial activities in the area".*[87] The precited author also notes that a commercial-compatible approach of the Common Heritage of Mankind was also offered by the resolution 1/2002 of the International Law Association, a resolution about the interpretation of the concept when it relates to space law and the Moon Agreement.[88] We believe that the political debate on space matters would benefit from taking note of contemporary developments in the notion of the common heritage of mankind beyond the caricature that can be made of it, even more so with the rise in power of space faring nations from the South.

However[89], at this stage of space exploration, and in the face of the hostility shown by certain stakeholders to the idea of commons, the reasoning to be adopted is in two stages. The first step is the following: if, indeed, space is factually (and economically) a common, the legal consecration of this qualifier seems to raise enough doubts or even hostility for it to be appropriate to carry it out at this stage of space exploration. If space law is the product of *"a realistic conception of the relations between States (...) corroborated by an appreciation of the new states of affairs that have arisen as a result of space activities"*[90], it is not only useless but also risky to base the legal analysis on a notion contested by the first space power, regardless of whether its understanding is limited. The second step of the reasoning, based on the conclusions of the first, asserts that, it is possible to disengage from the debates around the notion of the commons and its avatars. The problem must then be approached, not from theoretical debates, but by a pragmatic approach based on a practical and political reality as well as on positive law: the international nature of outer space and the deactivation of territorial claims. This idea is, after all, what the Outer Space Treaty *expressis verbis* proposes when its Articles I, II and VIII are combined. Designating outer space as an international space is a sufficient first proposition to drive the rest of the reasoning on coordination of occupations since "*it thereby makes clear that, indeed, only the community of states*

[85] See, for instance, but only for instance since this definition of international commons can be find in a lot of other articles: Kai-Uwe Schrogl, 'Which Future for the Global Commons?' [2018] Proceedings of the International Institute of Space Law 935; Ku (n 70).
[86] Tronchetti (n 14) 91, 125.
[87] ibid 123.
[88] ibid 125.
[89] Shall we say, sadly.
[90] Marcoff (n 39).

*can establish the legal regime for outer space* in principalem"[91]. Whether outer space is an international common or a common heritage of mankind is not useful for our debate and will be left to the fate of the evolutions of the *corpus juris spatialis* and particularly of the hypothetical renegotiations of the Space Treaty and the Moon Agreement.

Ultimately, the question, at the crossroads of law and geopolitics, is subtly different from that of the nature of space and its celestial bodies: insofar as space states decide to grant their nationals property rights over the space resources they extract while authorising the missions that lead to the said extraction, it is imperative for legal, economic, and global certainty *to consider the way in which the occupations must be coordinated*[92]. Indeed, it would be quite illusory to invest the national strategic front through national space resource laws without investing the international front in parallel. It is also important to do so on a truly multilateral scale, beyond the block logic currently at work in space, as demonstrated by the Artemis Agreements and the International Lunar Research Station. The fact that a handful of partner states agree on the main principles of lunar activities is an existing but insufficient effort.

This is essentially the idea expressed (once again) by the Luxembourg Council of State in its 2017 opinion when it notes the fragility of the approach adopted by the Luxembourg law when it says nothing about the way in which the various exploitation sites will be protected. Indeed, the concern to preserve the main principles of international space law should not so much be about space property as it should be about the terms of occupation underlying the exploitation of resources and in particular the concept of the safety zones[93] introduced by the Artemis Accords.

With regard to the question that concerns us, ie the contours of space property, the preceding developments lead us to the conclusion that a political and legal reflection on the coordination of occupations on the Lunar soil is an indispensable prerequisite for the coherence and efficacy of space property regimes.

### 3.2 Coordinating uses in private international law: space property and the Moon

The debate on property of space resources is premature. In fact, the exploitation of space and lunar resources has not yet begun and is not foreseeable for at least a decade. However, the property of these resources will not have the same effect depending on the scale of exploitation considered. Here the quantitative is also

[91] von der Dunk (n 28).
[92] von der Dunk and Hertzfeld (n 24). *"Eventually, when true private business operations are feasible on the moon or on asteroids, there will have to be some form of intermediary established to guarantee the right to use the territory. Debating the form and type of agreements needed for an intermediary should be reserved for the future time when more is known about the types and value of the space resources in question. Only then can a meaningful arrangement be worked out. Since these potential business ventures are well beyond the five to ten-year normal business planning horizon, there is little need to attack the specifics of such arrangements today."*
[93] Jack Wright Nelson, 'Safety Zones: A Near-Term Legal Issue on the Moon' (2020) 42 Journal of space law 604.

qualitative[94]. The proposals outlined below will therefore quickly be put to the test of time and technological developments. But this is, after all, the fate of most analyses in space law and more generally in technology law. It is therefore in this last part that we wish to answer the question that serves as the title of our article, *"What is space property the name of?"*.

In our view, space property is the name of at least three things, all of which are inter-related: an economic policy, a legal regime of private international law and a decentralised governance of space resources scheme. We will analyse these three facets in turn. Let us bear in mind at the outset that this article is primarily concerned with the resources of the Moon, insofar as they are used *in situ* and not brought back to Earth - the remark is important because it means that all the activity takes place in an international space.

### 3.2.1 Space property as economic policy

Undeniably, the first (and probably foremost now) function of space property is economic. We have already discussed the economic instrumentalisation of national space laws and the key role played by the US and Luxembourg laws in the establishment of a space resources market. It was indeed complex for the economic actors to grasp the legal nature of space resources with which they were confronted during the emergence of a market linked to such an uncertain activity and requiring massive investments *ab initio*. It was thus necessary to provide legal certainty for the space resources market to promote its emergence. This is what emerges from the preamble of the American Space Act of 2015, whose stated objective is to "*facilitate a pro-growth environment for the developing commercial space industry by encouraging private sector investment and creating more stable and predictable regulatory conditions, and for other purposes*", but also the opinion of the Luxembourg Chamber of Commerce on the draft law on the country's space resources. The latter clearly states that the purpose of such a law is the creation of a *"legal framework for the exploitation and use of space resources in order to guarantee legal certainty to private operators as to the property of space resources and, secondly, to regulate the approval and supervision of missions for the exploration and use of space resources"*.[95] Yet for the American and Luxembourg legislators, as well as for the resource exploitation lobbyists behind the two laws mentioned above, the most immediate path from market building to legal security was through property. Nevertheless, there is nothing surprising in this: as Jean-Philippe Robé reminds us,

[94] Marcoff (n 39) 670.

[95] Avis de la Chambre du Commerce du Luxembourg sur le projet de loi n°7093 sur l'exploitation et l'utilisation des ressources de l'espace, en date du 10 janvier 2017, n°4755GKA/ZLY <https://data.legilux.public.lu/filestore/eli/etat/projet/pl/10240/evenement/avis/1/doc/1/fr/pdf/manifestation/eli-etat-projet-pl-10240-evenement-avis-1-doc-1-fr-pdf-manifestation.pdf> accessed 25 May 2023.

*"property is a fundamental legal institution for the existence of any market economy"*[96]. Thus, the first of the three names for property of space resources is economic: for it is through property that the economic existence of these resources is assured, thereby contributing to the emergence of a financeable market, or as Lukas Rass-Masson puts it:

> *"(...) the economic operator who seeks to make a profit needs to be able to obtain, through his activity, legitimate wealth. And by legitimate wealth, we mean wealth corresponding to a subjective right, ie an asset or an individual prerogative recognised by law, enforceable and exchangeable, and therefore capable of circulation. Only this recognition by the law, particularly in the form of a monetary claim, makes it possible to transform the object of spatial activity into an asset capable of circulation and economic exchange. And it is only on this condition that wealth can be created and that investors will agree to embark on space activities, which are henceforth sources of profit prospects."*[97]

### 3.2.2 Space property as a private international law issue

This economic feature is mirrored in the legal analysis of the concept of space property. The combination of property, a traditional legal concept in Western law, and space resources – a divisive subject in contemporary doctrine – can only limit our discussion to a sketch of the views that an internationalist privatist might have on the insertion in space law of a concept such as property. For, in fact, the area of international law most directly concerned by this concept is that of private international law, for at least two reasons. The first is the origin of the recognition of property titles: one of the diverse national space laws under which the operator of the space resource has placed itself. Yet it is precisely the task of private international law to coordinate legal institutions of heterogeneous origin [98]: the coordination of national space laws, here. The second reason, although of lesser importance, is the characteristics of the owner. While it is not necessary for the owner to be a private person according to the

[96] Jean-Philippe Robé, *Property, Power and Politics: Why We Need to Rethink the World Power System* (Bristol University Press 2020).

[97] Rass-Masson (n 23). In French: *«(…) l'opérateur économique qui cherche à réaliser un bénéfice a besoin de pouvoir obtenir, grâce à son activité, une richesse légitime. Et par richesse légitime, il faut entendre une richesse correspondante à un droit subjectif, donc un actif ou une prérogative individuelle reconnue par le droit, opposable et échangeable, donc susceptible de circulation. Seule cette reconnaissance par le droit, notamment sous forme de créance monétaire, permet de transformer l'objet de l'activité spatiale en actif susceptible de circulation et d'échanges économiques. Et ce n'est qu'à cette condition qu'une richesse peut être créée et que les investisseurs accepteront de se lancer dans des activités spatiales, désormais sources de perspectives de bénéfices.»*

[98] Louis d'Avout, 'Les Phénomènes Collectifs et l'analyse Macro En Droit International Privé', *Le droit à l'épreuve des siècles et des frontières : mélanges en l'honneur du Professeur Bertrand Ancel* (LGDJ/Iprolex 2018) 151.

criteria of applicability *ratione personae* of the two model laws referred to above, it must be noted that the primary addressees of these laws, when they were drafted, were space-faring companies interested in space resources. An argument to which must be added that only commercial activities related to space resources are meant to be studied here. In the context of an internationalised and capital-intensive space economy, the legal operations of the sector's players are private legal operations with an international dimension, which are of direct interest to private international law.

Accordingly, private international law seems to call for taking a stand on the issue. And as we will demonstrate hereafter, we suggest space property is not a public international law regime, but a domestic law regime coordinated in its international dimensions by private international law.

And as soon as national space laws transform space resources into movable property[99] *ipso facto* the solutions developed by private international law to apprehend movable property can be mobilised, although not without difficulty. If, for private international law, space property is not a conceptual *terra incognita*, it is because several options[100] are at hand for the internationalist:

- One can, for example, consider the extraction and subsequent appropriation of space resources as the original appropriation of a movable asset for which no pre-constituted real right exists. One obstacle will be the requirement of a subsidiary connection to the one traditionally used for movables, ie the *lex situs*, which is lacking in the case of a primary acquisition made outside any State territory. Louis d'Avout asserts that there is, in this case *"a hypothesis of non-conflict of laws"* since *"the physical grasp of an unappropriated tangible thing located outside any State territory is in itself constitutive of a subjective right of property in favour of the occupant"*[101]. The latter author nevertheless sees in the existence of rules of public international law prohibiting appropriation a framing or a contradiction *"to the natural phenomenon of man-made apprehension outside any State territory"*[102]. If, in addition to this analysis, one adds the recognition by domestic law of the subjective right of property resulting from the taking of resources - which is what the laws of Luxembourg and the United States do when they recognise space property- it is appropriate to connect the subjective right then created to this specific legal order, either by considering the said connection as a simple priority connection for which the connection chosen by the owner could be substituted, or by considering the said connection as a unique and imperative connection with regard to the

[99] For they are in no way an immovable. See in this sense: Tronchetti (n 14) 196. About real estate property on celestial bodies, see: Virgiliu Pop, 'Appropriation in outer space: the relationship between land ownership and sovereignty on the celestial bodies' [2000] Space Policy 275.
[100] This list does not claim to be exhaustive.
[101] Louis d'Avout, *Sur Les Solutions Du Conflit de Lois En Droit Des Biens* (Economica 2006) 600.
[102] ibid 601.

original rights. This is indeed the meaning of the much-quoted national space laws when one combines their applicability ratione personae and the space property regime they implement: the American citizen and the Luxembourg company acquire title to space resources, with state authorisation for the conduct of activities, thus logically subjecting the related property title to state law.

If we leave the stage of original rights to arrive at that of derived rights, Louis d'Avout, again, affirms that *"outside the perimeter of the reference, the inexistent influence of a legal order that is primarily competent to ensure the territorial policing of economic rights, leaves more room for the principle of autonomy of the will"*[103]. And he continues, *"it is thus in principle that the holder of rights not subject to the principle of reference* [to the lex situs] - [as for] *rights in tangible things not situated on a state territory - will be able to transmit all or part of his rights under the conditions freely granted by him in the contract which binds him to the acquirer"*[104]. If one follows the theoretical analysis of this author, one arrives at the conclusion that the sale of space resources will be subject to the autonomy of the parties who will choose the applicable law, or even choose the absence of applicable national law. One can also arrive at the idea that the various rules of international trade law will be able to play a role in the international sale of movable property.

- It may also be proposed to link space resources to the status of things *in transitu*. This involves considering the space resource as a good transported on board a space object, registered with the authorising State, which keeps the object under its jurisdiction and control - the said State being, moreover, the one that has authorised the activity related to the resources in question. Thus, we can agree with Bernard Audit and Louis d'Avout, when dealing with things *in transitu*, they put forward the idea *that "the convenience of connection to the corresponding law encourages the application of the law of the flag to things transported as well"*[105]. However, it must be ensured that the lunar base or infrastructure that will host the stock of extracted resources can be considered a registered object, a question on which doubts remain[106]. Furthermore, in the context of international space collaboration, it is not a given that the infrastructure in question is under the control of the same state that

[103]ibid 632. In French: «hors du périmètre de la référence, l'emprise inexistante d'un ordre juridique prioritairement compétent pour assurer la police territoriale des droits patrimoniaux, laisse une place accrue au principe d'autonomie de la volonté».

[104] ibid 633. In French: «c'est ainsi en principe que le titulaire de droits non soumis au principe de référence – (…) les droits sur les choses corporelles non situées sur un territoire étatique – pourra transmettre tout ou partie de ses droits aux conditions par lui librement consenties par le contrat qui le lie à l'acquéreur».

[105] Bernard Audit and Louis d'Avout, Droit international privé (9th edn. LGDJ 2022) 845.

[106] George D Kyriakopoulos, 'Jurisdiction and Control over Installations and Facilities Serving Space Tourism Activities' (2014) 57 Proceedings of the International Institute of Space Law 445.

authorised the extraction. Let us imagine, for example, the case of an American lunar base hosting the stock of regolith extracted by a Luxembourg company.

- An intermediate solution would be to adopt a specific treatment for the case of space resources, mixing material and conflict methods. Logic would dictate that, about the original creation of title to space resources, the law of its owner should apply. After all, it would be a question of making the same legal system competent for the authorisation of exploitation, which is currently based in the two known cases on the nationality of the authorising State, and the creation of title to the proceeds of the exploitation. Ultimately, as soon as a Luxembourg company extracts space resources under a Luxembourg permit, it seems convenient that the property title to these resources (which will become part of the assets of the company in question) should itself be subject to Luxembourg law. Formulated as a bilateral conflict rule, the principle could be as follows: to the creation of an original title to space resources, the law of the nationality of the operator applies first if it is under this same law that the authorisation for exploitation was issued or, failing that, the law of the State that authorised the exploitation. If the goods are subsequently sold and remain in space, the same conflict rule will continue to be applied, but with a different scope of application: the law of the nationality of the operator, if it is under that law that the authorisation for exploitation was issued, or, failing that, the law of the State that authorised the exploitation, will apply as a matter of priority to the rights in rem derived from space resources.

The solutions proposed here are imperfect and prospective. They are to be considered only for what they are: hypotheses, even sketches of hypotheses. The only thing they demonstrate is that private international law could mobilise its methods and concepts in the service of the legal framework of space resources and their property. After all, these chunks of infinity are easily qualified in law: they are movables that have the particularity of being extracted from an international space with the vocation to remain there.

Perhaps we may also drive another conclusion as for the transnational effect of national space resources law. The question of the relation between national and transnational laws is rather a complex one. But, to use as a space-related assumption an expression of Ralf Michaels, written in another context, national space resources laws are typically the one *"domestic by source and yet transnational by scope"*[107]. Or, as Emmanuel Gaillard says, quoted by Ralf Michaels in the precited article, *"it is important not to confuse a national legal order with its domestic, as opposed to international,*

[107] Ralf Michaels, 'State Law as a Transnational Legal Order' (2016) 1 UC Irvine Journal of International, Transnational, and Comparative Law 141.

*substantive rules"*[108]. This approach is probably the one which would enable us to give an ontological response to the epistemological response we previously demonstrated: both as methodological framework and a day-to-say manifestation[109], both as both of law and a theory of law[110], the transnational legal order may be the one where the competing vocations of both public international law and private international law might be reunited. The limited scope of our article does not allow us to go into more detail on this element, so it is mainly a matter of retaining the conclusion that, in fine, Luxembourg and US laws cannot be regarded as purely domestic but are representative national-transnational laws.

### 3.2.3 Space property as economic policy

Finally, the last name for space property may relate to governance. Indeed, if we have qualified spatial property as a hybrid in the introduction, it is for this reason. Indeed, if fully mobilised in domestic law and private international law, property of space resources can be embodied in a second level of spatial governance. Private international law, insofar as it is a tool for decentralised coordination of national laws with the objective not so much of settling conflicts of laws and jurisdictions as of avoiding them, is also, in its own way and with its own methods, a tool for decentralised governance, as Alex Mills affirms *"the operation of private international law constitutes an international system of global regulatory ordering"*[111] essentially derived from the field's methodology.

For in the context of a capital-intensive space economy with an international reach, space property transforms resources into transferable assets, passing from one legal order to another as transactions occur. It is this transferability, this capacity of a property title to space resources to travel, which is at the heart of the second level of governance referred to: for it is not said that all legal systems accept to recognise and accept the property titles in question. This is basically the heart of the concern of the Luxembourg Council of State when it asked the following question:

> *"If Luxembourg puts in place a regime recognising a person's property of outer space resources, how can it ensure that other States will recognise the related title? This is all the truer since*

[108] E Gaillard, 'Transnational Law: A Legal System or a Method of Decision Making?' (2001) 17 Arbitration International 59. Cited by Ralf Michaels, ibid.
[109] Peer Zumbansen, 'Manifestations and Arguments: The Everyday Operation of Transnational Legal Pluralism' in Paul Schiff Berman (ed), Peer Zumbansen, *The Oxford Handbook of Global Legal Pluralism* (Oxford University Press 2020) <https://academic.oup.com/edited-volume/34238/chapter/290304206> accessed 13 April 2023.
[110] Michaels (n 107).
[111] Alex Mills, 'Towards a Public International Perspective on Private International Law: Variable Geometry and Peer Governance' (2012) <https://papers.ssrn.com/abstract=2025616> accessed 13 April 2023.

> *operators duly authorised in accordance with the provisions of the future law will necessarily have to use space launchers taking off from the territory of other States or landing on territories over which Luxembourg does not exercise any sovereignty. Similarly, the exploitation of these resources, once brought back to earth, and their marketing will not necessarily take place in Luxembourg. Is there not therefore a risk that the operators will have the resources they have extracted from celestial bodies confiscated by foreign authorities?"*

This perspective on space property allows it to be seen not so strongly as a threat to the main principles of the Space Treaty, but *rather as a complementary tool to the governance and coordination mechanisms of occupations as described in part* (3.1) of this section.

## 4 Conclusion

By the end of the decade, several competing lunar bases will be installed or in the process of being installed, most probably located around the Moon's South Pole and its water resources. By the end of two decades, companies will probably be extracting resources from the moon with a commercial and lucrative objective. For now, the harshest critics of space resources property may deny its existence or legality, but the fact is that it is there, and we are witnessing the emergence of a new element in the legal landscape of space law. It is therefore up to the lawyers to seize it and make it work for a cooperative and peaceful governance of space. For where public international law finds in its centralised character some heaviness in its evolution, private international law, a decentralised coordination tool, will be able to deploy all its flexibility by transforming space resources into transferable assets.

At the end of these developments, however, it is wise to conclude that nothing should be concluded until effective exploitation of space resources has really begun. Indeed, until then, what really contains the concept of space property remains hypothetical… And since its inception, space exploration has been both a high point of cooperation and a mobilisation of legal ingenuity. We are not immune to the emergence of an alternative framework to the one currently taking shape.

*Agnese Colucci*[*]

# SUSTAINABILITY CLAUSES IN AGRICULTURAL MULTI-PARTY CONTRACTS

***Abstract***

In the agricultural value chain, companies and actors respond to the general sustainability agenda by inserting sustainability clauses into their contracts. In particular, sustainability issues and the diffusion of innovative sustainable practices in the value chain may be addressed through vertical and horizontal coordination. Therefore, examples of vertically and horizontally integrated multi-party contracts in the agricultural sector will be considered. To this end, it will be questioned whether modifications to general contract law are requested in order to give consideration to the multi-party structure of certain contractual arrangements which are used in the Global Value Chain (GVC), as well as to accommodate the need to implement sustainability standards. Consequently, the nature of sustainability clauses in multi-party contracts, as well as the legal issues which arise from the enforcement of sustainability clauses, will be analysed.

**JEL CLASSIFICATION**: K12

**SUMMARY**



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## 1 Introduction

The present work is centred on the private regulation of sustainability in the agri-food value chains through multi-party contracts.

The increasing use of Transnational Private Regulation (TPR) to regulate sustainability, in particular through private contracts, stems from the need to supplement often inefficient international public law frameworks, which do not address sustainable development as such, but rather, environmental protection, human rights, and labour-related standards.[1]

Notably, the concept of "sustainable development" has been introduced in the public discourse by the report *Our Common Future* of the *World Commission on Environment and Development* (WCED), also known as the Brundtland Report, which affirmed that "*humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs*".[2]

The Brundland Report further emphasised that sustainable development is a process aimed at making the exploitation of resources, the direction of investments, the orientation of technological development and institutional change consistent with present and future needs.[3]

The reference to present and future needs made by the Brundtland Report can be found in the German *Grundgesetz in* Article 20a, which mentions the concept of responsibility towards future generations.

The concept of sustainable development was integrated in the French constitution through article 6 of the *Charte de l'environnement de 2004*, which affirms that "*public policies shall promote sustainable development. To this end they shall reconcile the protection and enhancement of the environment with economic development and social progress*".[4]

At the European level, Article 11 of the Treaty on the Functioning of the European Union (TFEU) provides that "*Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development*".

Although the concept of sustainable development has been integrated in some jurisdictions, it has not yet found full recognition at the international law level.

[1] However, soft law instruments have been provided in order to engage companies in a more sustainable behaviour. On this topic, reference should be made to UN Principles for Responsible Contracts (New York: UN, 2011) and to the OECD Guidelines for Multinational Enterprises, Commentary on General Policies <www.oecd.org/corporate/mne/> accessed 9 July 2023.

[2] World Commission on Environment and Development, 'Our Common Future' (1987), <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf> accessed 10 July 2023 16.

[3] ibid 17.

[4] English translation is available at the following link <www.conseil-constitutionnel.fr/en/node/17799/pdf> accessed 9 July 2023.

Certain instruments, such as the Paris Agreement,[5] are steadily contributing to the creation of an international law framework with regard to sustainability.

However, private actors involved in multiple jurisdictions, such as those of the agricultural Global Value Chains (GVCs), require a more comprehensive normative framework aimed at supporting sustainable practices in order to satisfy the consumers' request for sustainable products and processes, and to preserve their reputation at the global level.

A sustainable agri-food value chain may be defined as "*the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed of after use, in a manner that is profitable throughout, has broad-based benefits for society and does not permanently deplete natural resources*".[6]

Actors in the GVCs adopted private law mechanisms, such as the inclusion of sustainability contractual clauses (SCCs) in contracts and the institution of certification regimes, which are aimed at ensuring compliance with sustainability standards in the GVC.

Furthermore, TPR can also function as a gap filler in relation to public regulation regarding non-compliance, including enforcement and sanctioning, by addressing legitimacy and accountability.[7]

The above-mentioned private law mechanisms enhance the level of integration in the GVC. In such a context, multi-party contracts come into play as a resourceful tool for the implementation of sustainability standards and the promotion of innovative sustainable practices among suppliers of the GVC.

The evaluation of the role of private regulation of sustainability through multi-party contracts provides with the chance to rethink the traditional contract theory, based on the principle of privity of contract, in order to accommodate the contractual tendencies in the agri-food multi-party agreements. The building of a "sustainable contract law"[8]

[5] The Paris Agreement is an international treaty on climate change. It was adopted by 196 parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. Its long-term goal is to hold "*the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels*".

[6] FAO, Developing sustainable food value chains-Guiding principles (Rome, 2014) 6.

[7] Fabrizio Cafaggi, 'A Comparative Analysis of Transnational Private Regulation: Legitimacy, Quality, Effectiveness and Enforcement' (2014) 15, EUI Department of Law Research Paper <https://cadmus.eui.eu/bitstream/handle/1814/33591/LAW_2014_15.pdf?sequence=1&isAllowed=y> accessed 9 July 2023.

[8] Mauro Pennasilico, 'Sviluppo sostenibile, legalità costituzionale e analisi "ecologica" del contratto' (2015) 1 Persona e Mercato 37 <http://www.personaemercato.it/wp-content/uploads/2015/05/Pennasilico.pdf> accessed 9 July 2023.

should develop from a new concept of contractual justice, in which the privity of contract is mitigated by the principles of fairness[9] and social usefulness.

With regard to the nature of SCCs, it should be questioned whether immaterial process-related qualities belong to the notion of quality. Here, Italian law and the United Nations Convention on Contracts for the International Sale of Goods (CISG) will be considered.

Indeed, businesses are called to enhance their Corporate Social Responsibility (CSR) and to further engage with the Sustainable Development Goals (SDGs)[10] in order to protect their reputation at the global level.

It could be argued that such a reputational profile has a market value which relates to each supplied product and service. Following this reasoning, it may be inferred that the violation of SCCs manifests itself in a product's lack of quality.

## 2 The global need for a "sustainable agriculture"

The TPR of sustainability in the agri-food value chain responds to the global need for a "sustainable agriculture".

In order to understand this idea, we should start focusing on the concepts of food security and, subsequently, of food safety.

The concept of food insecurity is related to poverty rather than to food scarcity.[11] The phenomenon of poverty in agriculture is explained by the conditions of small farmers, whose livelihoods have been undermined. Subsequently, biodiversity has been impaired. In fact, the planet's diverse plant and animal species are safeguarded by small-scale farmers.[12]

Closely related to the concept of food security is the concept of food safety (i.e. the need for a product which does not damage human health), which started to come into play as a justification for protectionist technical barriers to trade in the aftermath of the globalisation of the economy.[13]

[9] Paulo Nalin, 'International Fair Trade (Fair Trade in International Contracts and Ethical Standard)', in Ingeborg Schwenzer (ed), *35 years CISG and Beyond*, (Eleven International Publishing 2016) 325.
[10] UN GA A/RES/70/1, 'Transforming our world: the 2030 Agenda for Sustainable Development' (New York, 25 September 2015) <https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf> accessed 10 July 2023.
[11] See generally Amartya Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation* (Oxford University Press 1990); Olivier de Schutter, 'International Trade in Agriculture and the Right to Food' (2009) 46 Dialogue on Globalization Occasional Papers.
[12] Miguel Altieri, 'Linking Ecologists and Traditional Farmers in the Search for Sustainable Agriculture' (2004) 2 (1) Frontiers in Ecology and the Environment 35.
[13] Antonio Jannarelli, 'Il diritto agrario del nuovo millennio tra food safety, food security e sustainable agriculture' (2018) 97 (4) Rivista di Diritto Agrario 511, 556.

At the same time, the development of "global food value chains"[14] connected to the industrialisation of the agricultural sector triggered the birth of a so-called "private food law"[15] governed by the "Tripartite Standards Regime", and characterised by "quality standards", certification, and accreditation activities.[16] As a consequence, soft law barriers to trade also contributed to the burdening of the circulation of agricultural products to the detriment of small producers and less developed countries.[17]

Furthermore, the industrialisation of the agricultural sector, together with the use of monocultures, caused the production of negative externalities such as the depauperation of the soil and the development of increasingly aggressive diseases for plants and animals.[18] Biodiversity has further suffered from this, and the entire planet has been depauperated.[19] Last but not least, the stability of the climate has also been affected.[20]

In such a context, the issues related to food safety and food security have had to be faced through the lens of sustainable development, which naturally also involves the agricultural sector.[21]

As mentioned above, the concept of "sustainable development" has been introduced by the Brundtland Report. Following that, in 2015, all UN Member States adopted the 2030 Agenda for Sustainable Development (2030 Agenda) which includes 17 Sustainable Development Goals ("SDG").[22] In this regard, SDGs 1 and 2 aim at fighting, respectively, poverty and hunger.

As was made evident by SDG 2,[23] food security and sustainable agriculture are deeply intertwined. Furthermore, food production requires a healthy environment, which depends on the protection of marine and terrestrial ecosystems (SDG 14, Life below Water, and SDG 15, Life on Land), and action to combat climate change (SDG 13, Climate Action). SDG 5, Gender Equality, also contributes to the achievement of SDG 2, as women are responsible of producing 50% of the world's food.[24]

[14] Maria Emilia Cucagna and Peter D Goldsmith, 'Value-adding in the Agri-food value chain' (2018) 21 (3) The International Food and Agribusiness Management Review 293.
[15] Bernd MJ Van der Meulen, '*Private Food Law: Governing Food Chains Through Contracts Law, Self-regulation, Private Standards, Audits and Certification Schemes*' (Wageningen Academic Publishers 2011).
[16] Antonio Jannarelli (n 13)
[17] Johan Swinnen and others, *Quality Standards, Value Chains, and International Development: Economic and Political Theory* (1st edn,Cambridge University Press, 2015); Jannarelli (n 13) 519.
[18] Jannarelli (n 13) 550.
[19] ibid.
[20] Bruce M Campbell and others, 'Urgent action to combat climate change and its impacts (SDG13): transforming agriculture and food systems' (2018) 34 Current Opinion in Environmental Sustainability 13.
[21] Antonio Jannarelli (n 13) 548.
[22] United Nations (n 10).
[23] *Goal 2 - "End hunger, achieve food security and improved nutrition and promote sustainable agriculture"*.
[24] UN GA, A/70/287, Interim Report of the Special Rapporteur on the Right to Food (5 August 2015) <https://www.ohchr.org/sites/default/files/Documents/Issues/Food/A-70-287.pdf> accessed 10 July 2023 para 35.

The European legislator recognised the need for a sustainable agriculture.[25] The new Common Agricultural Policy (CAP), which came into effect on 1 January 2023, takes into account the challenge of balancing food security with protecting nature and safeguarding biodiversity. In particular, the new CAP indicates the climate and environmental objectives as a priority for the States' strategic plans and points out the need to promote sustainability and modernity in terms of a global vision and therefore, in conformity with economic, social, environmental, and climatic sustainability.

The new CAP contributes to the objectives set by the European Green Deal, a set of policy initiatives presented by the European Commission which are aimed at making the European Union climate neutral in 2050. As part of the European Green Deal, the Farm to Fork strategy addresses the issue of food sustainability with the goal of making food systems fair, healthy, and environmentally friendly. Furthermore, the Farm to Fork Strategy incentivises the transition to a sustainable food system by means of new technologies and scientific discoveries.

In line with the above-mentioned normative framework, in 2021 the European Parliament and Council of the EU adopted an antitrust exemption in Article 210a of Regulation (EU) 1308/2013 for certain "sustainability agreements" in the agri-food supply chain.

## 3 Private regulation of sustainability and promotion of innovation in the agri-food Global Value Chain

The phenomenon of TPR in the GVC has clearly involved the agricultural supply chain,[26] which is notably characterised by the coordinated action of multiple actors operating in different jurisdictions.

TPR may be defined as a body of rules, practices, and processes which are made, either autonomously or by implementing delegated powers conferred by international law or by national legislation, primarily by private actors, firms, Non-Governmental Organisations (NGOs), or independent experts, such as technical standard setters and

[25] Antonio Jannarelli, 'Agricoltura sostenibile e nuova PAC: problemi e prospettive' (2020) 99 (1) Rivista di Diritto Agrario 23; Stefano Masini and Vito Rubino (eds), *La sostenibilità in agricoltura e la riforma della PAC* (Cacucci 2021); Irene Canfora and Vito Leccese, 'La condizionalità sociale nella nuova PAC (nel quadro dello sviluppo sostenibile dell'agricoltura)' (2022) 460 WP CSDLE "Massimo D'Antona".

[26] Kaisa Sorsa and others, 'Transnational private regulation, system level innovations and supply chain governance in the coffee sector: Evidence from Brazil, Italy and Finland' (2016) 224 Reports from Turku University of Applied Sciences 206and ff.; 'Codice Etico Per La Sostenibilita' Sociale E Ambientale Della Filiera Del Pomodoro Da Industria Del Bacino Del Centro Sud Italia' (30.01.2020) available at <https://oipomodorocentrosud.it/codice-etico/> accessed 13 July 2022; Barbara Pancino and others, 'Partnering for sustainability in agri-food supply chains: the case of Barilla Sustainable Farming in the Po Valley' (2019) 7 (13) Agricultural and Food Economics.

epistemic communities.[27] The definition of TPR includes rule-making, monitoring, and enforcement.[28]

Overall, TPR of sustainability is related to a large number of firms rather than to individual entities, and underlines the role of process rather than product regulation.[29]

TPR of sustainability is carried out through environmental, social, and economic provisions.[30] Provisions for environmental protection include, among others, the use of environmental principles (e g polluter pays, prevention, and precautionary principle), the introduction of greenhouse gas emissions mitigation, the control of soil and water contamination, energy saving, appropriate waste disposal, and the setting up of environmentally friendly logistics.[31] As for the social component provisions, these often relate to child labour, working hours, freedom of association, and collective bargaining.[32] A GVC is generally considered sustainable, from an economic point of view, when the activities carried out by each actor are commercially viable and profitable.[33] In this regard, the common objectives pursued are optimisation of the inputs, better production valorisation (quality and quantity), and transaction cost reduction for farmers.

As we will see, private initiative also plays a significant role in the promotion and diffusion of innovative sustainable practices among suppliers of the GVC.

### 3.1 Voluntary Sustainability Standards as a form of Transnational Private Regulation

As a new regulatory form, an increasingly growing set of initiatives in the area of sustainability is represented by Voluntary Sustainability Standards (VSS), which are set voluntarily by wholesalers and retailers to obtain certain social and environmental standards. Compliance with these standards is ensured through certifications and labels.[34] Such standards and criteria are created by private sector actors – companies, business and industry associations, or NGOs – and are defined by their non-mandatory and private character, as well as by their process-based approach and other criteria

[27] Fabrizio Cafaggi, 'New Foundations of Transnational Private Regulation' (2011) 38 (1) Journal of Law and Society 20, 49.
[28] Ibid.
[29] Fabrizio Cafaggi, 'Regulation through contracts: Supply-chain contracting and sustainability standards' (2016) 12(3) European Review of Contract Law 218.
[30] United Nations (n 10). In the field of agriculture the definition provided by SAFA Guidelines issued by FAO <https://www.fao.org/3/i3957e/i3957e.pdf> accessed 12 August 2022, version 3.0, 2014.
[31] For example, see Codice Commerciale Ferrero <https://www.ferrero.it/Codice-di-Condatta-Commerciale> accessed 18 July 2023.
[32] Fabrizio Cafaggi (n 29) 225.
[33] FAO (n 6).
[34] Matteo Fiorini and others, 'Voluntary Standards, Trade, and Sustainable Development' in Cosimo Beverelli, Jürgen Kurtz and Damian Raess (eds), *International Trade, Investment, and the Sustainable Development Goals: World Trade Forum* (Cambridge University Press 2020) 177.

(such as gender equality) which make them so-called credence goods.[35] An example of VSS that is relevant for the purposes of the present analysis is the GlobalG.A.P.,[36] a farm assurance programme and certification scheme that transposes consumer requirements into Good Agricultural Practices.

It can be asserted that VSS may be a tool for economic development and achievement of the SDGs.[37] With regard to this, the 2018 United Nations Forum on Sustainability Standards (UNFSS) report[38] identified three SDGs where the contribution of VSS have had a major impact: SDG 8 (promote decent work and economic growth), SDG 12 (ensure sustainable consumption and production patterns), and SDG 15 (promote environmental sustainability and protect life on land).

### 3.2 Sustainability provisions in private contracts

Contracts represent one of the means for the implementation of sustainability standards on the private level.

The inclusion of regulatory provisions may also be associated with reference to one or more certification schemes,[39] which prominently refer to process standards[40]. Furthermore, commercial contracts may incorporate codes of conduct with the aim of including CSR policy in their terms. From such incorporation, their binding character is inferred.[41]

It is worth noting that the topic of sustainability and CSR are deeply intertwined. In particular, corporate regulation of sustainability may be considered a spin-off of a CSR action plan. Indeed, codes of conduct have come to be a means of auto-discipline for the management of risks related to the impact that business activities can have on individual people and on the environment. The term 'ethics code' was then duly acquired in order to distinguish from codes of conduct, which are more related to the organisation of the company.[42]

[35] ibid.
[36] GlobalG.A.P., General Regulations (February 2019). <https://www.globalgap.org/.content/.galleries/documents/190201_GG_GR_Part-I_V5_2_en.pdf> accessed 9 July 2022.
[37] Matteo Fiorini and others (n 34).
[38] Santiago Fernandez de Cordoba and others (eds), 'Voluntary Sustainability Standards, Trade and Sustainable Development: 3rd Flagship Report of the United Nations Forum on Sustainability Standards (UNFSS)' (2018) <https://unfss.org/wp-content/uploads/2018/09/UNFSS-3rd-Flagship-Report-FINAL-for-upload-1.pdf> accessed 9 July 2023.
[39] Fabrizio Cafaggi, 'The Regulatory Functions of Transnational Commercial Contracts: New Architectures' (2013) 36 Fordham International Law Journal 1557.
[40] ibid 1603.
[41] Anna Beckers, 'Towards a Regulatory Private Law Approach for CSR Self- Regulation? The Effect of Private Law on Corporate CSR Strategies' (2019) 27(2) European Review of Private Law 221.
[42] Giuseppe Conte, 'Codici etici e attività d'impresa nel nuovo spazio globale di mercato', (2006) 1 Contratto e impresa 108; Giuseppe Conte, 'La disciplina dell'attività di impresa tra diritto, etica ed economia', in Giuseppe Conte (ed), *La responsabilità sociale dell'impresa* (Editori Laterza 2008) 3; Serenella Rossi, 'Luci e ombre dei codici etici d'impresa'(2008) 1 Rivista di diritto societario 23; Carlo Angelici, 'Responsabilità sociale di impresa, codici etici e

In the present analysis, sustainability clauses are considered to be contractual provisions that are not directly related to the subject matter of the contract and that "*prescribe minimum social and/or environmental standards to be upheld by contractual parties when performing their business activities*".[43]

The forms of sustainability clauses may be manifold. These can be included in contracts as express contractual provisions or incorporated by reference into one or more documents, such as general terms and conditions, a corporate code of conduct[44] or other internal policy, a global CSR initiative, or a separate agreement,[45] or a framework agreement.

The content of sustainability clauses may be related to environmental standards, fair commercial practices,[46] employment conditions, health and safety standards, human rights, and business ethics issues.

Sustainability obligations may also include the obligation to hold a human rights and environment due diligence policy that is consistent with international standards by prescribing the specific content of such policy that may encompass, among the other points, specification of salient human rights and environmental risks that the party has identified in its human rights and due diligence analysis.[47]

A relevant aspect that forms the private regulation discourse, and that therefore also applies to TPR of sustainability through contracts, is the impact of private regulatory strategies on the structures of GVCs. It has been shown that the regulatory strategy is an independent variable, capable of affecting the structure of the chain and its inner contractual relationships. At the same time, the chain's structure influences, or should influence, the choice of regulatory strategy by private actors.[48]

It is worth noting that sustainable sourcing has effectively changed the structure of supply chains by shortening them and enhancing the level of collaboration between

autodisciplina', (2011) 38(2) Giurisprudenza Commerciale 159; Francesca Degli Innocenti, *Rischio di impresa e responsabilità civile. La tutela dell'ambiente tra prevenzione e riparazione dei danni*, (FUP - Firenze University Press 2013).

[43] Kateřina Peterková Mitkidis, 'Using Private Contracts for Climate Change Mitigation', (2014) 2(1) Groningen Journal of International Law: International Energy and Environmental Law 54. See also Pace University School of Law and IACCM report 'The Triple Bottom Line: The Use of Sustainability and Stabilization Clauses in International Contracts' (2010), 24; Kateřina Peterková Mitkidis, 'Sustainability Clauses in International Supply Chain Contracts: Regulation, Enforceability and Effects of Ethical Requirements, (2014) 1 Nordic Journal of Commercial law 1.

[44] Louise Vytopil, 'Contractual Control and Labour-Related CSR Norms in the Supply Chain: Dutch Best Practices' (2012) 8(1) Utrecht Law Review 155; 'Codice Etico Per La Sostenibilita' Sociale E Ambientale Della Filiera Del Pomodoro Da Industria Del Bacino Del Centro Sud Italia' (n 26).

[45] Kateřina Peterková Mitkidis *Sustainability Clauses in International Business Contracts* (Eleven Publishing 2015) 155.

[46] GlobalG.A.P. (n 36).

[47] Commission, 'Proposal for a Directive for Corporate Sustainability Due Diligence' COM(2022) 71 final 23 February 2022. See also Livia Ventura, 'Supply chain management and sustainability: the new boundaries of the firm' (2021) 26 (3) Uniform Law Review 599.

[48] Fabrizio Cafaggi (n 39) and Fabrizio Cafaggi and Paola Iamiceli, 'Private regulation and industrial organization: contractual governance and the network approach', in Stefan Grundmann, Florian Möslein and Karl Riesenhuber (eds), *Contract Governance. Dimensions in law and interdisciplinary research* (Oxford University Press 2015) 343.

chain leaders and suppliers.[49] The level of vertical integration of the firms impacts the modes of sustainability implementations and, consequently, the relationships between firms.[50] It has been noted that more effective collaboration among segments of the chain located in multiple jurisdictions is required by the regulatory function in GVCs.[51] Moreover, the connection between sustainable sourcing and governance of the supply chain affects the allocation of responsibility for monitoring contractual obligations that deal with sustainability standards.[52]

It follows that the implementation of sustainability standards through contracts is able to increase the level of interdependence between firms and to enhance the degree of collaboration between actors in the GVC. Such interdependence calls for contractual arrangements characterised by a high level of coordination in the design and implementation of the contracts which, as we will see, is offered by multi-party contracts.

### 3.3 Promoting sustainability in agriculture through innovation: the role of multi-party licensing agreements

Multi-party licensing agreements represent a resourceful means of enabling the diffusion of innovative practices among suppliers of the GVC. Innovative practices, which are protected by intellectual property rights (IPRs), can ultimately lead to a more efficient implementation of sustainability standards.

Innovation and sustainability are deeply intertwined. IPRs notoriously serve the purpose of incentivising investments in new technologies. An example thereof is offered by contemporary crop genetic improvements, which are largely the results of private investments in research and development in both conventional breeding and plant biotechnology.[53]

Such a phenomenon therefore also involves the agricultural sector. Not surprisingly, the World Intellectual Property Organization (WIPO) took into account the SDGs in its "Development Agenda".[54]

Empirical studies in the Middle East and North Africa (MENA) regions show how digital agriculture represents a promising tool for addressing key challenges affecting the agri-food sector across the MENA countries, to the extent that it facilitates improvements in

[49] UNEP, 'Sustainability of supply chains and sustainable public procurement - a pre study' (30 June 2014) 23.
[50] Fabrizio Cafaggi (n 29) 226.
[51] Fabrizio Cafaggi and Paola Iamiceli, 'Contracting in global supply chains and cooperative remedies' (2015) 20(2-3) Uniform Law review 135.
[52] Fabrizio Cafaggi (n 29) 220.
[53] Jay P Kesan, 'Intellectual Property Protection and Agricultural Biotechnology: A Multidisciplinary Perspective', (2000) 44 (3) American Behavioral Scientist 464; Mark D Janis, 'Sustainable Agriculture, Patent Rights, and Plant Innovation' (2001) 9 Indiana Journal of Global Legal Studies 91.
[54] WIPO, Development Agenda (adopted by WIPO's member states in 2007) <www.wipo.int/ip-development/en/agenda/> accessed 10 July 2023.

primary production, supply chain and logistics performance, and also optimises the use of scarce natural resources.[55]

With regard to this, multi-party contractual schemes allow suppliers belonging to the same supply chain to adopt IPRs plurilateral licences. Furthermore, contractual networks may promote the setting up of platforms for the sharing of IPRs through licenses offered by the suppliers of the same supply chain, or by suppliers of different chains.[56]

Therefore, in terms of innovation, contractual networks are suited to the promotion of collaborative practices.

## 4 Incorporation of sustainability clauses in agricultural multi-party contracts

The consideration of SCCs in multi-party contracts enables an understanding of the quintessential effects of such clauses, which is to increase the level of interdependence and need for coordination among the actors of the GVC. In this regard, multi-party contracts come into play as a more suitable alternative to bilateral contracts. However, the intrinsic nature of multi-party contracts requires a redefinition of contract theory. In this respect, a definition of multi-party contracts is provided, and forms of multi-party contracts are presented. Finally, the legal nature of SCCs is investigated. To this end the possibility to qualify SCCs as immaterial qualities is explored both under the CISG and Italian law.

### 4.1 Definition of multi-party contracts

The present analysis aims at establishing a definition of multi-party contracts in terms of a comparative as well as transnational law perspective. For the purpose of the present analysis, multi-party contracts aiming at the creation of a new legal entity (ie a company, an association, etc.) will not be considered.

Multi-party contracts are characterised by the fact that for the conclusion of the contract, declarations of intent from more than two parties are required.[57] Furthermore, in multi-party contracts the principle of contract relativity is not fully operational.[58] In fact, without prejudice to the single claims against specific contractual parties, an agreement for the execution of the contract binds all contractual parties representing a

[55] Rachel A Bahn and others, 'Digitalization for Sustainable Agri-Food Systems: Potential, Status, and Risks for the MENA Region' (2021) 13 (6) Sustainability 3223.
[56] UNCITRAL Colloquium and WG I (MSMEs), 32nd New York, 25-26 March 2019, "Contractual networks in the third millennium: Transnational principles", Presentation by Fabrizio Cafaggi <https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/EN/Colloquia/cafaggi.pdf> accessed 10 July 2023).
[57] Michale Zwanzger, *Der mehrseitige Vertrag*, (Mohr Siebeck 2013).
[58] ibid 39, 434.

common general ground of the multi-party contract.[59] The agreement for the execution of the contract encompasses the schedule of duties applicable to all of the parties.[60] In particular, it encompasses first of all the accessory obligation to refrain from any action that could compromise the execution of the contract (cfr. Article 241 Paragraph 2 of the German Civil Code).[61] Sustainability clauses may be regarded as part of the schedule of duties under consideration of the reputational implications that their violation have for all members of the GVC. In particular, the respect of sustainability clauses is prodromic to the single obligations between the parties of the multi-party contract. This conclusion, as we will see in paragraph 5, is relevant for the analysis of the legitimation to enforce such clauses.

A possible way to characterise multi-party contracts is also to look at their functions. It has been noted that in multi-party contracts, the coordination function is of particular significance. In fact, the purpose of designing a contractual regulation through a multi-party contract instead of multiple bilateral contracts lies in the need to stabilise the behavioural expectations of *all of* the participants.[62] In this respect, multi-party contracts may fall into the following categories: i) simply coordinating contracts (characterised by the obligation of the parties to take or to refrain from a certain action without an objective service performance being involved); ii) framework contracts; iii) service procurement contracts; iv) partition agreements; v) contracts on the exchange of parties; vi) settlement agreements; or vii) contracts with neutrally participating parties (in which so-called participating parties do not undertake any obligation nor acquire any right).[63]

In some jurisdictions, multi-party contracts have a so called "common objective" (cfr. Article 1420 of the Italian Civil Code). In such multi-party contracts, the plurality of the contracts implies that the conflicting interests of different parties shall unify themselves in a common finality. In fact, every contractual party obligates himself to all the others and acquires rights with regard to all the others. The cooperation towards a purpose — a common objective — is therefore natural. The common objective itself involves a communion of shared interests between the parties which survive, notwithstanding possible conflicting interests between the parties.[64] In particular, the common objective lies in the organisation of the common additional activity. In fact, the function of the multi-party contract is not exhausted through the execution of parties' obligations (such as in other contracts). The execution of parties' obligations constitutes the premise for

[59] ibid 73 ff and 434.
[60] ibid 79.
[61] ibid 80.
[62] ibid 39.
[63] ibid 40 ff.
[64] Tullio Ascarelli, 'Il contratto plurilaterale', (1949) 9-10 Saggi giuridici 410, now in Tullio Ascarelli, *Studi in tema di contratti*, (Giuffrè 1952) 115.

further activity, whose realisation in turn constitutes the purpose of the contract.[65] In this regard, it should be noted that the presence of a common objective does not require the absence of a conflict of interests and the possibility that the parties pursue their own interest in addition to the common objective.[66]

Multi-party contracts having a "common objective" can then be separated into the categories of external multi-party contracts (company, association, etc.) – which, as mentioned, do not form part of the present analysis – and internal multi-party contracts (cartels, consortia agreements without external activity, etc.). In this second category, the so-called normative multi-party contracts hold particular relevance. These are characterised by the fact that the parties establish the terms according to which future contracts will (or will not) be concluded between themselves or with third parties, without necessarily creating a common organisation and/or foreseeing additional common activity.[67] As we will see in paragraph 5, the enforcement of multi-party contracts having a common objective is subject to peculiar rules on termination under Italian law.

### 4.2 Forms of multi-party contracts

The agri-food GVC is characterised by multiple forms of contractual patterns that involve a various array of actors, which are not limited to producers and buyers. Ventures that take place in the agri-food GVC may be both horizontal and vertical.

Examples of multi-party contractual arrangements in the agri-food GVC may be identified in contract farming agreements, consortium contracts, and contractual networks. These evidence the relationship between private regulation of sustainability and the topic of coordination in the GVC.

In general terms, contract farming purposes are:

i) to allow farmers to access credit to modernise their productive structures in order to make them suitable for the specific needs of industrial processes;

ii) to transfer knowledge about contemporary manufacturing processes to farmers;

iii) to shape farmers' productive choices on the real needs of final consumers.[68]

From their side, farmers commit themselves to providing a specific commodity in quantities and at quality standards determined by the purchaser. On the other hand, agro-industrial firms' obligation is to purchase the commodity at agreed-upon prices and

[65] ibid 114.
[66] Fabrizio Cafaggi, *Il contratto di rete. Commentario*, (Il Mulino, 2009) 27. The Author quotes Tullio Ascarelli, *I consorzi volontari tra imprenditori* (Giuffrè 1937).
[67] Tullio Ascarelli (n 64) 146.
[68] Antonio Jannarelli, 'Contractual relationships and inter-firm cooperation in the agri-food system', (2011) 5(4) Rivista di diritto alimentare.

to provide inputs (seed, fertilizers, and pesticides) or credit or technical advice (extension services) to the farmer.[69]

In this respect, multi-party contracts may facilitate the multi-functionality of contract farming by involving financial and insurance institutions[70] and having as an object the coordination of diverse aspects such as input supply, financing, and purchasing in the production segment of the GVC. Moreover, multi-party agreements serve the purposes of coordinating value chain activities.

Internal consortia constitute a prominent example of horizontal forms of multi-party contractual collaboration.

Under Italian law, consortia fall into the category of multi-party contracts having a "common objective" (see above in sub-paragraph 4.1). Through a consortium contract,[71] multiple businesses create a common organisation in order to impose discipline on or perform selected phases of their respective enterprises. Consortia agreements shall be stipulated in writing and shall indicate the object and duration of the consortium, the obligations and contributions of members, the cases of withdrawal, and exclusion. Internal consortia are those in which participants regulate their activities and the phases of the member firms; they don't have legal personality nor patrimonial autonomy.

Contractual networks constitute an example of both vertical and horizontal forms of multi-lateral contractual collaboration depending on how they are designed. These may be defined as a form of cooperation and collaboration between interdependent firms.

Networks of firms can have a contractual, organisational, or combined form. A variant of contractual network is characterised by the creation of a new company with the preservation of the original firms' own legal and economic independence at the same time.[72] It is worth mentioning that clusters differ from contractual networks by virtue of the territorial concentration which characterises them.[73] Namely, clusters are characterised by the absence of ownership linkages and by the territorial proximity between members, which fosters trust among participants.

For the purposes of the present analysis, only contractual networks that do not create a new entity will be considered.

Contractual networks may take the form of multi-party contracts.[74] In particular, multi-party contracts take the form of networks when "*the level of interdependence*

[69] ibid.

[70] See as an example a multipartite contract for seed cotton growing in Kenya involving a farmer, a bank, three companies, Cotton Development Authority, and the National Irrigations Board (8 December 2014) <https://www.fao.org/in-action/contract-farming/toolkit/contract-links/en/> accessed 12 August 2022.

[71] Articles 2602 ff. of the Italian Civil Code.

[72] Fabrizio Cafaggi, 'Introduction', in Fabrizio Cafaggi (ed), *Contractual networks, Inter-firm Cooperation and Economic Growth* (Edward Elgar 2011) 1.

[73] Ibid 7.

[74] Fabrizio Cafaggi, 'Contractual Networks and the Small Business Act: Towards European Principles?', (2008) 15 EUI Working Papers LAW <https://cadmus.eui.eu/handle/1814/8771> accessed 9 July 2023; Fabrizio Cafaggi (n 72) 201-202; the need for a harmonised approach to contractual networks has been explored at a colloquium organised by the

*among performances is such that the contract is not easily divisible and the purpose would be frustrated if one party does not or cannot perform and cannot be substituted*"[75].

Multi-party contracts shall not be considered as an extension of bilateral contracts based on the fact that they often deal with complex projects that involve joint or at least coordinated activities of multiple actors. Such contracts require the collaboration of the different players in order to define implementation strategies which could not be determined *ex ante*.[76]

Contractual networks may be defined as "*modes of organizing economic activities that bind formally independent firms who are more or less economically dependent upon one another through stable relationships and a complex reciprocity that is more cooperative than competitive in form*."[77] Key features of contractual networks are i) interdependence, ii) stable relationships, iii) long-term duration, iv) multiplicity of relationships – both formal and informal – between the members, and v) a combination of cooperation and competition.[78] The interdependence also concerns the strategic decisions that will affect the network as a whole and implies a common set of objectives to be achieved among all participants, together with the fact that one contract or contractual performance is made dependent on others either unilaterally or reciprocally.[79]

Networks are characterised by multi-laterality, as well as by the relational and symbiotic character of the contractual relations between the parties.[80] The achievement of the purpose of the networks is made possible by the interaction, interdependence, and cooperation, both of members who are contractually bound to one another and members who are not immediate contractual parties.[81]

Cooperation is deemed to generate the contractual surplus that will be divided among the members of the network. Contractual networks embody a view of contract law according to which contractual relationships can encompass both a cooperative and a competitive dimension.[82]

United Nation Commission on International Trade Law (UNCITRAL), held in New York on 25-26 March 2019, See UNCITRAL A/CN.9/991, Report of the Colloquium on contractual networks and other forms of inter-firm cooperation (2019).

[75] Fabrizio Cafaggi (n 72) 88.

[76] UNCITRAL (2019) (n 74).

[77] Gunther Teubner, *Networks as Connected Contracts*, (Hart 2011) 92. Teubner borrows this definition from Jorg Sydow, *Strategische Netzwerke: Evolution und Organisation*, (Gabler 1992) 82.

[78] Paola Iamiceli, 'Le reti di imprese: modelli contrattuali di coordinamento', in Fabrizio Cafaggi (ed), *Reti di imprese tra regolazione e norme sociali*, (Il Mulino 2004) 125.

[79] Fabrizio Cafaggi (n 74).

[80] Ulješa Grušić, 'Contractual Networks In European Private International Law' (2016) 65(3) International and Comparative Law Quarterly 581.

[81] ibid.

[82] Fabrizio Cafaggi (n 72) 10.

What comes into play in contractual networks is the shared interest in the existence and success of the network. The question then arises as to whether modifications to general contract law are requested in order to give consideration to the multi-party structure of various contracts. In this respect, the available legal instruments are manifold. For instance, an alignment of the remedies of the parties to the various contracts in the chain may be foreseen. An alternative is the allowance of a direct claim within a chain in derogation of the general principle of privity.[83]

Under Italian law, contractual networks are governed by Decree Law (d.l.) No 5/2009, converted into Law n. 33/2009, which indicates as possible members of contractual networks those qualifying as entrepreneurs (ie subjects professionally selling goods and/or providing services). Article 3 Paragraph 4-ter of d.l. 5/2009 provides that with network contracts, multiple entrepreneurs pursue the objective to increase, individually and collectively, their innovative capacity and competitiveness in the market, and to this end they commit, on the basis of a common network programme, to collaborating in predetermined forms and fields relating to the exercise of their enterprises or to exchange information or performances of industrial, commercial, technical, or technological nature, or to commonly exercise one or more activities falling into the object of their enterprise. The contract can also foresee the establishment of a common patrimonial fund and the appointment of a common body charged with the management, in the name and on behalf of the participants, of the execution of the contract, or of single parts or phases of the same. Such contractual network has no juridical personality unless this has been acquired pursuant to the last part of Paragraph 4-quater of Article 3 of d.l. 5/2009.

With regards to network contracts, it is possible to identify a partially different legislative treatment in case agricultural enterprises participate to the network or in case the network trades agricultural products (cfr. Article 17 of Law 154/2016; Article 36 of d.l. 179/2012).[84]

Under Italian law network contracts characterise themselves as being plurilateral contracts with a common objective and, at the same time, as having an exchange function.[85]

Common features of contractual arrangements in the GVC are the interdependence between contracts and the chain leader's power of intervention for the completion of contracts, either by direct intervention or by promotion of chain negotiations among

[83] Stefan Grundmann and others (n 48) 15.
[84] Nicola Lucifero, 'Le reti di impresa e le relazioni di filiera nel sistema della filiera agroalimentare' (2021) 2 Diritto agroalimentare 355; Luigi Russo, 'Il contratto di rete tra imprenditori agricoli: un passo avanti e due indietro?' (2017) 3 Diritto agroalimentare 527; Luigi Russo, 'Il contratto di rete in agricoltura' (2015) 1 Rivista di diritto civile 181.
[85] Raffale Lenzi, 'Forma e pubblicità del contratto di rete' (Vincenzo Cuffaro ed, *Contratto di rete di imprese*, Giuffrè 2016) 79, 80.

parties.[86] The interdependence between contracts has been fostered by the increasing importance of chain compliance with, among the other factors, sustainability standards.[87] Such interdependence requires coordination in the design and implementation of the contracts.[88] The result is the limitation of the freedom of contract for the chain's participants.[89] Moreover, centralisation can lead to abuse in contract design and or implementation.[90] Lead firms, as mentioned, fill the gaps of contracts when these are incomplete. It follows that their bargaining power is higher and therefore not equally distributed among the actors in the chain. As a consequence, unequal distribution of bargaining powers has an impact on terms, both price and non-price, among multiple relationships within the chain.[91] The tension between coordination of contracting and preservation of uniformity on one side and protection of freedom of contract for the chain's participants on the other marks the contractual relationships in the value chain.[92] The outcome of such tension influences the evaluation of the fairness of the exercise of coordination power.[93] As we will see in sub-paragraph 4.6, it follows that the evaluation of fairness should refer not only to the single contract, but to the whole process of contracting in the chain, given that the private regulatory power is exercised by the chain leader, who is technically a third party.[94]

### 4.3 The anatomy of sustainability clauses

For the purposes of this sub-paragraph, it is important to preliminarily clarify the reason why in the present analysis, sustainability clauses have been considered in the context of agricultural multi-party contracts. Indeed, agricultural supply chain contractual relationships, as seen above, show very clearly the peculiar tendencies of contract practice in the supply chain and, in particular, those related to the objective of achieving sustainability goals. Such tendencies may be summarised as the relational and organisational nature of contracts, the presence of third party beneficiaries, the need for a fair allocation of responsibility to monitor contractual obligations dealing with sustainability standards, and the role of reputation for all actors of the supply chain. These tendencies require a rethinking of contract theory, with the additional aim of protecting the purpose of the insertion of sustainability clauses into contracts.

[86] Fabrizio Cafaggi and Paola Iamiceli, 'The limits of contract laws. The control of contractual power in trade practices and the preservation of freedom of contract within agrifood global supply chains', in Fernando Gomez Pomar and Ignacio Fernandez Chacon (eds), *Estudios de Derecho Contractual Europeo*, (Aranzadi 2022), 3 <https://ssrn.com/abstract=4048571>, accessed 9 July 2022.
[87] ibid.
[88] ibid.
[89] ibid 5.
[90] ibid.
[91] ibid.
[92] ibid.
[93] ibid.
[94] ibid 6.

The building of a "sustainable contract law" shall develop from a new concept of contractual justice, based on the principles of fairness[95] and social usefulness. To this end, Article 41 of the Italian Constitution[96] mandates not only that private initiative cannot be in contrast with social usefulness, but also that the law shall provide appropriate programmes and controls so that public and private-sector economic activity may be oriented and coordinated for social and environmental purposes. This means that the privity of contract is mitigated by the social and environmental-protectionist function of private initiative.[97] The traditional concept of social justice under contract shall be reformed in order to include a notion of humankind that embraces both current and future generations.[98] This way, private autonomy will be suited for the traditional notion of sustainability which, as we have seen, is understood as the "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*"[99]. In fact, intergenerational justice "*is a specific variation of social justice and closely linked with environmental sustainability in both the theoretical discourse and practical application*"[100]. Therefore, the insertion of sustainability clauses in contracts not only constitutes the expression of the principle of the freedom of contract, but also aims at realising the objective of social justice as it is newly understood.

Sustainability clauses may be well detailed or instead, characterised by vagueness. An example of a vague sustainability clause could be the following:

"*The whole tobacco chain undertakes to constantly work to obtain, season after season, an excellent tobacco production in respect of the environment and of the people that work in it*".[101]

On the other hand, an example of a sufficiently detailed sustainability clause could be the following:

"*C. Improvement of the quality of the products and definition of minimum qualitative standards – protection of the environment*

[95] Paulo Nalin (n 9) 325.
[96] As newly reformed by Constitutional Law n. 1 dated 1 February 2022.
[97] With respect to the concept of social contractual justice, see Cristina Poncibò, 'The contractualisation of environmental sustainability', (2016) 12(4) European Review of Contract Law 335 where the Author affirms that "*the article endorses the idea of including environmental sustainability into the concept of social contractual justice*".
[98] Burns H Weston, 'The Theoretical Foundations of Intergenerational Ecological Justice: An Over-view', (2012) 34 (1) Human Rights Quarterly 251.
[99] World Commission on Environment and Development (chaired by Gro Harlem Brundtland), Our Common Future (n 2) 41.
[100] Poncibò (n 97) 339.
[101] Original version: "*Tutta la filiera si impegna a lavorare costantemente per ottenere, stagione dopo stagione, una produzione tabacchicola di eccellenza e nel rispetto dell'ambiente e delle persone che ci lavorano*", Accordo interprofessionale tabacco per i raccolti (2021-2023) 13. <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17187> accessed 12 August 2022.

*The "product" will have to comply with mercantile provisions currently in force for the production of "products" for energetic use, be healthy, loyal, mercantile and produced in respect of the environment.*

*Parties undertake to adhere to the system of traceability provided by DM 2 March 2010 as well as to treat the "products" in accordance with selection standards that promote the products with a higher energetic content.*

*Parties undertake to give priority to forms of purveying that belong to the regional territory. For extra-territorial purveying the parties undertake to respect the CO2 avoided emissions saving values established in the provision UNI/TS 11435 "Criteria for the sustainability of the energy production chains, warming and cooling from solid and gas biofuels from biomass".*

*Parties undertake to apply also to solid biomasses the minimum value of CO2 avoided emissions saving provided by Directive 2009/28/CE on the promotion of the use of energy produced by renewable sources specific for biofuels and bioliquids."* [102]

As we will see, the level of vagueness of the SCCs impacts their enforceability. In any event, a well drafted SCC should include the relevant sustainability objective, followed by a non-exhaustive list of conditions and requirements related to such objectives that have to be met.

### 4.4 Legal nature of sustainability clauses: immaterial qualities?

The main feature of sustainability clauses is that they are process-related. Namely, they relate to the process of production and not to the product itself. The question that arises is therefore whether the violation of such clauses results in a lack of quality of the product. It should be questioned whether immaterial process-related qualities belong to

[102] Contratto quadro Italian Bio Products SPA (2005) art. 3 lett. c. <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/8002> accessed 12 August 2022. Original version: "*C. Miglioramento della qualità dei prodotti e definizione di standard qualitativi minimi – tutela dell'ambiente. Il "prodotto" dovrà rispettare le norme mercantili attualmente vigenti per le produzioni di "prodotti" ad uso energetico, essere sano, leale, mercantile e prodotto nel rispetto dell'ambiente. Le Parti Aderenti si impegnano ad aderire al sistema di tracciabilità previsto dal DM 2 marzo 2010 nonché a trattare i "prodotti" secondo standard di selezione che valorizzino maggiormente i "prodotti" stessi a maggior contenuto energetico. Le parti si impegnano a dare priorità a forme di approvvigionamento che ricadono comunque nel territorio regionale. Per approvvigionamenti extra-regionali le parti si impegnano a rispettare i valori di risparmio delle emissioni evitate di CO2 stimate nella norma UNI/TS 11435 "Criteri di sostenibilità delle filiere di produzione di energia elettrica, riscaldamento e raffreddamento da biocombustibili solidi e gassosi da biomassa".*
*Le Parti concordano di applicare anche alle biomasse solide, il valore minimo di risparmio delle emissioni evitate di CO2 previsto dalla Direttiva 2009/28/CE sulla promozione dell'uso dell'energia prodotta da fonti rinnovabili specifico per biocarburanti e bioliquidi*". See also Accordo interprofessionale tabacco per i raccolti (2021-2023) Attachment 3 <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17187> accessed 12 August 2022.

the notion of quality. Here, the discipline of the United Nations Convention on Contracts for the International Sale of Goods (CISG) and Italian law will be considered.

A. CISG

With regard to the CISG, it should be verified whether the notion of quality under Article 35 (1) also encompasses immaterial process-related qualities. Case-law has recognised that the agreed origin of the goods also forms part of the quality features.[103] It could be argued that the origin of the product also comprises environmental, social, and ethical matters.[104] Indeed, the doctrine has recognised that the notion of quality includes, in addition to physical qualities, all actual and legal relationships that pertain to that between the product and the environment.[105] The notion of quality also includes respecting certain production standards, in particular good manufacturing practices, and ethics principles.[106]

Furthermore, in the case that the clause does not contain sufficient details to determine the requirements to be met in producing the goods, its violation may be regarded as non-conformity of the product to any particular purpose made known (expressly or in an implied manner) to the seller at the time of the conclusion of the contract (cfr. Article 35 Paragraph 2 b) CISG). For instance, the doctrine has affirmed that a particular purpose exists when the buyer is active in a market which gives particular emphasis to the fairness of the business and the respecting of ethics principles.[107] It follows that, in case of violation of an SCC, the reputational profile of the buyer would be affected. The further prerequisite laid down in Article 35(2)(b) CISG is that the buyer relied on the seller's skill and judgement and it was reasonable for him to do so.

B. Italian law

Under Italian law, the violation of sustainability clauses may be translated into a lack of quality of the product under Article 1497 of the Italian Civil Code. With regard to this, promised qualities are to be distinguished from essential qualities. Essential qualities relate to the substance, structure and measure of the things which are necessary for the normal use to which a product belonging to a certain *genus* is normally destined. Promised qualities are those atypical characteristics relating to a different use, or peculiar to the thing itself, or relating to the original use but to be carried out under certain conditions. Bianca, among other authors, considers both essential and promised

[103] Bundesgerichtshof (Germany), 3 April 1996, CISG-online 135, online at <http://www.cisg-online.ch/cisg/urteile/135.htm> accessed 12 August 2022.
[104] Ingeborg Schwenzer and Benjamin Leisinger, 'Ethical Values and International Sales Contracts', in Ross Cranston, Jan Ramberg, Jacob Ziegel (eds), *Commercial law challenges in the 21st century: Jan Hellner in memoriam*, (Iustus 2007) 267.
[105] Peter Schlechtriem and others, *Kommentar zum UN-Kaufrecht*,(CISG 7. Edition 2019), Article 35 Rn. 9.
[106] ibid; Ingeborg Schwenzer and Benjamin Leisinger (n 104) 267.
[107] Schlechtriem and others (n 105) Article 35 Rn. 18-23.

qualities to be related to the material characteristics of the good.[108] However, it is worth mentioning that in some case-law,[109] the categories of essential and promised qualities have been attributed to immaterial qualities. In particular, the hypothesis has been formulated, that there is a lack of essential qualities in the sale of shares of a company carrying out the indicated activity, but with a corporate asset not correspondent to the one guaranteed at the sale.[110] In particular, it has been specified that company shares constitute "second category" goods, in the sense that they are not completely distinct and separate from those included in the corporate assets, and are representative of the juridical positions of the shareholders in relation to the management and utilisation of those goods, which are functionally intended for the pursuit of the social activity.[111] It follows that the goods belonging to the assets of the company, being functionally intended for the pursuit of the social activity, cannot be considered completely extraneous to the sale contract of the shares.[112] The difference between the effective quantitative consistency of the social asset and that indicated in the contract has an impact on the solidity and productivity of the company, and consequently on the value of the shares, and can therefore constitute lack of essential qualities, which makes an action for termination admissible under Article 1497 of the Italian Civil Code.[113]

Similarly, it could be argued that the violation of sustainability clauses has an impact on the commercial value of the good, given that it affects the reputation of the company. The reputation of the company may be considered as a secondary good which is strictly connected with the commercial value of the product. In fact, the commercial value of the product not only depends on the physical characteristics but also on the reputation of the company, especially in case this operates in the supply chain. It follows that the violation of sustainability clauses may result in the lack of promised quality of the product and legitimate a termination action under Article 1497 of the Italian Civil Code.

There are further cases in which the immaterial qualities of the product have been recognised by Italian case-law as falling under the provision of Article 1497 of the Italian Civil Code. In particular, goodwill has been considered as an immaterial quality of the company which can be regarded as a promised quality under Article 1497 of Italian Civil

[108] Massimo C Bianca, *La vendita e la permuta* (Utet 1993).
[109] Cass Civ 21 June 1996, n. 5773; Cass Civ 28 March 1996, n. 2843; Cass Civ 18 December 1999, n.14287; Cass Civ 9 September 2004, n. 18181.
[110] Cass Civ 9 September 2004, n18181 (n 109).
[111] ibid.
[112] Guido Alpa and Vincenzo Mariconda (eds), *Codice dei contratti commentato*, (Wolters Kluwer Italia 2020) 1093, 1096.
[113] ibid.

Code and which justifies remedies under Articles 1453-1458 of the Italian Civil Code as recalled by Article 1497.[114]

### 4.5 Fairness of sustainability clauses

Implementation of sustainability standards through contracts may raise issues in connection with the fairness of such clauses, which will be considered under the perspective of EU Directive EU/2019/633 (UTP Directive).

The scope of the UTP Directive is to tackle imbalances in bargaining power between suppliers and buyers of agricultural and food products within the agricultural and food supply chain (cfr. Recital 1). To do this, the Directive "*establishes a minimum list of prohibited unfair trading practices in relations between buyers and suppliers in the agricultural and food supply chain and lays down minimum rules concerning the enforcement of those prohibitions and arrangements for coordination between enforcement authorities*" (Article 1). The Directive distinguishes between so-called blacklisted unfair practices, which are always forbidden, and so-called greylisted unfair practices, which are prohibited "*unless they have been previously agreed in clear and unambiguous terms in the supply agreement or in a subsequent agreement between the supplier and the buyer*" (Article 3 Paragraph 2). The provisions of the Directive apply, depending on thresholds set in Article 1(2). The definition of "agricultural and food products" goes beyond the agri-food sector and includes, among food products, raw agricultural products, semi-products, food supplements, food for special medical purposes, total diet replacement for weight control, fortified food, novel food, products not intended for human consumption, etc.

For the purposes of the present analysis, it is interesting to focus on unfair practices which may occur following the implementation of sustainability standards. In particular, letter c) of Article 3 of the UTP Directive provides that the unilateral change by the buyer of the terms of a supply agreement relating to the method and quality standards is prohibited. Indeed, contract term modifications concerning quality standards and methods of production may depend on the imposition of sustainability standards, also through general terms and conditions and/or the use of 'supplier codes' which, as we will see, therefore have a systemic effect along the chain.[115]

### 4.6 Fairness of multi-party contracts including sustainability provisions

The UTP Directive may have an impact not only on the evaluation of the fairness of SCCs but also on the structure of multi-party contracts.

[114] Cass Civ 8 March 2013, n 5845.

[115] Fabrizio Cafaggi and Paola Iamiceli, 'Unfair Trading Practices in Food Supply Chains. Regulatory Responses and Institutional Alternatives in the Light of the New EU Directive', (2019) 5 European Review of Private Law 1075.

Pertaining to this, as will be seen below, it is fundamental to identify in which type of chain the multi-party contract falls.

For example, a multi-party contract which allows the chain leader to unilaterally impose on the first-tier supplier terms regarding the quality and the method of production of the product in the supply chain may ultimately be regarded as fair under Article 3 Paragraph 2 of the UTP Directive. However, such an agreement may have severe consequences for the entire chain upstream.[116]

Therefore, another point to be examined is how the practices listed by the UTP Directive, which are relevant for the purposes of the present analysis on sustainability clauses, also may have systemic effects on the supply chain.

It has been argued that a distinction shall be made upon the type of chain. In particular, chains can be categorised as:

1) modular chains, "*where information is complex but easily codified and transferred, limited specific investments are required to suppliers and switching costs are relatively low since highly competent suppliers can be easily integrated or expelled*";
2) relational chains, "*where complex information needs to be shared but cannot be easily transmitted and learned, so that relations are largely based on trust, mutual dependence and high levels of asset specificity determining high switching costs*";
   or
3) captive chains, "*where high economic power is held by one or few actors (mostly, final producers or big retailers), whereas small suppliers are economically and technologically dependent with high or prohibitive switching costs*".[117]

It has been shown that contract term modifications concerning quality standards will generate systemic effects mainly on relational and captive chains respectively, due to the high level of interdependence along the chain for the former and to the lack of competences of suppliers which increase the level of technological dependence of suppliers on the buyers for the latter.[118] On the other hand, in modular chains the level of interdependence between actors is rather low due to the high codifiability of knowledge, the high competence of suppliers, and the absence of specific investments.[119] As a result, the unilateral imposition of new quality standards will cause distributional effects in relational and captive chains where new investments will be required to adapt to the new quality standards. Moreover, in captive chains exclusionary

[116] ibid 1096.
[117] ibid 1079. The authors quote Gary Gereffi, John Humphrey and Timothy Sturgeon, 'The Governance of Global Value Chains' (2005) 12(1) Review of International Political Economy 78.
[118] Gary Gereffi, John Humphrey and Timothy Sturgeon (n 117) 78.
[119] ibid; Eugenio Pomarici, 'Food Value Chains: Governance models' in Pasquale Ferranti and others (eds) *Encyclopedia of Food Security and Sustainability* (Elsevier 2019) 516.

effects will also be potentially generated because the need for the said adaptations may cause the exit of chain participants.[120]

However, the systemic effect of unilateral change of contract terms relating to quality standards will not take place if the change relates to an isolated stage of the production process.[121]

The main takeaway is, therefore, that only through a high level of contractual coordination along the chain and the adoption of contractual architecture that fairly allocates the tasks and costs of sustainability compliance along the chain, is it possible to set aside the risks deriving from the implementation of sustainability standards.

## 5 Violation of sustainability clauses: enforceability aspects and effects

The consequences of the violation of sustainability clauses may vary depending on the type of multi-party contract involved. These consequences, together with the enforceability of sustainability clauses in multi-party contracts, will be considered under the perspective of international and Italian law. Preliminarily, a central point is to explore how compliance with transnational sustainability standards is managed in the GVC.

### 5.1 Chain compliance with transnational sustainability standards

The need to ensure compliance with sustainability standards is making chain leaders engage directly with suppliers and, therefore, reducing the degree of delegation to intermediaries. A central role is played by contracts, in particular through the monitoring of contractual performance and sanctioning of non-compliance.[122]

New instruments of control and oversight have been developed in order to ensure increased supervision over the chain, which goes "*well beyond the scope of bilateral contracts*".[123] The obligations provided by these instruments include: i) the duty to report on sustainability; ii) investigation of the causes of failures to comply, and iii) the proposal of action plans directed at removing the hurdles to effective regulatory compliance.[124] The focus of regulatory provisions is on compliance, and the occurrence of breaches calls for corrections instead of compensation for harm. The goal of those provisions is risk allocation rather than ensuring compliance with standards.[125]

The need to ensure compliance to sustainability standards in the supply chain has thus created new forms of collaborative chain governance, as has been illustrated by

[120] Fabrizio Cafaggi and Paola Iamiceli (n 115) 1101.
[121] ibid 1102.
[122] Fabrizio Cafaggi (n 29) 218.
[123] ibid 228.
[124] ibid.
[125] ibid; Fabrizio Cafaggi (n 39) 1557.

contractual schemes related to traceability, which, together with certification, is used to provide evidence of compliance.[126][127] Traceability can be described as a "*form of information regulation that requires electronic platforms with data sharing, process requirements, and compliance controls*".[128] Notwithstanding the fact that traceability regimes vary across different sectors, and within commodities in each sector, these influence the supply-chain governance in the sense that the need for ensuring high quality of information about the process along the chain calls for a stronger cooperation among participants.[129]

The intervention of third parties in the compliance phase of the process is evident when certification regimes are involved. In fact, certification contracts confer inspection powers to the certifiers.[130] More closely, "*the certifier (1) will monitor the supplier's activity, including its relationships with the different tiers along the chain, (2) will provide certification if requirements are met, and (3) is given direct remedial power by the certification contract in case of non-compliance. This power ranges from warning to fining, to suspension or termination, which may result in decertification*".[131]

In general, compliance with regulatory provisions is carried out by the buyer, by the certifier, and finally, by the regulatory body.[132] It becomes clear that the principle of contract relativity, which is designed for bilateral contracts, is not fully operational. It follows that multi-party contracts, because of their nature and characteristics — which transcend the principle of contract relativity as explained above — are more suited to ensuring compliance with regulatory standards. Indeed, there is a general common interest, which shall belong to the above-mentioned "schedule of duties" of all parties in the GVC, in order to adopt a mechanism that ensures compliance with regulatory standards, including through external bodies.

### 5.2 Enforceability of sustainability clauses

In general terms, the first prerequisite for sustainability clauses to be enforced is that they become a valid part of a contract. In the case of sustainability clauses being

[126] UNIDROIT, FAO and IFAD. Legal Guide on Contract Farming (Rome 2015) para 19; See BSR-UNGC, A Guide to traceability (New York: UNGC Office, 2014) <www.bsr.org> accessed 9 July 2023.
[127] BSR-UNGC (n 126).
[128] Fabrizio Cafaggi (n 29) 228. Also see UNEP (n 49).
[129] BSR-UNGC (n 126) 9: "*Companies need to have a means of verifying sustainability claims linked to their products, and traceability systems can help business follow through on attributes connected to their products. Traceability in particular provides a tool to monitor products and materials as they travel through the supply chain in order to ensure that responsible social and environmental practices are used at every step. Verifying the claims they make about these materials through mechanisms like third party audits has been an important issue for stakeholder relations. Trace- ability systems can help companies fulfill their sustainability promises by providing a means of assuring sustainability and by generating data that can be shared with the stakeholders*".
[130] GlobalG.A.P. (n 36), Article 5.3.
[131] Fabrizio Cafaggi (n 39)1605. Also, see GlobalG.A.P. (n 36), Article 6.4.
[132] Fabrizio Cafaggi (n 39) 1610.

included in the contract, this prerequisite is normally fulfilled. However, problems may arise in the case of incorporation by reference, which is not sufficient in order for the conformity to such instruments to be obligatory.[133]

Guidance may be found regarding this in rules on standard terms and conditions. In fact, a code of conduct or any other CSR document may be regarded as standard terms and conditions[134] under the condition that it is drafted by one party only in advance of the contract and intended for general and repeated use.[135]

Looking at the form and content of the reference, it is then possible to establish, following the general rules of interpretation of the parties' intentions, whether a referenced document becomes part of a contract. Namely, under the CISG it should be questioned whether a reasonable person would comprehend that the referenced document is intended to form part of the contract.[136] Such a document does not need to be in writing or signed,[137] and its incorporation in the contract can also have been made clear during pre-contractual negotiations.[138] What is most important is the effective knowledge by the other party of the text of the document.[139]

Under Italian law, standard terms and conditions drafted by one of the parties are effective with regard to the other party if at the conclusion of the contract he/she knew them or should have known them through ordinary diligence (Article 1341 Paragraph 1 of the Italian Civil Code). Certain types of standard terms of conditions, so-called unfair terms ("clausole vessatorie"), shall be specifically approved by the other party (cfr. Article 1341 Paragraph 2 of the Italian Civil Code).

The level of specificity of sustainability clauses may influence their enforceability. However, companies may opt for vague sustainability clauses for multiple reasons, such as retaining flexibility of the contract[140], the absence of concrete statutory sanction threatening[141], or helping to achieve the objective of sustainable development[142].

[133] Louise Vytopil (n 44) 155.
[134] ibid 166.
[135] Unidroit Principles of International Commercial Contracts (UPICC) Article 2.1.19. The CISG does not contain a special provision on standard terms and conditions. However, in the present case, the definition of standard terms and conditions might be found in the UPICC (cfr. Article 7 (2) CISG). Furthermore, the inclusion of standard terms under the CISG is determined according to the rules for the formation and interpretation of contracts (cfr. CISG Advisory Council Opinion No 13).
[136] Ingeborg Schwenzer (ed), *Schlechtriem & Schwenzer Commentary on the UN Convention on the International Sale of Goods (CISG)* (OUP 2010), Article 14, paragraph 37.
[137] ibid.
[138] Stefan Vogenauer and Jan Kleinheisterkamp (eds), *Commentary on the Unidroit Principles of International Commercial Contracts (PICC,)* (OUP 2009), article 2.1.19, paragraph 13.
[139] ibid Article 2.1.19, paragraph 17.
[140] Doreen McBarnet and Marina Kurkchiyan, 'Corporate social responsibility through contractual control – Global supply chains and 'other regulation', in Doreen McBarnet, Aurora Voiculescu and Tom Campbell, *The new corporate accountability*, (Cambridge University Press 2009) 70.
[141] Louis Kaplow, 'Rules Versus Standards: An Economic Analysis' (1992) 42 (3) Duke Law Journal 557.
[142] Kateřina Peterková Mitkidis (n 43) 16.

### 5.3 Effects of the violation of sustainability clauses in multi-party contracts

The violation of sustainability clauses in multi-party contracts may have different consequences, depending on the type of multi-party contract involved.

For multi-party contracts having a common objective, a breach of contract by one party does not determine the termination of the contract towards the other parties unless the unperformed obligation must be regarded as essential (cfr. Article 1459 of the Italian Civil Code).

If the sustainability obligation is included in framework agreements, which are often multi-party contracts, it may be more easily regarded as essential. In fact, framework contracts provide a 'framework' for relationships that allow for their development over time. From this perspective, compliance with sustainability contractual clauses plays a central role in fostering a long-lasting "healthy" contractual relationship, to the extent that it preserves the reputational aims of the parties.

Finally, in consideration of the minimum level of cooperation which characterises multi-party contracts, a cooperative approach to remedies against breach is required.[143] In particular, a cooperative approach to remedies against breach in food global value chains may require, in essence, the prioritisation of corrective measures over contract termination, providing parties the possibility to renegotiate the contract after a breach in order to preserve the mutual advantages of the relationship in the long term.[144]

### 5.4 Third party beneficiaries

The first beneficiaries of sustainability clauses are not party to the contract — they are so-called third parties. It should be recalled that according to the principle of privity of contract, a contract may confer rights and impose obligations only on the contractual parties. However, this principle may be derogated and third parties may acquire certain rights.[145] From a comparative law perspective, three main requirements have been identified for the application of the contract law third-party beneficiary doctrine with respect to sustainability contractual clauses: i) the intention of contractual parties to ii) grant a specific right to iii) an identified or identifiable third party.[146]

Under Italian law the stipulation in favour of third party beneficiaries is valid when the third party has an interest thereto (Article 1411 Paragraph 1 of the Italian Civil

[143] Fabrizio Cafaggi and Paola Iamiceli (n 51) 135.
[144] ibid.
[145] Ingeborg Schwenzer and Mareike Schmidt, 'Extending the CISG to Non-Privity Parties' (2009) 13 Vindobona Journal of International Commercial Law & Arbitration 109. See also Articles 5.2.1-5.2.6 UPICC.
[146] Kateřina Peterková Mitkidis, 'Enforcement of sustainability clauses', in Vibe Ulfbeck, Alexandra Andhov, Kateřina Peterková Mitkidis (eds), *Law and responsible supply chain management* (Routledge 2019).

Code). The concept of interest has been interpreted by the doctrine as an economic advantage.[147]

Furthermore, the parties shall have agreed to perform an obligation in favour of the third party with the aim to let him acquire not only an advantage but a right.[148] It should be questioned whether through a sustainability contractual clause, contractual parties confer a new specific right to the third party. This is not the case when the objects of sustainability contractual clauses are absolute subjective rights, such as human rights. With regard to environmental clauses, it should be verified whether the nature of the attributed rights can fall under the notion of the right to health, which has been considered to encompass the right to a healthy environment,[149] and therefore qualifying as an absolute subjective right.

Furthermore, the third party must at least be identifiable at the conclusion of the contract.[150] Concerning the identification requirement,[151] this might be a difficult condition to meet in relation to environmental sustainability clauses where there is an indefinite number of third party beneficiaries, such as future generations.[152]

Finally, the third party may also not yet exist at the conclusion of the contract.[153]

In conclusion, under Italian law it appears difficult to apply the legal framework for third party beneficiaries in the context of SCCs. In fact, very often SCCs have as an object absolute subjective rights, which are not new specific rights.

The main situations when the enforcement of sustainability contractual clauses is required by/against third parties are when i) third parties try to enforce the contract between the buyer and the supplier; and ii) the buyer tries to extend the applicability of sustainability contractual clauses beyond first-tier suppliers.[154]

As pertaining to second-tier suppliers, difficulties arise for the buyers seeking to achieve compliance with SCCs, given the lack of a direct legal relationship with them. It has been suggested that qualifying SCCs as a kind of warranty, such as an implied warranty of merchantability and fitness for particular purposes, could be the objective of an automatic transfer, together with the goods' ownership by each subsequent buyer.[155] It follows that the sub-buyer would have a direct contractual claim against the

[147] Michele Tamponi, 'Il contratto a favore di terzo', in M Bessone (ed) *Trattato di diritto privato* (Torino 2000) 366.
[148] Cass Civ 22 June 2007, n.14593; Cass Civ 26 November 2003, n. 18074.
[149] Cass Civ (SS.UU) 6 October 1979, n. 5172; Corte Cost 28 May 1987, n. 210; Corte Cost 30 December 1987, n. 641.
[150] Cass Civ 17 September 2019, n. 23125; Cass Civ 18 July 2002, n. 10403.
[151] Article 5.2.2 UPICC according to which, "*The beneficiary must be identifiable with adequate certainty by the contract but need not be in existence at the time the contract is made*".
[152] Cristina Poncibò (n 97) 352.
[153] Cass Civ, 29 July 2004, n. 14488; Cass Civ, 22 November 1993, n. 11503.
[154] Kateřina Peterková Mitkidis (n 43) 17.
[155] Ingeborg Schwenzer and Mareike Schmidt (n 145) 111, 113.

original seller.[156] However, this conclusion has been subject to criticism, based on the fact that SCCs do not influence the tangible quality of goods.[157]

### 5.5 Remedies for non-performance

Under the CISG, if the seller fails to perform any of his obligations under the contract or this Convention, the buyer may require specific performance, price reduction, and damages. The contract can be avoided only, among other conditions, if the failure by the seller to perform any of his obligations under the contract or this Convention amounts to a fundamental breach of contract (cfr. Article 49 (1) a) CISG), which must also be foreseeable under the general rules on contract interpretation (Article 49 (1) and Article 25 CISG). For this, attention should be given to the language of the sustainability clause and/or how the supplier was informed of the buyer's standards regarding sustainable development.[158]

The remedy to specific performance is obviously not applicable in the case of violation of sustainability contractual clauses, given that these requirements do not relate to physical product quality.[159]

With specific regard to biofuels, it has been affirmed that the eventual violation of sustainability clauses could constitute a prejudice concerning the legitimate expectations of the other party.[160]

Under Italian law, a lack of quality of the product legitimates the buyer to undertake action for termination under the general rules on termination for non-performance. However, the lack of quality shall exceed the tolerance limits established by usages (Article 1497 of the Italian Civil Code). Finally, the terms of limitation and prescription as of Article 1495 of the Italian Civil Code apply.

## 6 Conclusion

Multi-party contracts are well suited for the implementation of sustainability standards to the extent that they increase the level of interdependence and collaboration of actors among the chain and allow a systematic and fair allocation of risks and costs in monitoring and compliance procedures.

In particular, the high level of interdependence offered by contractual networks permits the adoption of strategic decisions that will affect the whole network and which

[156] Kateřina Peterková Mitkidis (n 43) 19.
[157] ibid.
[158] Cristina Poncibò (n 97) 348.
[159] ibid.
[160] Priscila Pereira De Andrade, 'La Contribution Limitée De La Convention Des Nations Unies Sur Les Contrats De Vente Internationale Des Marchandises Pour l'Application Des 'Clauses De Durabilité' Des Biocarburants', (2016) 53 Canadian Yearbook of International Law 119.

could also relate to a systematic programme for the implementation of sustainability standards.

Moreover, multi-party contracts represent an attractive solution for the diffusion of innovative sustainable practices among suppliers in the GVC. Therefore, they incentivise private investments in research and development activities, which are key for the building of sustainable agriculture. Furthermore, in terms of innovation, contractual networks confirm their suitability for the promotion of collaborative practices.

However, the collaborative nature of multi-party contracts requires a redefinition of contract theory which shall mitigate the principles of contract relativity and of freedom of contract by introducing the principles of fairness and social usefulness as limits to the privity of contract.

As to the nature of SCCs, these can be qualified as immaterial qualities both under the CISG and Italian law. In fact, under the CISG, the notion of quality under Article 35 (1) also encompasses immaterial process-related qualities. With regard to Italian law, the violation of SCCs may be translated as a lack of quality of the product under Article 1497 of the Italian Civil Code.

In conclusion, it is strongly advised to emphasise in contracts that compliance with SCCs forms part of the obligation to deliver a conforming product/service.

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