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Les Systemes Reglementaires Bresiliens pour l'Unitisation et le Démantèlement Offshore - Une Analyse de l'Ordre Juridique Transnational

The Brazilian Regulatory Systems for Unitization and Offshore Decommissioning - An Analysis of the Transnational Legal Order

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I dedicate this thesis to my two sons, Martin and Thales:
- Always seek to improve your knowledge about things. This will be the best way to develop your talents, give strength to your voice and move your life. Certainly, this search will provide you with moments of great joy!

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Résumé: Les Systemes Reglementaires Bresiliens pour l'Unitisation et le Démantèlement Offshore - Une Analyse de l'Ordre Juridique Transnational

Cette thèse analyse le système de régulation du secteur *upstream* brésilien, en se concentrant sur la régulation de l'unitisation et du démantèlement offshore. L'hypothèse développée est que les règles non étatiques, appelées règles transnationales, font partie du système de régulation du secteur *upstream* brésilien. Suivant le cadre théorique développé par Ost et Kerchove (2002), cette thèse a pour objectif d'analyser le système de régulation du secteur *upstream* brésilien au-delà de la doctrine positiviste encore prédominante. Elle entend dépasser la dualité généralement établie entre l'ordre national et l'ordre international. Afin d'appréhender la manière dont les règles transnationales interagissent avec l'ordre juridique national, cette thèse adopte la méthodologie de Halliday et Shaffer (2015), proposant un ordre juridique transnational (TLO) pour le système de régulation du secteur *upstream*.

À travers l'analyse de la réglementation pour l'unitisation et le démantèlement offshore, cette thèse montre comment les règles transnationales ont influencé le processus d'élaboration des règles des lois pétrolières et pré-sel, les résolutions traitant de ces opérations et les contrats E&P adoptés au Brésil. Il est également démontré que des règles transnationales sont adoptées pour interpréter et appliquer les règles nationales.

En ce qui concerne la réglementation de l'unitisation, cette thèse démontre l'influence que les réglementations étrangères, les contrats types et les pratiques de l'industrie ont sur le processus d'élaboration des règles nationales brésiliennes liées à cette pratique. Elle montre également l'influence que les pratiques de l'industrie et les contrats types ont sur l'interprétation de l'unitisation.

Concernant le démantèlement offshore, il a été constaté que les réglementations étrangères, les contrats types, les pratiques de l'industrie et le code de conduite influençaient le processus d'élaboration des règles du système de réglementation brésilien. Les règles internationales ont également été utilisées comme référence pour construire les normes nationales pour le démantèlement offshore. Les pratiques de l'industrie et les codes de conduite sont utilisés pour interpréter les réglementations sur le démantèlement. Il est ainsi fait référence aux pratiques de l'industrie et aux réglementations étrangères dans l'application des règles de cette opération.

Considérant que le système de régulation du secteur *upstream* brésilien est un TLO, cette thèse analyse le modèle de gouvernance adopté par l'État brésilien à la lumière de la méthodologie d'Abbott et Snidal (2009). Il est vérifié que l'État brésilien a peu d'action concernant l'influence que les règles transnationales ont sur les deux systèmes de régulation analysés. La deuxième hypothèse développée dans cette thèse est ainsi que la connaissance de l'État brésilien sur les règles transnationales de l'unitisation est encore assez limitée. Il en va différemment du démantèlement offshore. L'État brésilien y joue un rôle plus actif, participant à des forums pour discuter des règles. Il peut même participer à la rédaction de certaines des principales conventions internationales sur ce sujet. Mais on peut conclure que le modèle de gouvernance adopté par l'État brésilien n'est pas le plus adapté pour faire face à la présence de règles transnationales dans ce système.

Bien que l'objectif de cette thèse ne soit pas une recherche relative à la gouvernance, des propositions sont avancées pour que l'État brésilien puisse jouer un nouveau rôle de gouvernance. Il s'agirait pour lui de se positionner en tant qu'orchestrateur dans le processus d'élaboration des règles du système de réglementation de l'unitisation et du démantèlement. Cette thèse conduit à émettre l'hypothèse que l'exercice du rôle d'orchestrateur aiderait l'État brésilien à rassembler les acteurs publics et privés dans le processus d'élaboration des règles

transnationales et les encouragerait à participer à ce processus. Ainsi, l'État brésilien pourrait soutenir et guider les réseaux formés par les acteurs publics et privés, en encourageant et en facilitant la collaboration entre eux pour améliorer les systèmes de régulation de l'unitisation et du démantèlement offshore.

Abstract: The Brazilian Regulatory Systems for Unitization and Offshore Decommissioning - An Analysis of the Transnational Legal Order

This thesis analyzes the Brazilian regulatory system for the upstream sector, focusing on the regulation for unitization and offshore decommissioning. The hypothesis developed in this thesis is that non-state rules, called transnational rules, are part of the Brazilian regulatory system for the upstream sector. Following Ost and Kerchove's (2002) understanding, this thesis presents a comprehensive assessment of the Brazilian regulatory system for the upstream sector beyond the predominant positivist doctrine and, beyond the duality between national and international orders. In order to understand how these rules interact with the national legal order, this thesis adopts the methodology of Halliday and Shaffer (2015), proposing a Transnational Legal Order for the regulatory system of the upstream sector.

Through the analysis of the regulation for unitization and offshore decommissioning, this thesis shows how transnational rules influenced the rule-making process of Petroleum and Pre-salt Laws, the resolutions dealing with these operations, and the E&P contracts adopted in Brazil. It demonstrates that transnational rules are adopted to interpret and enforce national rules.

Concerning unitization regulation, this thesis proves the influence that foreign regulations, model contracts, and industry practices have on the rule-making process of Brazilian national rules related to this practice, and also shows the influence that industry practices and model contracts have on interpreting unitization national rules.

Regarding offshore decommissioning, it was found that foreign regulations, model contracts, industry practices, and code of conduct influenced the rule-making process of the Brazilian regulatory system. International rules were also used as a reference for constructing the national norms for offshore decommissioning. Industry practices and codes of conduct are used to interpret regulations on decommissioning. Reference ares made to industry practices and foreign regulations in enforcing the rules of this operation.

Considering that the Brazilian regulatory system for the upstream sector is a TLO, this thesis analyzes the governance model adopted by the Brazilian State in the light of the methodology of Abbott and Snidal (2009). This analysis verified that the Brazilian state does not have much influence as transnational rules do when it comes to the two regulatory systems analyzed. The second hypothesis developed in this thesis is that the Brazilian State's knowledge of transnational rules about unitization is still quite limited, but compared to offshore decommissioning, the Brazilian State already plays a more active role, participating in forums to discuss transnational rules and having participated in the drafting of some of the leading international conventions on this topic. Thus, it can be concluded that the governance model adopted by the Brazilian State is not the most adequate to deal with the presence of transnational rules in this system.

Although the focus of this thesis is not governance research, suggestions are proposed for the Brazilian state to perform a new governance role, acting as an orchestrator of unitization and for the decommissioning regulatory system rule-making process. This thesis suggests that performing the orchestrator role would help the Brazilian state bring together public and private actors in the rule-making process of transnational rules and encourage them to participate in this process. Thus, the Brazilian State could support and guide networks formed by public and private actors, encouraging and facilitating collaboration between them to improve the regulation of the regulatory systems of unitization and offshore decommissioning.

SUMMARY

FIGURE LIST

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LIST OF ACRONYMS AND STANDARDIZATION

AIPN – Association of International Petroleum Negotiators

ALARP - As Low as Reasonably Practicable

ANP – Brazilian National Agency of Petroleum, Natural Gas and Biofuels

API – American Petroleum Institute

ASTM - American Society for Testing and Materials

BIMCO - Baltic and International Maritime Council

BNDES - Brazilian Development Bank

CNPE – Brazilian National Council of Energy Policy

COS - US Center for Offshore Safety

DAS - Decommissioning Security Agreement

E&P – Exploration and Production

EPE – Brazilian Energy Research Office

EPRD - Engineering, Preparation, Removal, and Demolition

HCs – Host Countries

IBP – Brazilian Institute of Petroleum, Natural Gas and Biofuels

IEA – International Energy Agency

IEC - International Electrotechnical Commission

IGOs – Intergovernmental Organizations

IMO – International Maritme Organization

IOCs – International Oil Companies

IPAs – International Petroleum Agreements

IRF – International Regulator's Forum

ISA - International Society of Automation

ISO International Organization for Standardization

ITP – Initial Tract Participation

JOA - Joint Operating Agreement -

MER – Maximum Efficient Rate of Production

MME – Brazilian Ministry of Mines and Energy

NGOs – Non Governmental Organizations

NOCs – National Oil Companies

NORSOK – Standards Norway

OECD – Organization for Economic Cooperation and Development

OGP - Association of Oil and Gas Producers or IOGP - International Association of Oil and Gas Producers

OPEC – Organization of the Petroleum Exporting Countries

PPSA – Pré-sal Petróleo S.A

PSA – Production Sharing Agreement

RSS - Regulatory Standard-Setting

TLO – Transnational Legal Order

TP - Tract Participation

UA – Unitization Agreement

UK – United Kingdom

UN – United Nations

UNCITRAL - United Nations Commission On International Trade Law

UOA – Unit Operation Agreement

US – United States

UUOA - Unitization and Unit Operating Agreement

INTRODUCTION

Petroleum in the Context of the Energy Transition

Petroleum[1] guarantees the daily function of modern society because it is used as a basic input in the production of fuels, petrochemicals, and fertilizers. Petrochemicals used to produce plastic, resins, and fibers are an essential component in producing goods and have an increasing tendency to use plastic instead of metal and wood. The use of fertilizers has a relevant role since it helps raise the productivity of agricultural production. Therefore, since World War II, petroleum has been the world's primary energy source and is essential to the operation of the global economy (Szklo and Magrini, 2008; Bagheri and Minin, 2015; Pinto Jr, 2016).

Meanwhile, in 2016, the '2030 Agenda for Sustainable Development' and the 'Paris Agreement' came into force, signaling the current context for a transition to a low carbon economy. As a result, there has been an increased in environmental demands and rising efforts to replace fossil fuels, which could lead to a reduction in the oil demand. Therefore, in a scenario that considers the implementation of the 2030 Agenda and the Paris Agreement – the Sustainable Development scenario - the IEA (2019) indicates that the world's primary energy demand of oil and natural gas would be 55% in 2030 and 47% in 2040. Considering that this percentage was 57% in 2018, there is a small reduction in demand[2].

Given the high proportion of oil and natural gas in the world's demand for primary energy, even in a more conservative scenario, there is a need to develop new oil and gas sources. In the search for new frontiers to meet this demand, there is a trend towards offshore development, given the reduction of onshore opportunities (Piquet and Pinto Jr., 2018).

However, offshore petroleum operations are generally more complex than onshore operations as it is highly capital intensive, technologically challenging, and more environmentally sensitive. Furthermore, it involves other issues beyond the petroleum industry, such as safety navigation and fishing.

[1] Petroleum means oil and gas in this thesis.

[2] The 2020 WEO is heavily influenced by the pandemic, reflecting changes in demand that may not be continuous. In this report, oil and natural gas represent 55% of primary energy demand in 2019 and the forecast for 2030, according to the Stated Policies Scenario, is 54%.

Research Problem

Offshore Development in Brazil: the Importance of a Proper Regulatory Framework for Maintaining the Interest of Oil Companies

Brazil stands out in offshore production of oil and gas, representing a high level of expertise due to the technological trajectory of its national oil company, Petrobras, which has explored this environment since the 1970s (Piquet and Pinto Jr., 2018), and also by the Pre-salt province, which already represents more than 70% the Brazilian production[3].

According to IEA's WEO (2019), considering the Stated Policies Scenario, the Pre-salt output in Brazil is the third-largest source of production growth globally to 2030, after the United States and Iraq [4].

However, production in the Pre-salt requires substantial investments, as it takes place in ultra-deep waters and at a distance from the Brazilian coast. In order to attract such investments, a clear and stable regulatory framework that reduces uncertainties and that is adequate for international practice is essential.

Brazilian regulation must safeguard national energy policy goals, generate wealth for current and future generations, and preserve the environment and social rights, but must also continue to attract investments from private investment companies. As Ribeiro (2010) writes, investments must be guaranteed, minimizing risks.

After discovering the Pre-salt province, Brazil implemented a new regulatory framework in 2010 to encourage investments for exploring this province. However, when this legal framework was put to the test during the first bid round for the Libra area, it was found to be unsuitable for attracting investments. The bid area received only a single bid, which meet the minimum required to be auctioned. Among the explanations raised to justify the lack of competition was the uncertainty regarding the role of the Brazilian state-owned company created to manage the pre-salt, Pre-salt Petroleo SA (PPSA) and the legal requirement that Petrobras, another Brazilian state-owned company, be the exclusive operator in the pre-salt area.

[3] According to Monthly Oil and Natural Gas Production Bulletin of April. For more information, see : https://www.gov.br/anp/pt-br/centrais-de-conteudo/publicacoes/boletins-anp/bmp/2021/2021-04-boletim.pdf. Accessed on 04/06/2021

[4] The newsletter Petroleum Intelligence Week, of 02/04/2021, reports that "*Goldman Sachs recently called the Santos pre-salt "the most profitable non-Opec basin with scale*."

Regarding PPSA, Florencio (2016) states that the uncertainty regarding the role of PPSA in the production sharing contract consortium of Libra generated concerns among potential investors and increased the risk of investment in this area. This situation encouraged discussions to reach a "proper regulatory framework for the Pre-salt."[5]

Between 2016 and 2017, the regulatory framework was improved, seeking to balance incentives for companies' investments and the collection of government take (Piquet and Pinto Jr., 2018). Thus, there was an intense introduction of rules corresponding to the demands of the industry, which inaugurated a new phase for the Brazilian petroleum sector. Among the regulatory changes, it is worth highlighting the removal of the requirement for Petrobras to be the sole operator in the Pre-salt and the flexibility of the local content policy. Such changes proved effective in attracting investments, as the auctions following these changes attracted the interest of important IOCs, such as Shell, Total, BP Energy, ExxonMobil, Equinor, and Repsol[6] (Piquet and Pinto Jr., 2018). The participation of these companies, together with Petrobras, is essential for the development of the pre-salt fields[7]. Even in the context of the COVID-19 pandemic, production and exploration investments were maintained[8].

Specific Regulatory Issues for Brazilian Offshore Operations: Unitization and Decommissioning

Concerning the offshore operations in Brazil, Piquet and Pinto Jr. (2018) make the following comments:

> *"the main characteristic of the petroleum activity in Brazil over the last decades concerns the training and specialization in the development of offshore petroleum resources. (...) Thus, in view of the new sectorial context, it is essential to adjust policy and regulatory instruments in order to fully exploit the comparative and competitive advantages*

[5] The Petroleum Intelligence Weekly (PIW) newsletter, dated 16 January 2017, reported on efforts to change the Brazilian regulatory framework for the pre-salt area to attract investments from private companies since Petrobras requires technical and commercial collaboration to continue these projects. In October 2016 (PIW, 03/10/ 2016), this same newsletter interviewed the president of Petrobras at the time, who stated that Petrobras needed partners to explore the Pre-salt. For that, it would be necessary to amend the Pre-salt Law opening the possibility for other companies to operate in the Pre-salt Polygon.

[6] For more information, see: http://rodadas.anp.gov.br/en/partilha-producao-2. Accessed on 05/07/2021.

[7] The PIW of 02 April 2021 reports that "*Shell, Equinor, Exxon Mobil, Total, and NOC heavyweights China National Offshore Oil Corp. and China National Petroleum Corp. have been devoted non-operated partners with Petrobras in massive pre-salt fields*."

[8] According to the PIW of 02 April 2021, "*Brazil's low-cost, low-carbon pre-salt barrels have emerged as the highly resilient source of supply, both for Petrobras and global majors*."

> *associated with offshore production. This step is essential for Brazil to succeed as a relevant petroleum exporter, which is a necessary condition to enable the correct economic use of export revenues and government participation for the purposes of economic and social development both in terms of federal and state and municipal plans."*[9]

Regarding offshore operations carried out in Brazil, two practices deserve special attention due to the impact they may have on the operation cost: unitization in the Pre-salt area and decommissioning. For this reason, the regulatory systems of these two practices are analyzed in this thesis.

Unitization

The exploitation of the Brazilian Pre-salt, in addition to the complexities mentioned above inherent to offshore operations, faces other challenges specific to the Brazilian case. Unitization is among these challenges, a practice that occurs when a reservoir extends beyond the boundaries of a block, requiring different parties to negotiate an agreement for the joint production of this reservoir. Due to the methodology adopted to define the first blocks located in the Pre-salt area, there is a high probability of unitizations occurring in this area (Amui and Melo, 2003). In addition, the geological conditions of the pre-salt reservoirs favor the sharing of reservoirs, which requires unitization. According to Pinto Jr. (2021), "*geology does not obey geography, nor the geometry of blocks*." By April 2021, eight Unitization Agreements (UA) had been signed, and twelve are under negotiation (PPSA, 2021).

Establishing clear and adequate rules for international practice, which would not harm the attraction of investments for operations in the Pre-salt area, was a challenge for the Brazilian State. The construction of an appropriate regulatory system took place after successive changes. Unitization regulation was published in 2013, and amendment planning began in 2015, before being completed in 2017. The rule-making process of this regulatory framework used as references the regulation of other producing countries and rules elaborated by non-state actors.

[9] Free translation of "a característica principal da atividade petrolífera no Brasil ao longo das últimas décadas diz respeito à capacitação e especialização no desenvolvimento de recursos petrolíferos offshore. (...) Desse modo, ante o novo contexto setorial, é indispensável adequar os instrumentos de política e regulação a fim de explorar plenamente as vantagens comparativas e competitivas associadas à produção offshore. Tal passo se revela indispensável para que o país (Brazil) possa lograr êxito como exportador relevante de petróleo, o que constitui condição necessária para possibilitar o correto aproveitamento econômico das receitas de exportação e das participações governamentais para fins de desenvolvimento econômico e social tanto no plano federal quanto nos planos estaduais e municipais."

Decommissioning

Another challenge related to Brazilian offshore operations is due to the fact that Brazil holds the record for deepwater operations. Brazil has 34% of all its production systems in deepwater and ultra-deepwater, making the offshore operation in this country technically complex and financially very costly (FGV, 2021). This technical complexity and high costs are due to everything from the installation of equipment to its decommissioning, that is, when production is closed, and the facilities are removed.

Offshore decommissioning still poses many challenges for all producing countries that must deal with this issue since it does not have many cases already concluded worldwide. However, in the Brazilian context of deepwater and ultra-deepwater, planning decommissioning is even more challenging. Piquet and Pinto Jr. (2018) also highlight the growing expansion in the amount of equipment installed in the subsea bed as the vector trend for offshore activities, making subsea units increasingly larger and more numerous. This configuration further increases the costs of offshore decommissioning in Brazil.

Thus, it is a big challenge to ensure that high-cost offshore decommissioning operations will be carried out by companies that hold the rights to the field when the financial resources from the field's production run out. According to FGV (2021), Brazil must be a world leader in investment volumes concerning decommissioning. Thus, demanding measures to avoid the default of this operation without impacting investments is a regulatory challenge.

The regulatory system for decommissioning in Brazil is not yet complete. In 2020, a new resolution was published that updated the rules about technical and operational safety issues; however, Costa (2021) notes that it has already been verified that changes will be needed. Regarding financial matters, the Brazilian petroleum regulatory agency – ANP - is drafting a specific resolution, but as of June 2021, this resolution had not yet been published. The main challenge of this resolution is to ensure the protection of the Brazilian State against default concerning decommissioning operations without harming the flow of investments. Considering the complexity of this topic, the process of elaborating the regulatory framework for decommissioning relies on the participation of public and private, national, and international actors who work in this sector. In this process, foreign regulations and private industry rules are used as references.

Thesis Objectives

This thesis analyzes the Brazilian regulatory system for the upstream sector [10], focusing on the regulation for unitization and offshore decommissioning, verifying that the Brazilian authorities are obliged to regularly redefine the rules to remain attractive for investors.

In the rule-making process for these two sectors, the Brazilian state observes the evolution of other producing countries' regulations and industry practices. Foreign regulation and industry practices are rules outside the Brazilian legal system. Understanding how these rules interact with the national legal order within the context of the regulatory system for the upstream sector of the petroleum industry is a challenge that has long been faced by scholars who dedicate themselves to researching this issue.

Thus, the first objective of this thesis is to present a way to understand the presence of these non-state rules in the Brazilian legal order from a different perspective than the traditional positivist doctrine. This thesis seeks to present a new understanding beyond the national or international, public or private dichotomy. This is because the positivist doctrine only recognizes the rules created by the state or by Intergovernmental Organizations (IGOs), which can be considered public, belonging to the national legal order or international legal order, as valid. Thus, this thesis proposes an understanding of the Brazilian regulatory framework considering national rules, international rules, and non-state rules by emphasizing the interaction between these rules.

The second objective of this thesis is to characterize and evaluate the governance model adopted by the Brazilian State, given the presence of non-state rules in the Brazilian national legal order. This thesis proposes adjustments in the governance model and, as a suggestion, the role of orchestrator for the Brazilian State, aiming to achieve the most effective regulation.

Definition of Transnational Rules

It is important to note that these non-state rules will be called transnational rules in this thesis. These rules are developed by private and transnational actors and cannot be classified as national or international rules.

[10] The upstream sector of the petroleum industry covers the first activities of the petroleum supply chain, which means exploration, appraisal, development and production activities (BAGHERI and DI MININ, 2015 p.2).

They cannot be considered national because the Brazilian State does not develop them. Within the logic of the positivist doctrine, a rule is deemed to be national if a competent state actor creates it and also provided that it follows the procedures fixed in the Constitution, the highest norm of the national legal order, and in the other norms subordinate to the Constitution.

Transnational rules also cannot be considered international rules, as they are not created by actors who have a personality under international law. According to Resek (2018), individuals, private or public companies, and NGOs do not have legal personalities under international law. Therefore, they cannot formally create international rules. According to the classic Public International Law theory, only the norms issued by sovereign countries and Intergovernmental Organizations (IGOs) will be considered part of the international legal order. In addition, Resek maintains that the international legal order is based on consensus.

Within the Brazilian regulatory system for the upstream sector, the relevant transnational rules are model contracts, industry practices, codes of conduct, risk allocation models, and foreign regulations. Despite being created by sovereign countries, foreign regulations cannot be considered international rules within the Brazilian regulatory system for the upstream sector. This is because foreign regulations are prepared within the national legal order of a given producing country, without the participation of the Brazilian State, that is, without the consent of that country. Thus, under the optimum of the Brazilian national legal order, foreign regulations are rules that cannot be classified as national or international. Therefore, foreign regulations will be treated in this thesis as transnational rules.

Research Analysis Framework: the TLO and the New Governance

Beyond the Positivist Doctrine

Following Ost and Kerchove's (2002) understanding, this thesis presents a comprehension of the Brazilian regulatory system for the upstream sector beyond the still predominant positivist doctrine, beyond the duality between national and international orders.

When verifying the presence of transnational rules in the Brazilian regulatory system for the upstream sector, it is observed that the positivist logic is insufficient to understand this system. The positivist logic only recognizes rules created by state actors as valid, following the procedures established in the Constitution. According to this logic, the national legal order would be a closed system, hierarchically structured based on the Constitution.

From a positivist perspective, the Brazilian regulatory system would be composed only of specific constitutional rules for the petroleum industry. These rules are: the law that organizes this sector, generally called the petroleum law; the resolutions that establish the industry operation rules within the producing country; and specific contracts for exploration and production operations. International conventions created by IGOs would also integrate this system after being ratified by the Brazilian State. Transnational rules are simply disregarded by positivist doctrine.

Lex Petrolea

In the effort to understanding the presence of transnational rules in the regulatory system for the upstream sector of the petroleum industry, some scholars defend the existence of the *lex petrolea*, a group of rules completely autonomous from national and international legal orders (Bishop, 1998; Martin, 2012; Bowman, 2015; De Jesus, 2012; and Garcia, 2012). De Jesus (2012) argues that companies operating in the upstream sector have developed their own rules for governing transnational petroleum contracts. He also rejects the adoption of national law to resolve disputes arising from such contracts.

However, this thesis does not adopt this interpretation as it understands that there are hardly any rules completely independent from the State (Michaels, 2016) and that the transnational rules enforcement system, primarily arbitration, depends on the acceptance of the State (Daintith, 2017).

Transnational Legal Order

To understand the Brazilian regulatory system for the upstream sector in an integrated way as a system formed by national, international, and transnational rules, this thesis adopts the methodological approach of Halliday and Shaffer (2015). These authors propose the existence of a new legal order, which they call the Transnational Legal Order (TLO).

The TLO, as proposed, would be formed by the rules that make up the national legal order, the rules that make up the international legal order, and the transnational rules. Halliday and Shaffer (2015) characterize this third order, differentiating the TLO from the then consolidated national legal order and international legal order. For Halliday and Shaffer (2015), TLO would be "*less*

an overcoming than a transcending of the state", a new order that does not suppress the state concept but extends beyond its powers and requires looking beyond the national lens.

According to Halliday and Shaffer (2015), the TLO's objective is to directly or indirectly influence legal institutions within nation-states. Thus, for these authors, the transnational rules orbit around the national and international order and are valid because they interact, influence, and affect the national and international legal orders.

By analyzing the regulation of unitization and offshore decommissioning, it is possible to point out concrete examples that demonstrate the presence of transnational rules in the Brazilian regulatory system for the upstream sector. These examples show that these rules influence the rule-making process of the norms that make up this system and also the interpretation and enforcement process of these norms.

A New Governance Model and the State Role of Orchestrator

After verifying that the transnational rules interact with the national order in the Brazilian regulatory system for the upstream sector, specifically concerning the regulation of unitization and decommissioning, this thesis analyzes the governance model adopted by the Brazilian State to manage the rule-making process of all the rules that make up this system.

For this analysis, this thesis follows Abbott and Snidal's (2009) methodology since it proposes four types of governance models - Old National, Old International, New, and New Transnational - for understanding the governance model adopted by a state. These authors also suggest a new state's role for coordinating the plurality of actors and harmonizing the adoption of rules resulting from state and non-state rule-making processes: the role of orchestrator. Acting as orchestrator, the state will take measures to engage public and private actors in regulatory activities and facilitate adopting and enforcing these private rules.

The governance ideal models as proposed by Abbott and Snidal's (2009) can be briefly described as follows:

- In the Old National Governance model, the state is the central actor, regulating from the top down with coercion to enforce rules when necessary. The expertise comes from state bureaucrats and professional regulators, who were supposed to have all the expertise required to implement policies.

- In the Old International Governance model, the IGOs are the main actors. The rules published by these organizations take the form of treaties, recommendations, or other non-binding soft laws. The IGOs' expertise focuses on the technicians of these organizations.
- In the New Governance model, the State plays the role of orchestrator, promoting and empowering other public and private actors in order to encourage them to regulate activities, including self-regulation. The expertise is dispersed, coming from state bureaucrats and private actors.
- In the New Transnational Governance model, the state is not in the central position. Instead, the rule-making process occurs predominantly through Regulatory Standard-Setting (RSS) schemes created by private actors, from the bottom up, with little direct state participation. The expertise comes from the actors that make up the RSS scheme.

Thesis Hypothesis

In short, the hypothesis developed in this thesis is that transnational rules are part of the Brazilian regulatory system for the upstream, so it is possible to understand this system from a TLO, according to the methodology of Halliday and Shaffer (2015).

Through TLO, it is possible to demonstrate the articulation between the different rules – national, international, and transnational – within the same regulatory system. In the case studies of the Brazilian regulatory system for unitization and offshore decommissioning, it is possible to identify the rules that make up each of these systems, which differ for each case and demonstrate the articulation between them. In the case of unitization, the interaction occurs between national and transnational rules, as international rules are applied in cases of transborder unitization which do not yet take place in Brazil. Concerning offshore decommissioning, the interaction takes place between the three different rules, emphasizing the international rules that were the first to embody this regulatory system.

Regarding the interaction of national rules with the TLO, the Brazilian state does not have as much of an effect as the influence the transnational rules do over the two regulatory systems analyzed. The hypothesis developed in this thesis is that the knowledge of the Brazilian State on transnational rules about unitization is still quite limited. Regarding the Brazilian regulatory system for offshore decommissioning, the other hypothesis developed in this thesis is that the

Brazilian State already plays a more active role, participating in forums to discuss transnational rules and having participated in the drafting of some of the leading international conventions on this topic.

Therefore, the Brazilian State must be more aware of these rules and better coordinate the impact that transnational rules have on the Brazilian regulatory system, maximizing the usefulness of these rules within this system. According to Worthington (2020), transnational rules can contribute to more effective regulation.

Although the focus of this thesis is not governance research, and, therefore, it is not possible to affirm that the role of orchestrator is the best option for the Brazilian State to deal with transnational rules, suggestions are proposed for the Brazilian State to act as an orchestrator in the unitization and decommissioning regulatory system rule-making process. This thesis assumes that the performance of the orchestrator role would help the Brazilian state bring together public and private actors in the rule-making process of transnational rules and encourage them to participate in this process. Thus, the Brazilian State could support and guide networks formed by public and private actors, encouraging and facilitating collaboration between them, to improve regulation for unitization and offshore decommissioning.

Thesis Results

From the analysis of the two case studies – unitization and offshore decommissioning regulatory systems –transnational rules can be verified. However, it can be noted that the Brazilian State is still not fully aware of the interaction of transnational rules with its national legal order.

In these two case studies, it is possible to verify how transnational rules influenced the rule-making process of Petroleum and Pre-salt Laws, the resolutions dealing with these operations, and the E&P contracts adopted in Brazil. It is also demonstrated that transnational rules are adopted to interpret and enforce national rules.

Concerning unitization regulation, this thesis proves the influence that foreign regulations, model contracts, and industry practices have on the rule-making process of Brazilian national rules related to this practice. Examples are given to show the influence that industry practices and model contracts have on interpreting unitization national rules.

Regarding offshore decommissioning, it was found that foreign regulations, model contracts, industry practices, and code of conduct influenced the rule-making process of the Brazilian regulatory system. International rules were also used as a reference for constructing the national norms for offshore decommissioning. Industry practices and codes of conduct are used to interpret regulations on decommissioning and reference was made to industry practices and foreign regulations in enforcing the rules of this operation.

Thus, it is understood that the proposal of Halliday and Shaffer (2015) is the one that offers a better understanding of the Brazilian regulatory system for the upstream sector because it proposes an approach that considers that this system is composed of national, international, and transnational rules.

Considering that the Brazilian regulatory system for the upstream sector is a TLO, it is possible to say in the light of Abbott and Snidal (2009)'s methodology, that the governance model adopted by the Brazilian State is not in the best position to deal with the presence of transnational rules in this system. The Brazilian State rarely carries out actions aimed at engaging public and private actors in regulatory activities or facilitating the adoption and enforcement of these transnational rules.

Regarding the governance model adopted for the rule-making process of the two regulatory systems analyzed, this thesis demonstrates that the Brazilian State has a hybrid governance model. When it comes to unitization, the Brazilian State has characteristics of the Old National and New Governance models. Regarding decommissioning, the governance model has similarities to the Old National, Old International, New Governance models. However, the Brazilian State does not exercise the role of orchestrator in any of the two regulatory systems analyzed. Regarding the influence that transnational rules exert on the Brazilian regulatory system for the upstream sector, the State must adopt new functions to deal with this situation.

Considering that this thesis did not carry out an in-depth study on governance, the research developed in this thesis could still be expanded, seeking to find ways for transnational rules to contribute to the improvement of the regulatory system rule-making process, building a more precise, more effective, and easier way to update regulation.

Hopefully, the knowledge of transnational rules and the awareness of the Brazilian State about the process of interaction between these rules and national regulation will contribute to future studies in finding ways to improve the regulation process.

Thesis Structure

This thesis is divided into three chapters, in addition to the introduction and conclusion.

The first chapter presents the theoretical framework of this thesis. This chapter presents the proposal of Halliday and Shaffer (2015) on TLO and details the methodology that these authors create for describing this new order. Based on this methodology, the first chapter structures a TLO for the regulatory system for the upstream sector of the petroleum industry. Then, Abbott and Snidal's (2009) theoretical approach is presented on the ideal governance models to deal with the rule-making process of regulatory systems, highlighting a new role to be played by the State: the role of orchestrator. This chapter then details all the ideal models of governance presented by these authors and describes the role of orchestrator, offering alternatives to the State for performing this role.

The second chapter includes the first case study of this thesis. The theoretical approach of Halliday and Shaffer (2015) and Abbott and Snidal (2009) exposed in the first chapter is applied to analyze the Brazilian regulatory system for unitization. Initially, the unitization practice is described, highlighting its shortcomings. Then, the Brazilian regulatory system for unitization and the influence that the TLO of the upstream sector exerts on the rule-making process of this system is briefly presented. This influence is demonstrated through concrete examples. After verifying the presence of transnational rules and the role of the TLO in the national legal order, this chapter assesses the type of governance adopted in the Brazilian regulatory system for unitization. Then, it analyzes whether the governance model is the most appropriate to deal with the presence of transnational rules and helps in dealing with unitization shortcomings. This chapter demonstrates that Brazil's governance model for the regulatory system for unitization is hybrid but closer to Old Governance with few similarities to the New Governance model. Furthermore, the Brazilian State does not play the role of orchestrator. Thus, this chapter brings some suggestions for Brazilian State orchestration which can be used in the rule-making process of the regulatory system for unitization, aiming to achieve an adequate regulation that attracts investments.

The third chapter follows the same structure as the second chapter. It details the operation of offshore decommissioning and highlights the challenges that will be faced in regulating this operation. The Brazilian regulatory system for offshore decommissioning is also briefly detailed. Then, concrete examples that prove the influence of TLO from the upstream sector on the rule-making process of this system are presented. This chapter also analyzes the type of governance adopted in the Brazilian regulatory system for offshore decommissioning. It

concludes that it is a hybrid model with characteristics similar to the Old, Old International, and New Governance models. In the rule-making process of the regulation of offshore decommissioning, the Brazilian State uses transnational rules more conscientiously and performs some actions that resemble the role of orchestrator. However, adjustments still need to be made to adopt transnational rules more effectively in the Brazilian regulatory system for offshore decommissioning. Thus, as in the second chapter, suggestions are proposed for the Brazilian State to act as an orchestrator of the regulatory system for unitization.

The fourth chapter presents the general conclusion. The results obtained in this thesis are delivered through a comparative table that exposes the two regulatory systems analyzed.

CHAPTER I - THE REGULATORY SYSTEM FOR THE UPSTREAM SECTOR OF THE PETROLEUM INDUSTRY AS A TRANSNATIONAL LEGAL ORDER AND A NEW PROPOSAL OF STATE GOVERNANCE

1.1 A New Approach for the Regulatory System for the Upstream Sector of the Petroleum Industry

In the organization of sectors of the economy that involve transnational activities, there is a proliferation of actors, regulatory activities, and connection networks, which are entangled by poorly defined borders that do not consider territorial space, national sovereignty, and autonomy. As a reflection of this new order, we have a legal pluralism characterized by the multiplicity of powers and institutions that create law (Ost and Kerchove, 2002), requiring that state and non-state actors seek joint solutions through cooperative relations (Djelic and Sahlin-Anderson, 2008). From this perspective, the upstream sector of the petroleum industry[11] is an important example of this dynamic in several ways.

The upstream is an economically important sector, characterized by the accelerated pace of technological advancement, powerful global players who have a transnational operation, and substantial long-term investments in high-risk activities (Bagheri and Di Minin, 2015). This complex sector is also responsible for a social and environmental impact to a lesser or greater degree, according to the type and size of operation (Smith et al., 2010).

Multiple actors make up the upstream sector and participate in the rule-making process, directly or indirectly: producing countries, also called Host Countries (HCs); the exploration and production (E&P) companies, called International Oil Companies (IOCs) or National Oil Companies (NOCs), and their associations; Intergovernmental Organizations (IGOs); and civil society, organized through Non-Governmental Organizations (NGOs), academic institutions or socially responsible investor associations.

The upstream sector requires regulatory activities addressing diverse issues. They might deal, among other things, with fiscal regimes for the appropriation of petroleum income, access to reserves, conservation of petroleum resources, how to carry out E&P operations, supervision,

[11] The upstream sector of petroleum industry cover the first activities of the petroleum supply chain, which means exploration, appraisal, development and production activities (BAGHERI and DI MININ, 2015 p.2)

labor rights, health, safety and environment protection, local communities, private contractual transactions, corporate social responsibilities (CSR), or conflict resolution.

In order to manage such complex issues, there are frequent connection networks among the upstream actors to search together for solutions. These networks are more numerous among non-state actors, notably the upstream companies. These companies generally cooperate to mutually benefit, aiming at minimizing difficulties related to fluctuations in petroleum prices, challenges related to technology, geology, and geography, as well as political and social policies (Martin and Park, 2010).

In addition to institutionalized connecting networks, as IGOs, public actors also have informal collaboration networks to discuss upstream sector regulation, although they are fewer in number. Despite this, public actors share regulatory policies and experiences informally between them in what Gilardi and Wasserfallen (2018) called a diffusion process. Wiener (2001) called this process of horizontal transfers from one country to another a legal transplant process, what can be considered a modality of international or horizontal diffusion. Among these networks, there are strong IGOs such as OPEC and OECD, in addition to the UN and its agencies with upstream sector-related competences. Regarding informal networks, the International Regulators' Forum stands out, since it is a sphere where regulators from various HCs exchange practices and experiences in regulating safety in offshore upstream operations.

However, cooperation arenas between public and private actors to discuss and establish the rules of the upstream sector are rare. Among the few examples is an American center called the Ocean Energy Safety Institute, a collaborative initiative of the US government, academia, non-governmental organizations, and industry[12].

In most cases, these networks exist in environments that are not within the boundaries of any country. Nor will the rules that emerge from these connecting networks be restricted to the boundaries of any country. Conversely, the practices, standards, and model contracts resulting from this collaborative process have wide application throughout the upstream sector, regardless of the HCs where E&P operations are developed. Because of the non-boundary character of these rules and the fact that they are not elaborated exclusively by a HC, the rules are referred to as transnational by some scholars, such as De Jesus (2012) and Garcia (2012).

[12]For more information about OESI see: https://oesi.tamu.edu/

Nonetheless, it is important to emphasize that despite the importance of such transnational rules[13], the upstream sector's regulatory system is initially formed by the rules issued by the HCs. It is the nationally established rules that will authorize the E&P activities, determine how this sector will be organized, and set the conditions for recognizing transnational rules. This presents the analytical problem of understanding the influences and reciprocal interactions between these different types of norms. In response to this problem, this thesis proposes an analytical structure that presents the regulatory system of the upstream sector of the petroleum industry as a legal order, following the Halliday and Shaffer (2015) approach.

This chapter aims to present the upstream sector regulatory system as a legal order composed of the norms emanating from HCs and IGOs, considered as public norms in this thesis, and the ones emanating from non-state actors, such as those norms arising from the connection networks, which are considered as transnational rules in this thesis.

This method of analyzing the regulatory system using a broad approach, distinct from the positivist doctrine which only recognizes the legal orders composed of rules emanating exclusively from states and IGOs, has been the object of study by several scholars who analyze this regulatory movement beyond the state (Ost and Kerchove, 2002; Black 2002; Abbott and Snidal, 2009; Djelic and Sahlin, 2012; De Jesus, 2012; Garcia, 2012; Halliday and Shaffer, 2015; Michaels, 2016). These studies propose a new conception of the legal order, which goes beyond the national and international dichotomy, also incorporating the rules produced by non-state actors or by public-private networks. In this thesis, the Halliday and Shaffer (2015) approach to the transnational legal order will be adopted, as they have established a methodology to delimit this new order.

According to Michaels (2016) the study by Halliday and Shaffer can be considered a groundbreaking work and an ‘impressive analysis’. For this author, the law resulting from this transnational order could be characterized by its sources, emphasizing that this law would be neither domestic nor international in origin. Transnational law would be developed “by private actors, arbitrators, so-called formulating agencies, and the like”, thus forming a “non-state-law”, in a broad view. Abbott and Snidal (2009) also include the Regulatory Standard-Setting (RSS) schemes in the list of sources of transnational law, such as the Forest Stewardship Council (FSC) or Fair Trade International of the Max Havelaar Foundation.

[13]It is important to note that in this thesis the transnational rules will not be considered as the *lexmercatoria*, as proposed by Gaillard (2001)

By considering a specific TLO for the upstream sector's regulatory system, it will be possible to analyze the possibility of producing countries taking on a new role in the rule-making process. Micheals (2016) emphasizes the crucial and complex role of the state in the transnational legal order. For this author, Halliday and Shaffer (2015) are able to clearly delimit the role of the state, surpassing previous approaches to transnational law where this role was imprecise and amorphous.

To analyze this new role, the analysis of Abbott and Snidal (2009) will be added to Halliday and Shaffer's (2015) approach. These authors propose that states act as the orchestrators of the international regulatory system, using a transnational new governance model of regulation. By adopting this new transnational governance model, states, acting singly or associated in IGOs, would leave their central and exclusive position in the rule-making process in order to facilitate and orchestrate the participation of private actors and institutions, increasing the regulatory expertise in a collaborative and decentralized process to seek joint solutions.

For these authors, the orchestration function would include directive and facilitative measures to engage public and private actors in regulatory activities as well as the possible extension of public law principles into private institutions' regulatory activities. In the second section of this chapter, Abbott and Snidal's (2009) concrete actions for the state exercising this new role of orchestrator will be presented.

Given that legal orders are made up of norms, which in the understanding of positivist doctrine (Kelsen, 1999) are formed initially from acts of will, the following section will present the relevant actors for upstream sector's regulatory system, presenting their acts of will, meaning their interests and goals in this sector. This is because, according to Halliday and Shaffer (2015), *"(a)ctors invest in law precisely to advance their perceptions of their interests and normative goals."*

1.2 Relevant Players of the Upstream Sector's Regulatory System

According to Duval et al. (2009), the upstream sector's regulatory system is made up by "*various laws, regulations, and contracts around the world*" that consolidate the rights and obligations of its relevant players. In a broader perspective, which will be adopted in this thesis, the practices, standards, and model contracts resulting from the collaborative process between the upstream's actors are added to this system.

As the relationships established between these actors are long term, it is a challenge to find solutions that address all "*delicate legal, technical, economic, financial, political and environmental problems*" that balance all interests involved.

Rules issued by state actors such as producing countries and IGOs are easily accepted as part of the upstream regulatory system. However, the rules issued by companies, industry associations and civil society cause divergences as to their legal validity. This issue will be addressed in the second section of this chapter. Before that, in the next subsection, each relevant actor in the rule-making process of upstream sector's regulatory system will be described. The rules issued by these actors will compose the transnational legal order of the upstream sector's regulatory system, hence the importance of describing them.

1.2.1 Producing Countries or Host Countries – HCs

HCs, as the owner of the subsoil resources, have the primary objective of regulating the access to oil and natural gas reserves, the conditions under which petroleum companies will carry out their E&P activities, and how the revenue will be appropriated by the Government, also known as the fiscal regime (Inkpen and Moffett, 2011). In some cases, the HCs also create NOCs to perform the E&P activities in order to increase control over their natural resources production.

Duval et al. (2009) maintain that the history of the petroleum industry shows the constant efforts of HCs to strike a balance between maximizing their share of income from oil operations without discouraging investments by companies tasked with discovering and developing "*the black gold of crude oil*."

Daintith (2017) points out that HCs must be concerned with "*health and safety of workers in the industry, the interests of population in the neighborhood of petroleum operations, and the general protection of the environment,"* in addition to seeking to maximize fiscal return, the ultimate recovery of their reserves and local content.

In other words, HCs will aim to exercise sovereignty over petroleum resources, maximize revenues from its exploitation, increase the NOCs' influence on management decisions and control of these resources, develop national technology, improve its workforce, and achieve sustainable development of the country (Duval et al.., 2009).

However, the interests of HCs may vary depending on the degree of economic development. Developed countries such as Norway, instead of pursuing income maximization, may focus on

long-term resource management to extend their access to this non-renewable resource. Developing countries, dependent on the resources from oil exploration, may choose to produce in the short term to generate income to leverage their development.

Inkpen and Moffett (2011) add that for HCs that run NOCs, their objectives would be less concerned with maximizing growth or economic development and more concerned with self-interest. The interest would be to use the high amounts of income provided by the exploitation of petroleum resources for the survival of the government and the strengthening of leadership, as can be read on the following transcription:

> *"The goal of governments is not about economic development or maximizing growth. The goal is political and self-interested: government-run businesses help maximize the state's power and help finance and sustain the leadership's chances of survival. State-owned oil and gas companies can be enormous cash cows, and as the Venezuela case shows, the oil industry provides money for redistribution and political survival."*

1.2.2 Companies – IOCs and NOCs - and Industry Associations

Concerning the relevance of the rule-making process for the upstream sector's regulatory system, this section will focus on the interests of IOCs and NOCs and their associations while recognizing the importance of service companies to the petroleum industry, notably in relation to the development of technology.

International Oil Companies – IOCs

IOCs, which are responsible for investing heavily in E&P operations and bear all the risks associated with exploration, aim to maximize the level of profitability in their operations. Duval et al. (2009) point out that recently these companies have included in their project management the need to adhere to "increasingly stringent corporate social responsibilities (CSR), as well as environmental and socio-economic requirements related to local communities where they operate."

According to Bagheri and Di Mini (2015), the IOCs will guide their actions *"insisting on the operatorship role; working oilfields from discovery to depletion; having 10 to 50 year planning horizons; diversifying businesses to cope with volatile markets; having a global reach with a very large scale of operation; stressing financial conservatism and minimum debt."* In order to

reach these goals, they invest massively in the development of technology and in increasing their technicians' level of expertise. Therefore, IOCs concentrate a large portion of the technical expertise of the UPSTREAM SECTOR.

National Oil Companies – NOCs

The National Oil Companies – NOCs - are state-owned companies generally formed to manage a country's oil resources. They represent an effort of the HCs to increase their control over such resources and thus retain more revenue from their exploitation. However, Victor et al. (2011) point out that the interests of an HC and its NOC are not always convergent. As an example, these authors mention the Gazprom Russian NOC, and PEMEX, Mexican NOC that became states within their own states, achieving some independence concerning the control of the respective HCs.

For Bagheri and Di Mini (2015), the NOCs will generally aim to: redistribute the wealth of petroleum revenues for the society at large, build foreign and strategic policy and cooperation, assure energy security, participate in the policymaking process, and contribute for the country industrialization and economic development.

In recent decades, some NOCs have stood out for their managerial performance, technical excellence, financial leverage, and international operation. Differing from traditional NOCs, super NOCs intensify their investments in research and development (R&D), thus reducing the technological gap in relation to IOCs. These super NOCs, including the Norwegian Equinor, the Brazilian Petrobras, and the Petronas of Malaysia, are more oriented by financial goals than traditional NOCs. According to Roberts (2007), this happens because:

> *"Many NOCs now have the cash and the competence to go head to head with their IOC counterparts in competing for and developing the big E&P opportunities, and most NOCs have learned how to expand their interests into overseas markets, in direct competition with IOCs, whilst maintaining the fallback comfort of their domestic monopolies."*

Industry Associations

The industry associations of the upstream sector are mainly an arena that congregates the petroleum companies and their experts. They seek solutions to make upstream operations more efficient, which includes expressing their members' interests to HCs more strongly. Since the

scope of these associations' actions goes beyond the boundaries of a single country, they can be considered transnational institutions.

According to Garcia (2012), the industry associations of the upstream sector "work to identify and develop best practices for upstream operations concerning issues such as health, safety, and the environment (HSE).” The model contracts adopted by such parties in the transactions of the upstream sector are another important product of these associations. Martin and Park (2010) argues that a significant aspect of the contract standardization is to achieve more efficiency, stating *"Model contracts seek to standardize the terms governing certain common types of agreements used in the petroleum business. This movement to model contracts is not surprising when considering how significant the role standardization can play in attaining efficiency."*

These associations also seek to disseminate uses and practices through forums and publications, such as codes of conduct, guidelines, and training courses.

As examples of these associations, Martin and Park (2010) cite: American Petroleum Institute (API), International Energy Committee of the American Corporate Counsel Association (ACCA), Association of International Petroleum Negotiators (AIPN), International Association of Oil and Gas Producers (OGP), United Kingdom Offshore Operators Association (UKOOA), International Association of Drilling Contractors (CAODC), International Association of Geophysical Contractors (IAGC), Petroleum Equipment Suppliers Association (PESA), Petroleum Services Association of Canada (PSAC), American Association of Petroleum Landmen (AAPL), Canadian Association of Petroleum Landmen Petroleum Joint Venture Association (PJVA), Rocky Mountain Mineral Law Foundation (RMMLF), Council of Petroleum Accountants Societies (COPAS), and Petroleum Accountants Society of Canada (PASC).

1.2.3 Intergovernmental Organizations (IGOs)

First, it is necessary to clarify that this thesis will be adopting the terminology Intergovernmental Organizations (IGO) to describe the institutions that group the countries, following the approach of Thompson and Snidal (2011). These authors consider the commonly adopted term to describe interstate arrangements - International Organization – to be a term that also includes arrangements among non-governmental and transnational actors.

IGOs are institutions formed based on the principles of sovereignty and nation states deriving from the Peace of Westphalia in 1648, which, according to Thompson and Snidal (2011),

"*placed the states of Europe on an equal legal footing and established the norms of territorial integrity and non-interference in the domestic affairs of other states.*

For Rezek (2018), IGOs are a product of a legal construction resulting from a number of countries' combined will. That is why this author maintains that the constitutive treaty of every international organization is, for it, of greater importance than the constitution for a nation-state. A nation-state's existence does not depend on the existence of a constitution. For this author, the existence of the latter does not seem to be conditional on the availability of a basic diploma. The nation-state is a group of humans to live, under some form of regulation, within a given territorial area, and it is certain that the constitution is nothing more than the legal canon of that order. The IGO, on the other hand, is only a legal reality: its existence is only supported in the constitutive treaty, whose main virtue is not, therefore, to discipline its functioning, but to have given it life to formalize its constitution, without which no material element pre-existed.

With respect to the upstream sector, it is important to consider the IGOs that address its members' interests related to this sector. In this regard, due to their relevance to the upstream sector's regulatory system, the following IGOs stand out: the United Nations (UN), the World Bank, the Organization of the Petroleum Exporting Countries (OPEC), and the Organization for Economic Co-operation and Development (OECD). These IGOs publish resolutions, guidelines, and codes of conduct that impact the regulation rule-making process of each HC, and the performance of the companies that work at upstream sector.

Thompson and Snidal (2011) point out that, in general, the richest countries in western Europe are more numerous in the composition of the IGOs, generating a certain bias towards developed and developing countries. Developed countries, according to Abbott and Snidal (2009), "*are the home of most multinational enterprises (MNEs), the source of most foreign investment, and the largest global markets.*"

The following items will briefly outline the interests of these four IGOs.

United Nations - UN

The UN is an arena that brings together HCs and investor countries, and addresses common issues among all the countries that are part of upstream sector, such as property rights of petroleum reservoirs; limits for the development of cross-border petroleum reservoirs; offshore operations; environmental and health protection; sustainable development; and arbitration.

Among the norms issued by the UN that have direct application to the upstream sector, the following stand out:

- The UN Resolutions on the Ownership of Natural Resources published in 1952, 1962, 1966 and 1974 that reaffirmed the sovereignty of the HCs over their natural resources and defined the conditions for the development of these resources by foreign investors[14];
- The 1958 Geneva Convention on the Continental Shelf (Geneva Convention), the first international Convention that dealt with offshore structures' decommissioning, aiming to ensure safety in navigation.
- The United Nations Convention on the Law of the Sea of 1982 (UNCLOS) that establishes guidelines for setting boundaries for international maritime borders and for the continental shelf[15];
- The conventions and guidelines issued by the International Maritime Organization (IMO) that compose a veritable regulatory framework for maritime navigation, including environmental safety, legal affairs, electrical engineering, maritime safety and navigation, essential for planning the offshore petroleum exploitation[16];
- 2030 Agenda for Sustainable Development[17] and Paris Agreement[18], with regard to providing affordable energy and fighting climate change. The countries, which have

[14] For more information see: http://www.ohchr.org/EN/ProfessionalInterest/Pages/NaturalResources.aspx. accessed 01 Mar 2018

[15] For more information see: http://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm accessed 01 Mar 2018

[16]The main IMO conventions related to marine pollution, accident prevention and damage compensation are: International Convention for the Safety of Life at Sea (SOLAS), 1974; International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997 (MARPOL); International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), 1969; Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LC), 1972 (and the 1996 London Protocol); International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990; International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001.For more information see: http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/Default.aspx accessed 01Mar 2018

[17]In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals, which officially came into force on 1 January 2016. These goals are aimed at ending poverty, protecting the planet and ensuring peace and prosperity for all. For more information see: <http://www.un.org/sustainabledevelopment/> accessed 29 Jan 2018

[18]The Paris Agreement was approved on December 12, 2015, during the COP-21 in Paris, which establishes emission reduction measures for carbon dioxide from 2020. It entered into force on November 4, 2016. The main objective of the universal agreement is keeping the global temperature rise well below 2 degrees Celsius and make even greater efforts to limit the temperature rise to 1.5 degrees Celsius above zero. In addition, the agreement aims to strengthen the capacity to deal with the impacts of climate change. More information at <http://unfccc.int/essential_background/convention/items/6036.php> accessed 1/29/2018

ratified these agreements, should change their regulatory framework in order to achieve the objectives outlined in these two covenants.

Notes on Organizing Arbitration Proceedings and Arbitration Rules for ad hoc arbitrations published by the United Nations Commission on International Trade Law (UNCITRAL). This Commission is the main legal entity of the UN System to deal with issues of international commercial law. According to Garcia (2015), the HCs often adopt UNCITRAL as a reference source of uses and practices for the regulation of arbitration proceedings[19].

Organization of Petroleum Exporter Countries – OPEC

The OPEC is an arena for the cooperation of huge exporters HCs, all developing countries[20], which influence its members on issues such as sovereignty over natural resource ownership, oil pricing, production levels, and types of agreements, challenging the power of IOCs (Duval et al., 2009).

According to Julian Garcia (2015), their members can enter into commitments with direct impact on petroleum operations, which can be considered international obligations. A notable and recent example of such a commitment was the Declaration of Cooperation, signed by the members of OPEC in 2016, with the purpose of limiting production volumes voluntarily, aiming to reduce stocks and bring stability to the market after the imbalance from the increase in the production of American tight oil. Therefore, such a cooperation agreement influences the regulation of each signatory country directly, since it imposes limits on oil production. It also affects the entire petroleum chain, as it leads to a change in the price of the barrel, considering the reduction of oil output.

Organization for Economic Co-operation and Development – OECD

The OECD objectives include, beyond economic growth, the protection against imbalances in the international market, as occurred after the Arab oil embargo in 1973; with the sharp increase

[19] More information available at: http://www.uncitral.org/uncitral/es/about_us.html accessed 01 Mar 2018

[20]For more information about OPEC members, see: https://www.opec.org/opec_web/en/about_us/25.htm

in the crude oil price in the first half of 2008, or with the decline of oil barrel price from the end of 2014.

Garcia (2015) affirms that the OECD has contributed to the development of transnational rules since it publishes codes of conduct to be adopted by its member countries, which may affect petroleum operations. This is exemplified by the OECD Codes of Liberalization of Capital Movements and Current Invisible Operations revised in 2016[21]; the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions of 2009[22], and the Guidelines for multinational enterprises of 2011[23].

It is also important to highlight the International Energy Agency, an autonomous institution within the OECD, created to equip its members with the information and organization necessary to meet the challenges imposed by the Petroleum Industry, as reported on its website:

> *"The history of the IEA began with the 1973-1974 Middle East War crisis and its immediate aftermath. While oil producing countries appeared relatively well organized to utilize their new oil based economic and political power, many OECD countries found themselves inadequately equipped with the information and organization necessary to meet the corresponding challenges[24]*."

World Bank

The World Bank aims to finance projects relevant to the economic development of developing countries related to the creation of an infrastructure in the most diverse areas, including energy projects (World Bank, 2018). Until 2019, the World Bank played a significant role in financing development projects in the upstream sector[25], and publishing guidelines and codes of conduct in order to require stricter conditions in this sector of operations.

Through the loans, the World Bank could require some stricter conditions for companies to operate. For example, the International Finance Corporation (IFC), part of the World Bank

[21] For more information see: http://www.oecd.org/investment/investment-policy/codes.htm accessed 06 Mar 2018
[22] For more information see: http://www.oecd.org/daf/anti-bribery/oecdantibriberyconvention.htm accessed on 06 Mar 2018

[23] For more information see: http://www.oecd.org/investment/mne/ accessed 06 Mar 2018

[24]For more information see:https://www.iea.org/about/history/

[25]As announced at the One Planet Summit in 2017, the World Bank Group will no longer finance upstream oil and gas since the beginning of 2019. Only upstream gas projects in the poorest countries where there is a clear benefit in terms of energy access and the project fits within the countries' Paris Agreement commitments could be analyzed for financing purposes. For more information, see: https://www.worldbank.org/en/news/press-release/2017/12/12/world-bank-group-announcements-at-one-planet-summit

Group, used to require consent from indigenous groups for an oil or mining project on their land.

Regarding the World Bank's Guidelines, Garcia (2015) highlights the importance of the 'Company Codes of Conduct and International Standards, Part II, Oil & Gas'[26] for the upstream sector regulation, since these codes establish international standards or benchmarks for a wide range of issues generally addressed in corporate codes of conduct, including workers' rights, health, safety issues, environmental concerns, compensation, migrant labor issues, human rights, security rules, community involvement, ethical conduct, good governance, and the rule of law.

Furthermore, Weaver (Duval et al., 2009) mentions the relevance of the World Bank directives related to sustainable development that require Environmental Impact Assessments (EIA) and Social Impact Assessments (SIAs) for oil and gas projects.

The settlement of conflicts between HCs and oil companies is another issue addressed by the World Bank. Its International Center for the Settlement of Investment Disputes (ICSID) was the first institute of international investment arbitration in the world and remains an important forum for disputes between foreign private investors and HCs or their representatives. The cases involving the oil and gas sector are the most numerous, often reaching the highest percentages[27].

Duval et al. (2009) highlight that the ICSID award is mandatory for the countries that have ratified its convention, presenting the same status as a final sentence issued by the national court. Therefore, it cannot be questioned outside the ICSID procedures; in other words, it does not allow interference from local courts.

1.2.4 Civil Society (ONGs, socially responsible investors, academy)

First, it is necessary to clarify that the civil society category is broad and brings together several actors, not only NGOs but also labor unions, student groups, academics, and socially responsible investors, among others. Given their relevance to the upstream sector's regulatory system, in this thesis, civil society actors will be restricted to NGOs, academics or academies of science, and socially responsible investors.

[26]For more information see: http://documents.worldbank.org/curated/pt/442691468349802764/Oil-and-gas-mining
[27] Oil, Gas & Mining cases represent 24% of All ICSID Cases, the largest share in comparison with other economic sectors. For more information, see: https://icsid.worldbank.org/en/Documents/ICSID_Web_Stats_2019-2_(English).pdf

According to Thompson and Snidal (2011), "*(n)on-government organizations pressure governments for change, but also work with them to manage a variety of issues, including the environment, human rights, and international regulation in various settings."* At the upstream sector, the NGOs' objectives are trying to minimize the environmental and social impacts of this sector and encourage sustainable development. Thus, they can play an important role in developing guidelines and studies analyzing the impact of a upstream sector regulation. As an example, Weaver (Duval et al., 2009) points out the guidelines for exploring and producing in the Artic and in mangrove swamps developed by the International Union for the Conservation of Nature (IUCN).

Academics or academies of science are independent sources of expertise. Their objectives are to provide technical advice for the upstream sector, acting as counselors of governments and industry. Academics can also play an important role in developing standards or even technical guidelines since they are supposed to be more impartial than industry alone making these standards (Weaver, 2014).

Socially responsible investors could act as the NGOs trying to minimize the environmental and social impacts and encourage sustainable development, but they can be more effective since they can impose strict conditions on loans and loan guarantees. Similar to IFC, they can require consent from indigenous groups to an oil project on their land or an environmental impact assessment or even safety and environmental management systems (SEMS).

Having exposed the interests of each relevant upstream sector actors, that is, how their acts of will are presented, the following sections will deal with the legal orders that group each category of norms produced by these actors. Positivist doctrine will be adopted to describe the national and international legal order. For the description of a supposed upstream sector autonomous order supported by some scholars (Bishop, 1998; Martin, 2012; Bowman, 2015; De Jesus, 2012; and Garcia, 2012), the approach of *Droit en Reseaux* of Ost and Kerchove (2002) will be adopted. And for the proposed upstream sector's regulatory system-specific order, it will be used the transnational legal order approach of Halliday and Shaffer (2015).

1.3 A Proposal of a Transnational Legal Order for the upstream sector's Regulatory System

According to Michaels (2016), to delimit the new transnational legal order it is necessary to differentiate it from national and international legal orders, in order to overcome the dichotomy

between national and international. By adopting this understanding, Halliday and Shaffer (2015) develop a functionalist approach, according to which the emergence of a new order occurs in response to the failures of national and international orders in presenting solutions to the challenges of sectorial regulation. Thus, for these authors, in order to understand the need for a new order it is necessary to understand the deficiencies of the existing orders.

The national legal order is restricted to the rules issued by state agents under the terms provided for in the Constitution. The international legal order is restricted to the norms resulting from negotiations between sovereign states and those agreed upon in the scope of IGOs. These two orders do not incorporate norms produced by private actors, such as standards, practices, or codes of conduct, often resulting from the process of self-regulation. However, there is a growing reference to these practices in national and international norms. Therefore, there is a need to conceive an order that integrates both the norms issued by public agents, whether at national or international level, and the norms issued by private agents.

For Michaels (2016), the transnational order "*is placed somewhere between national and global, between the law that is purely inside a locality (in this case the nation-state) and that law that is everywhere (global law)*." Considering that an order that reaches all countries globally would be something utopic, even when dealing with an example like human rights, and that national orders emanate rules that apply more and more to cross-border activities, this author considers that most national orders would be transnationalizing.

This section will characterize national legal orders, international legal orders, and self-regulation with the aim of presenting the transnational legal order and characterizing it through comparison with the categories previously described. In this exhibition, the norm-making process and their scope of application will be discussed, whether national, international, private, or transnational.

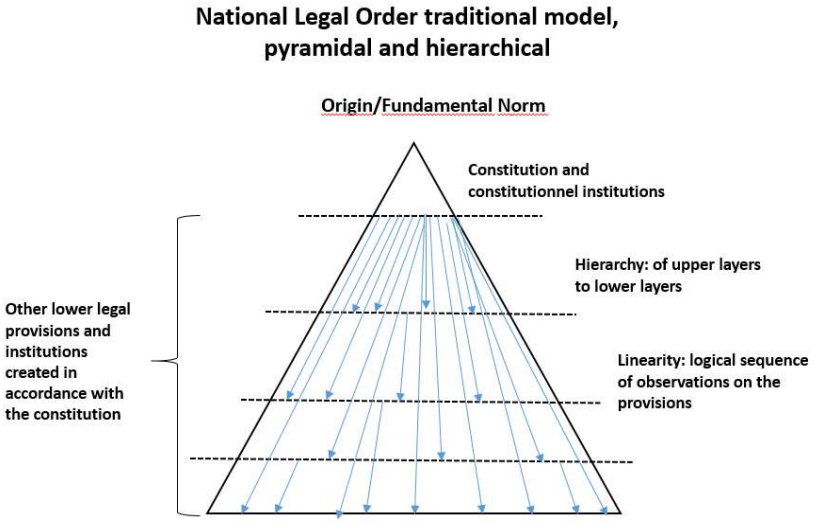
1.3.1 National Legal Order

The construction of the national legal order is based on the positivist doctrine, which in this section will be described according to Kelsen's Theory of Pure Law (1999). According to Kelsen, the national legal order is a closed system composed of rules organized in overlapping and hierarchical layers, subordinate to the constitution, in a pyramidal structure in which the constitution would occupy the top. Thus, only the rules provided in the constitution and those created following the legislative procedures provided for in the constitution would be part of

the national legal order. Customs can be recognized as an objectively valid norm only if the constitution determines it as a norm-creating fact. According to Halliday and Shaffer (2015), the application limits of the national legal order would be restricted to the borders of the state that exercises sovereign jurisdiction.

According to this understanding, the constitution would be the fundamental norm that establishes the creative facts of the law, be they rules or customs. It is also the instrument that creates the bodies and gives them the power to create general legal norms, laws, and regulations, setting the rules of the legislative process. The constitution also creates and authorizes the bodies with competence to monitor compliance with the rules and apply sanctions. Thus, according to the theory proposed by Kelsen, the law itself governs its own creation, in a closed, linear system, subordinate to the dictates of the Constitution.

Figure 1 - Adaptation of the norms' hierarchy representation according to Veronese (2018)



Source: developed by the author

Continuing with this theory, the norms must be created in conformity with what determines a fundamental norm, a superior norm to be valid, and to integrate the legal system. Besides, they must have the minimum effectiveness to be valid, which means the conduct prescribed by the norm must be applied by the bodies with competence assigned by the constitution or higher norm and followed by the persons to whom the norm is addressed. In other words, the rule will

be valid when a court established according to the constitution's provisions refers to the rule in a decision, for example, or when citizens shape their conduct according to what the rule prescribes.

Another validity requirement is the presence of coercion exercised exclusively by the state in the event of non-compliance with the rules. According to the positivist theory, the law is established as an order of coercion, constituted by mandatory legal norms that are binding and backed by coercion. Because of these characteristics, these norms are also called 'hard law.'

Michaels (2016) points out the following advantages of the national legal order: i) its technical administrative capacity, not found in any other institution; ii) its military structure, supported by the exclusive coercive power of the state, which means global power for the most powerful countries; iii) its financial capacity, being able to help the system in the face of a crisis, as occurred in 2008; and iv) the superiority of its rules and the ability to demand them using coercion. However, it presents as disadvantages "*relative immobility and locality, transparency of decision making, and the ensuing relative inflexibility*", being always limited by the contours of the constitution.

Nevertheless, it is important to consider that Kelsen's Pure Theory was written in the middle of the twentieth century when the idea of order and stability prevailed as a worldview. In this conception, the state should occupy the center of the political order, representing the supreme power in the national legal order, based on the rule of law, and guaranteed by the threat of coercion. In the context lived by Kelsen, the territorial, political and legal boundaries were well defined, allowing the adoption of closed, linear and hierarchical systems of rules (De Jesus, 2012; Ost and Kerchove, 2002)

To illustrate this model, Ost and Kerchove (2002) cite Thomas Hobbes's Leviathan (2017), the founding work of legal positivism and modern political theory. These authors recall the frontispiece of the original edition that brings a personification of the republic, a half-man, half God who holds the temporal (sword) and spiritual (cross) power, under a quote that refers to the sovereign power of the republic (*non est potestas Super Terram quae Comparetur ei*.[28]). Figure 2 presents this frontispiece.

[28] In free translation: "There is no power on earth that can be compared to"

Figure 2 – Frontispiece of Léviathan de Thomas Hobbes (2017)

Source: Ost and Kerchove (2002)

The national legal orders relevant to the upstream sector would be those of HCs, which have a regulatory system composed of rules produced exclusively by state agents, subordinate to the constitution, which aim to regulate access to reserves and E&P activities. On the history of the upstream sector regulatory system's emergence at the national level, Walde (2003) reports that *"(t)he discovery of oil and gas in the Dutch, Norwegian, British and Danish offshore areas have resulted, throughout the 1970's, in the emergence of a well-developed body of oil & gas law regulating in particular, as administrative law, the licensing of access to exploration and development."* The actors involved in the process of drafting such rules are exclusively public agents, represented by the ministries of energy or oil and gas, regulatory agencies, and even their NOCs. Examples of such norms would be petroleum laws, regulatory decrees, resolutions on procedures related to E&P activities, E&P contracts, tender protocols, ministerial acts, among others.

1.3.2 International Legal Order

The emergence of the International Legal Order is attributed to the Peace of Westphalia in 1648, when the concept of state sovereignty emerged, in which a state would act on equal terms with other states in their international relations. According to Thompson and Snidal (2011), Westphalian sovereignty helped to order political life at the international level, although in a highly decentralized and limited way. This order covers relations between states and the

operation of IGOs created by them, and addresses conflicts between national jurisdictions asserting authority over the traditional activities of private actors (Halliday and Shaffer, 2015).

The shape of this order was also the result of the positivist doctrine analyzed by Kelsen in his Pure Theory of Law (1962). According to this theory, the international legal order brings together a complex of rules governing the reciprocal conduct of sovereign states, the exclusive subjects of international law. And the creation of these international norms would occur through customs or treaties, that is, through the members of the international community themselves and not through a special legislative body. As Kelsen's theory recognizes as valid only the norms that present coercion, in the international legal order the coercions would be wars and retaliation. These sanctions consist of the compulsory deprivation of life, liberty, and other goods, particularly the economic assets of individuals, but are not directed at people but instead the nation-state. However, for Kelsen, as every law is essentially the regulation of human conduct, the norms that compose the international legal order would indirectly affect human conduct through the countries to which individuals belong. According to Kelsen, the customs, treaties, and decisions of international courts would be organized hierarchically and in different extracts, reflecting the same structure of the national legal order.

Nevertheless, despite the relevance of the systematization of the international order by positivist doctrine, Dupuy and Kerbrat (2014) argue that it has become insufficient to explain how the norms that integrate this order are produced today. Especially after the creation of the UN and the multiplication of international, governmental, and non-governmental organizations. After the creation of the UN, the sources of international law were identified from Article 38 of the Statute of the International Court of Justice (ICJ), annexed to the United Nations Charter, which lists the following sources:

> a) *"international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;*
> b) *international custom, as evidence of a general practice accepted as law;*
> c) *the general principles of law recognized by civilized nations;*
> d) *subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law."* [29]

This statute is sometimes recognized as the superior law within the international order, following the positivist logic. However, Dupuy and Kerbrat (2014) point out that the

[29] For more information see: https://www.icj-cij.org/en/statute

international order is characterized by normative equivalence, different from the hierarchical structure postulated by positivism. Thus, this provision would have an operational character, serving as a guide for judging internationally, which should always consider the sovereignty of countries. In the meantime, these authors emphasize the antiquity of this diploma, with more than half a century of existence, referring to the international community without considering the size and heterogeneity of the present day, which would explain the absence of reference to unilateral acts of international organizations[30] and the archaism of using expressions such as civilized nations.

In international legal order, there is no fundamental norm, as in the national legal order, which prescribes the process of drafting norms to give them validity. Therefore, there is no pyramidal structure as in the national order, nor a hierarchy between norms. Each organization will provide the procedure for drafting these standards. Notwithstanding, according to Kingsbury et al. (2005), international organizations tend to replicate public law mechanisms, principles, and practices. Thus, these organizations would be ensuring adequate standards of transparency, participation, decision-making, legality, and review of rules and decisions, which, according to these authors, would shape a global administrative law.

Rezek (2018) affirms that instead of subordination, coordination is the principle that presides over the organized coexistence of so many sovereignties. The norms emanating from the international legal order rarely take the form of hard law, binding and backed by coercion. Most of the time, they take the form of recommendations, such as conventions, guidelines, and codes of conduct, aimed at influencing the drafting of rules within the national legal order. The doctrine calls this kind of non-binding norms soft law.

Dupuy and Kerbrat (2014) also point out that in the face of an increasingly transnational or globalized world, characterized by the complexity of international relations, other actors are considered as part of the international community in addition to sovereign countries, which remain primary or fundamental actors of international law. To support this statement, the authors point out that the UN adopts the concept of international civil society to designate various associations or NGOs, as well as diverse economic actors such as multinational corporations. These actors play an important role in initiating, implementing, and monitoring the application of international norms. Regarding the role of NGOs, these authors highlight their ability to influence, often in a decisive way, the functioning of IGOs, especially concerning

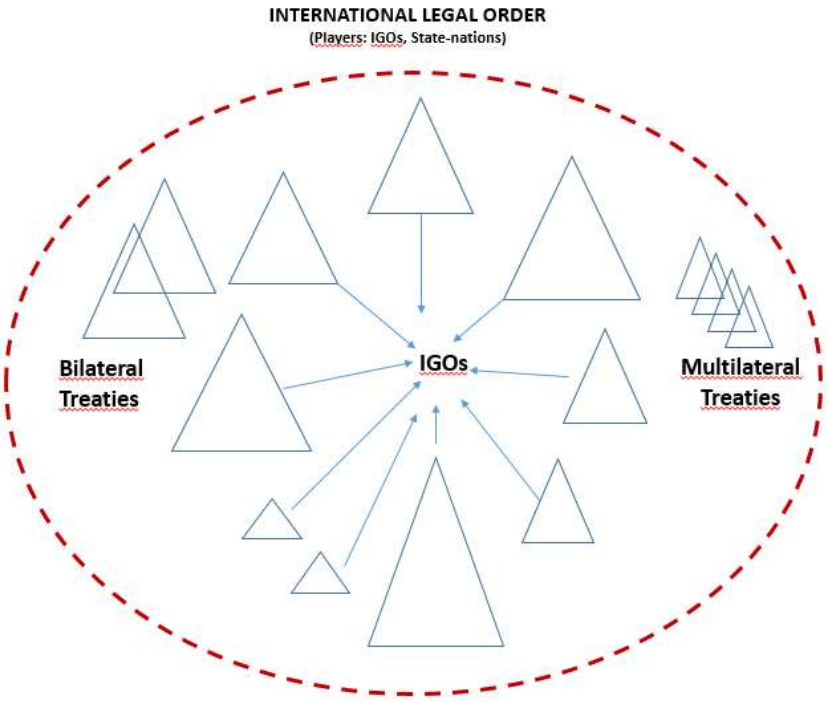
[30]There is no consensus between the scholars about the unilateral acts as a valid source of Public International Law. Rezek (2018) for example, affirm that unilateral acts represents only a legal act, not a norm.

legal demands related to issues such as economic, political, and social developments, the protection of human rights and environment, development assistance, and others.

However, for the purposes of this thesis, only sovereign states and IGOs will be considered as subjects of the international legal order, as the classic view of International Public Law maintains (Pellet et al, 2009; Rezek, 2018). As individuals, companies and NGOs have no international legal personality because they cannot formally create norms under international law. These actors will be considered as rule-making subjects only in the transnational legal order.

In relation to the upstream sector regulatory system, according to the classic theory of the Public International Law, only the norms issued by sovereign countries and IGOs will be considered part of the upstream sector international legal order, as shown in the Figure 3. Thus, the norms such as UN Resolutions and Conventions, commitments between OPEC members and investment treaties will be considered part of the upstream sector international legal order.

Figure 3 – Representation of International Legal Order



Source: developed by the author

1.3.3 Self-Regulation – An autonomous order?

With respect to the positivist doctrine, for modern law to exist, it must be created by a state body, within the normative hierarchy of a legal order, founded on the constitution. However, this conception does not fit the current reality in which private norms created by companies and their associations, or even by regulatory standard-setting (RSS) schemes, proliferate in the process of self-regulation.

According Coglianese and Mendelson (2010), "*Self-regulation refers to any system of regulation in which the regulatory target—either at the individual-firm level or sometimes through an industry association that represents targets—imposes commands and consequences upon itself*." These authors also add that self-regulation offers a close connection between the regulator and the regulatory target. In proposing the theory of 'Droit en Reseaux', which considers legal pluralism, the multiplicity of powers and institutions that create law and their interactions, Ost and Kerchove (2002) present an opposing view to the conception of legal order postulated by Kelsen's theory. They point to the increase in norms privately created by transnational corporations to regulate the economic relations established between corporations, arguing that in practice these norms have broad functionality and are endowed with legitimacy and enforceability, following the requirements of the positivist doctrine itself. They maintain that self-regulation brings great flexibility by being self-produced and self-controlled, with better adaptation to ultra-specialized and unstable situations.

In these authors' views, government is powerless to regulate in detail and constantly update all operations of the industry, leaving empty spaces in its regulation. Not even the efforts made by IGOs to develop international rules are sufficient to fill such spaces. Thus, economic power or the market is called to self-regulate in order to maintain itself.

Ost and Kerchove (2002) emphasize that state law and international regulation, coming from IGOs, find a strong competitor in the market law. The market would be a network organization, devoid of a center and top, but not of power, and would be disputing power against governments. The relationships that are established between their operators (companies) take the horizontal form of contractual relationships. The previously fixed and stable rules give way to markets and their imposition of competition between the actors.

In this context, the rules are negotiated, and the geographical location of companies and contracts is chosen because of tax incentives in a competition (law shopping, forum shopping). The law is privatized, and the action of the public powers is increasingly confused with that of

the private powers. Market law deconstructs the traditional regulatory model centered on the state, although it recognizes the importance of this model in some social sectors.

The contract assumes the position of a primarily legal instrument, the main source of self-regulation. For these authors, the present contractual order has reached an unprecedented extent and tends to institutionalize, favoring the transition to more global regulation. Currently, there is a proliferation of partnership networks that produce rules such as model contracts, codes of conduct, and standards, ensuring stability in contractual relationships. Conflict resolution bodies are also established, the arbitral jurisdictions that produce and use self-regulation.

The market self-regulation is also called *lex mercatoria*, a name created by the École de Beaune scholars. For Gaillard (2001), the *lex mercatoria* would be composed of transnational rules or general principles of law. According to this author, *lex mercatoria* would have the same characteristics of a genuine legal order, namely: completeness; structured character, ability to evolve, and predictability.

Concerning the upstream sector, self-regulation is called *lex petrolea* by some authors. *Lex petrolea*, before called *lex petroleum,* would be, according to De Jesus (2012), "the particular branch of a general universal *lex mercatoria* (...) progressively evolving into a transnational legal order completely autonomous from national and international legal orders." This author argues that companies operating in the upstream sector have developed their own rules for governing transnational petroleum contracts and that they reject the application of national law in resolving disputes arising from such contracts.

To analyze the *lex petrolea*, it is important to recall the 1975 lecture given by Professor El-Kosheri at The Hague Academy. According to Garcia (2012), this was the starting point for the development of the legal approach for a transnational petroleum regulation. In his lecture, El-Kosheri defended the existence of an autonomous and specific legal order for the oil industry, which he called the lex petroleum, of a transnational nature, consisting of specific practices and jurisprudence of this industry:

> *Toutefois, quelle que soit l'ampleur de cette réalité mouvante créée par la lexcontractus, elle reste tributaire du régime juridique qui lui confère sa force obligatoire et la source de sa protection. Qu'il soit choisi par les parties ou déterminé par le juge ou l'arbitre saisi, le cadre légal auquel l'accord de participation est ancré permet surtout une certaine « transnationalisation » en fonction de techniques juridiques appropriées élaborées essentiellement par la pratique et la jurisprudence arbitrale. Ainsi, on peut constater, à la*

fois, le recours fréquent aux « principes généraux » et l'élaboration graduelle d'une véritable lex petroleum de nature « transnationale.[31]

Scholars such as Bishop (1998), Martin (2012), Bowman (2015), De Jesus (2012) and Garcia (2012) discussed the relevance of *lex petrolea*, made up of industry-specific rules elaborated outside the positivist system of production of law, such as arbitral decisions, model contracts, and good oilfield practices.

Although they are produced outside the limits imposed by the positivist theory, these scholars defend the effectiveness of these rules because they are generally accepted and adopted continuously and voluntarily by the transnational petroleum community, plus they have its biding force assured by the arbitration courts.

Regarding the autonomy of *lex petrolea* in relation to the state, Michaels (2016) suggests that there are hardly any completely independent rules. For this author, "there is (almost) no law without a state."

In the same direction, Daintith (2017) maintains that there is no system of enforcement for these rules, opposing himself to the existence of *lex petrolea*. According to this author "*arbitration, as the essential dispute settlement procedure appealed to by lex petrolea, depends for its enforcement on those very national legal systems of which it is supposedly independent and, on the obligations, accepted by nation-states under international treaty law.*" Daintith further supports the grammatical imprecision of the term *lex petrolea*, which should be *lex petrolaria* using good grammar. However, this author agrees that these specific rules represent common responses to issues posed by upstream sector.

For Daintith (2017), these rules, integrated with the national and international rules that regulate the upstream sector, would compose a specific legal order: the 'transnational petroleum law'. Following this perspective, the next sections will analyze the existence of a transnational legal order (TLO) as proposed by Halliday and Shaffer (2015), and the setting of a specific TLO for the upstream sector regulatory system.

[31]Translation by De Jesus (2012): *Nevertheless, despite the amplitude of the movable reality created by the lexcontractus, it remains attached to the legal order that grants its binding force and the source of its protection. Whether it is chosen by the parties or determined by the judge or the arbitrator, the legal order in which the participation agreement is incorporated allows above all a certain 'transnationalization' in accordance with the appropriate legal techniques which are essentially created by the practice and the arbitral jurisprudence. In this manner, we can notice the frequent recourse to 'general principles' and the gradual elaboration of a real lex petroleum of a 'transnational' nature.*

1.3.4 Transnational Legal Order

For a brief insight into TLO, Halliday and Shaffer make a simplified description detailing each element of the TLO expression. In these authors' understanding, 'order' refers to the attempt to order a particular sector in which relevant actors have identified a problem. The 'legal' is based on the attributes of TLO, which require that this order must be composed of norms in recognizable legal forms, with the participation of a transnational legal organization or network in the rule-making process. Furthermore, they must be incorporated by national legal orders, or at least influence their legal organizations. And the 'transnational' is because TLO is intended to order relations that transcend the boundaries of countries in one manner or another.

The TLO has three main attributes according Halliday and Shaffer. The first is the presence of a legal organization or network whose performance transcends or spans countries' boundaries in the rule-making process. The second is the engagement of legal institutions that make up the TLO within multiple countries, directly or indirectly, formally or informally, in the adoption, recognition, and enforcement of transnational rules. The third requires that transnational rules must be produced in recognizable legal forms.

Halliday and Shaffer also enumerate five essential characteristics for detailing the TLO framework. These characteristics deal with the interactive rule-making process between the orders; the legal forms adopted by TLO, both hard and soft law; the legal pluralism; the legal realist perspective of the TLO; and the TLO authority.

These attributes and characteristics will be analyzed in detail in the next section, where a TLO for the upstream sector will be proposed following Halliday and Shaffer's methodology.

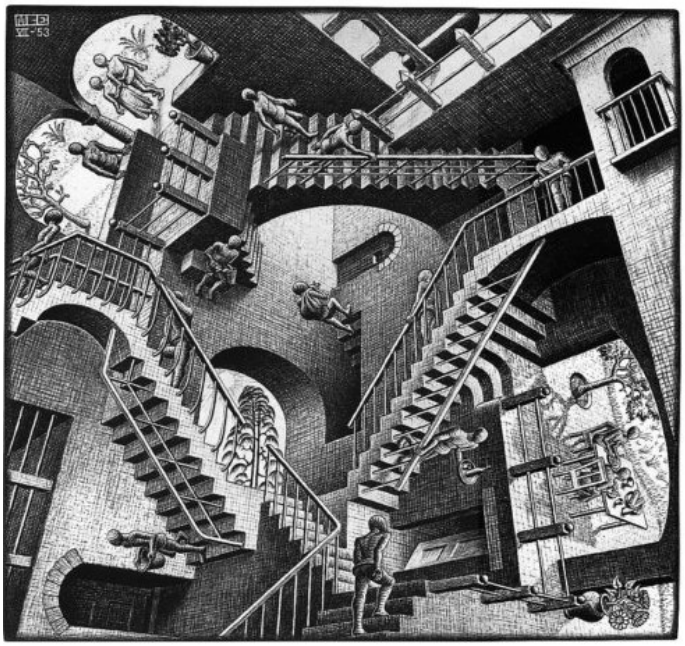
Beyond the duality between national and international

As advocated by Ost and Kerchove (2002), Halliday and Shaffer postulate that it is necessary to go beyond the still predominant positivist doctrine, focused on the duality between national and international orders. Thus, it will be possible to better understand the transformations of the current world, which present problems that transcend national borders and therefore demand transnational responses.

Ost and Kerchove (2002) argue that it is necessary to adopt a pluralistic and relativistic perspective to go beyond the monological and pyramidal worldview of positivist doctrine. Through Escher's lithograph (1953), reproduced below in Figure 4, these authors challenge their

readers to understand several orders in an integrated manner. Thus, Escher's lithography presents an exercise to try to understand a new order, which brings together the optics of multiple actors, acting jointly and in a decentralized way in the formulation of joint solutions.

Figure 4 – Relativity (Escher, 1953)



Source: Ost and Kerchove (2002)

Before presenting the concept of TLO adopted by Halliday and Shaffer (2015), it is important to recall the pioneering study by Jessup (1956), which suggested adopting the expression ‘transnational law’ as a mechanism for overcoming the classic two-dimensionality between international and national law. Jessup defines this body of law as the one which regulates relations that transcend national borders, including public and international law and other rules that do not fit into these categories, the non-state rules.

For Ribeiro and Xavier Junior (2017), Jessup sought to analyze the multi-connected issues that do not fit only in private or public norms of international law and that recognize the existence of other actors, besides states and IGOs, such as companies, individuals and other groups. For these authors, Jessup's concept of Transnational Law includes all the norms that regulate events or actions transcending national boundaries.

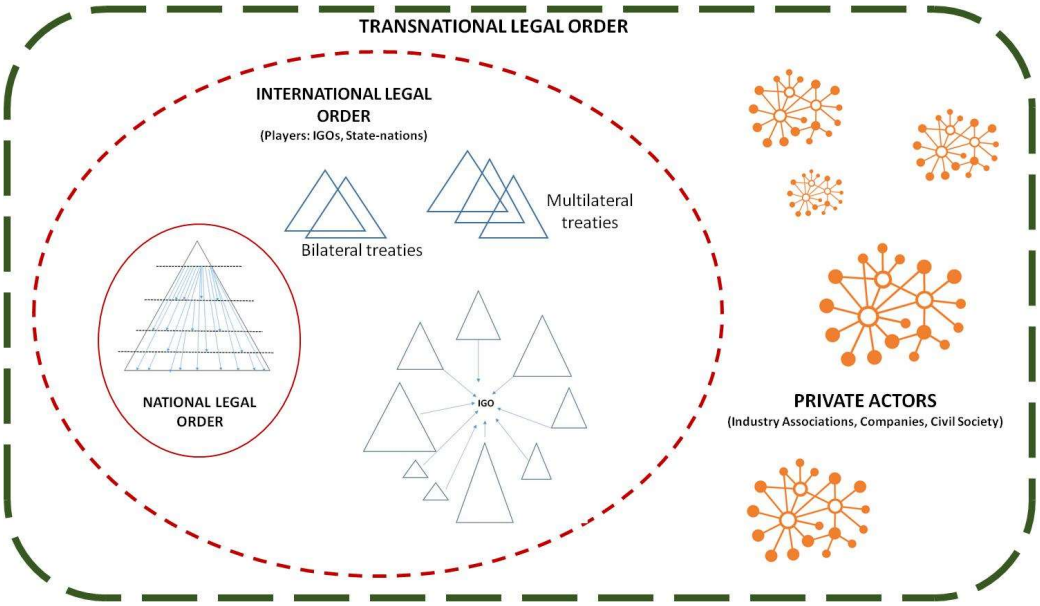
Following the Jessup approach, Halliday and Shaffer (2015) present a methodological structure to configure TLO. This new order is defined by these authors:

> *"as a collection of formalized legal norms and associated organizations and actors that authoritatively order the understanding and practice of law across national jurisdictions. We construe 'associated organizations and actors' broadly to include any organization or social formation including networks. By actors, we refer both to collective actors and to individuals whose activities and careers cross national boundaries. By authoritative we refer to acceptance of the legal norms as reflected in law's understanding and practice. Nation-states remain central to TLOs (we do not live in a post-national world), but they do not alone define the territorial boundaries of legal ordering."*

Thus, the TLO would be composed of a multiplicity of actors that would participate, alongside the states, in the creation of norms and the process of implementation of those norms into the national legal order. States continue to play a relevant role in evaluating and conducting the process of incorporating transnational rules into their legal order. For Coglianese and Mendelson (2010), the State could deliberately encourage regulated, non-state actors, to develop its own rules for presenting responses to public problems, in a process called meta-regulation.

For Halliday and Shaffer (2015), TLO would be "*less an overcoming than a transcending of the state*", a new order that does not suppress the state concept but extends beyond its powers, and requires looking beyond the national lens. The TLO considers the norms that orbit around the national and international order, forming a new order that brings together all the rules that govern that particular sector. Figure 5 presents a schematic of the TLO, displaying the plurality of actors integrated in this order.

Figure 5 - Representation of the TLO actors' plurality



Source: developed by the author

For Halliday and Shaffer, a TLO arises from the growing incompatibility between national regulation and global markets in light of changes in economic interdependence and changes in the interests and power configurations of state and other actors[32]. Economic globalization has resulted in increased interaction between actors by creating common frameworks for references and demands for the coordination of a legal order. The mismatch between perceived problems and existing laws often creates pressure that leads to the formation of TLO. Thus, the regulation of the economy and political institutions will be shaped by innovations in the industry, technological advancement, developments in business organization, and the unintended consequences of the existence of TLO itself.

For Ralf Michaels (2016), transnational law is *"an attempt to deal with a paradigm shift, namely the decline of a Westphalian global order with states as the exclusive actors on the international sphere and with a corresponding dichotomy of law as either domestic or international law."*

[32] According to Gaillard (2001), this would also be the justification for the emergence of transnational rules. This author reports that for Ecole de Beaune, transnational rules "having been conceived and developed in response to the perceived inadequacies of national legal orders".

Beyond the State

A TLO is an amalgam of rules from transnational, national, and local levels, whether hard-law or soft-law, drawn up by a plurality of actors whose goal is to establish rules that settle the practices and mentalities of national and local legal actors. To this end, TLO incorporates and goes beyond the international legal order's rule-making process by addressing not only the relationship between states and between states and transnational private actors, but also dedicating itself to ordering relationships between private transnational actors. According to Halliday and Shaffer, TLO:

> *"span legal orders that vary in their geographic scope, from bilateral and plurilateral agreements to private transnational codes to regional governance bodies to global regulatory ordering. Such TLOs may apply to trans-boundary activities or simply have social effects in more than one jurisdiction."*

Halliday and Shaffer support the fragmentation and disaggregation of the state, which is now branching into other organs and agencies, but stress that the national legal order remains central in the process of formation and institutionalization of legal norms, without being surpassed by the TLO. However, the national legal order is no longer autonomous, as it is influenced by the legal rule-making and conveyance process of the international and transnational spheres.

With the same view, Ost and Kerchove (2002) recognize that TLO does not represent suppression of the state, but the transcendence of the state, meaning a legal order not without the state, but beyond it. For them, TLO is not truly an independent order like the national, and it only becomes law if the state recognizes it as such. According Michaels (2016), states continue to play a prominent role in TLO as suggested by Halliday and Shaffer.

TLO procedural character

Regarding the process of transnational legal ordering, Halliday and Shaffer maintain that, despite the legal focus on legal forms and the category of institutions, TLO has an essentially procedural character, as expressed in the second attribute. Thus, the TLO's objective is to directly or indirectly influence legal institutions within nation-states. TLO would be designed to shape the transnational rule-making process with a plurality of actors acting in a decentralized manner, aiming to be incorporated by states or at least influencing the content of these states' norms. According to these authors:

> *"This process is both top-down and bottom-up, involving the formation, conveyance, and practice of legal norms and the recursive interaction between different levels of social organization through which legal norms become institutionalized. This process often involves considerable contestation in light of different perspectives, values, priorities, and distributive implications. If institutionalized, the legal norms orient social expectations, communication, and action."*

Contrary to traditional legal theories, Halliday and Shaffer sustain that TLO dispenses the hierarchy of norms and is not always binding and backed by coercion. TLO focuses on the interaction dynamics between actors who produce, interpret, and engage with legal norms, rather than focusing on the sources of law, primary and secondary rules, and the rule of recognition. Finally, TLO does not rely on normative criteria to determine what is meant by law. However, it recognizes that normative character requires special attention, which is usually approached through social science scholarship.

TLO normative consolidation occurs in different spheres. In the transnational sphere, it is observed in the texts promulgated by the international and transnational organizations in the form of treaties, model laws, guidelines, standards, arbitral decisions, and decisions of the international courts. At the national level, the consolidation of TLO occurs when the meaning of national legal norms reproduces the dictates of transnational rules in their statutes, regulations, and other legal rules. At the local level, consolidation is evident when the public and private actors who implement and apply the norms think and act following the TLO norms.

In relation to the rule-making and rule-application process, Halliday and Shaffer (2015) assert that it is necessary to distinguish two forms, prescriptive and diagnostic, which complement each other to shape, monitor, and demand compliance with specific norms. The prescriptive form dictates norms that are immediately binding, such as rules, legal principles, and standards, as well as those that are likely to become binding as subsequent national statutes, agency regulations, or judicial decisions. The diagnostic form complements prescriptive norms by measuring the incorporation of transnational standards by law, legal compliance, and national legal order. These authors point out that transnational standards are increasingly adopted by transnational legal ordering.

TLO can be partially developed when the process of drafting, understanding, and applying of national legal rules is influenced but not determined by TLO, denoting its partial institutionalization. Complete institutionalization of a TLO is very rare, as it is a major

challenge to align understandings at the national, international, and transnational levels and enforce its norms on the practices and mindsets of local legal actors.

For Garcia (2015), TLO is sectorial and aims to create rules for a transnational community, considering economic, cultural, or religious interests. Therefore, it aims to satisfy a global interest that cannot be met only with the efforts of the state or private actors. As an example of transnational sectorial orders, Garcia (2015) cites sports associations, as well as transnational economic communities in sectors like construction, commerce, the internet, and the petroleum industry.

The next section will discuss a sectorial TLO for the upstream sector regulatory system, following the methodology of Halliday and Shaffer (2015).

1.4 A Sectorial TLO for the Upstream Sector of Petroleum Industry

The upstream sector transnationalization is defended by several actors such as De Jesus (2012), Garcia (2012; 2015), and Dantith (2017). According to this last author, the upstream sector is constituted by common rules found in petroleum laws, contracts, offshore health and safety regulations, and other instruments of HCs, which represent common responses to this sector issues. For Garcia (2015), the upstream sector transnationalization is observed by the standardization, by reference to industry practices in the national legislation, and by the replication of regulatory standards among HCs. Jesus (2012) argues that a transnational petroleum society elaborates rules to govern their transnational petroleum contracts, aiming to achieve the common purpose of making upstream activities possible and profitable for each actor of the society.

1.4.1 Upstream Sector's Transnational Rules

In order to delimit the scope of the proposed TLO for the upstream sector that will be defined in this thesis, it is important to present the norms that make up this order. The TLO for the upstream sector will be composed of all the norms related to this sector issued by i) HCs, which shape their national regulatory system for this sector; ii) IGOs and sovereign states through international conventions, which compose the international legal order for the upstream sector; iii) and by the private and transnational actors and networks in the form of transnational rules of the upstream sector. With respect to the latter, the four basic types of transnational sources

pointed out by Garcia (2012) and Weaver (2009) will be considered: a) model contracts, b) industry practices, c) risk allocation models, and d) codes of conduct. In addition, for the purposes of this thesis, foreign regulations will also be considered a type of transnational source. Next, each of these transnational sources will be briefly presented.

Model Contracts

Martin and Park (2010) assert that over the last several decades, the industry has worked on a cooperative basis to develop and use various types of petroleum model contracts to gain the benefits of standardization, or in other words, reducing costs and increase efficiency. As an example of this, Garcia (2012) points to the adoption of the Standard Drilling Contract of the American Association of Oilwell Drilling Contractors (AAODC) model contract, approved in 1952. According to this author, the model inspired other associations and groups of companies to subsequently approve their own model contracts, such as the Association of International Petroleum Negotiators (AIPN) and Oil & Gas UK (OGUK).

Upstream contracts are complex because they often involve large investments, sophisticated technology, increased exposure to risks, and other difficulties. By trying to use their specific contractual versions in the negotiations, the parties will spend more time and hence more resources to come up with similar solutions. Therefore, the negotiation time of these contracts may extend for months or years. Thus, it is more efficient for such parties to hold discussions in industry associations, represented by their specialized professionals, to negotiate such contractual models, and to commit themselves to constant updates. This standardization, according to Martin and Park (2010), "*can save months of management time in each and every negotiation*" since it reserves only a small part for the parties to negotiate and draft. According to these authors, the *"global petroleum industry is fully engaged in expanding the number of model contracts and improving the quality of the models that already exist."* For Ost and Kerchove (2002), this contract standardization generates stability in contractual relations and networks of economic partnerships.

It is important to highlight that this section focuses only on contracts negotiated between the oil companies, or between them and service companies. This category has several types of standardized contracts drafted by industry associations. Examples of these contracts are Joint Operating Agreements (JOA), lifting agreements, and unitization agreements, among others.

The contracts negotiated between the HCs and the IOCs or NOCs to grant E&P rights, called in this thesis E&P contracts[33], in the established form of concession, production sharing, service, and participation, will not be considered as transnational rules, but as part of the upstream sector regulatory system of each HC. Although there is a process of information exchange, replication of rules, and standardization among the regulatory agencies that elaborate such contracts, Garcia (2015) states that there is no global model for the E&P contracts. Neither is there a transnational outreach organization that promotes these models. Martin and Park (2010) report that for this category, standardization of contracts is more difficult since each HC tends to develop a specific contract that reflects their needs, exercising their sovereignty over their natural resources. According to these authors, the AIPN attempted to launch a global model for the E&P contracts, which received no support from the parties involved. Instead, it published two studies[34] on the common clauses adopted by the HCs in these types of contracts.

Industry practices

Duval et al. (2009) define industry practices[35] as "*those practices and procedures employed in the petroleum industry worldwide by prudent and diligent operators under similar conditions and circumstances, having regard to factors such as conservation of petroleum resources, operational safety, and environmental protection*."

Garcia (2015) defines them as behaviors or repetitive conduct performed by members of the petroleum industry that are generally accepted and practiced, and therefore legitimated by the members of this community. These repetitive conducts would be the 'uses of the sector' as referred to in the arbitration regulations[36]. This author points out that in case of doubt about the recognition of such practices, it is possible to use model contracts, guidelines, or industry databases as the first source of codification of these practices. In case of conflict, both the state

[33] Duval et al. (2009) called these contracts International Petroleum Agreements (IPA)

[34] For more information see: Alexander, Frank. Government Petroleum Contract Handbook. (vols. 1 and 2). AIPN. 199 and 2004. Available at https://www.aipn.org/forms/store/ProductFormPublic/government-petroleum-contract-handbook-vol-1 and https://www.aipn.org/forms/store/ProductFormPublic/government-petroleum-contract-handbook-vol-2 accessed 4 Dec 2018

[35]It is important to clarify that industry practices can be identified in several ways: 'good oilfield practice' (Duval el al., 2009; Smith el al., 2010); 'Best and good industry practices' (Garcia, 2012); 'International standards' (Walde, 2004; Wawryk, 2002); and 'Good international petroleum industry practices - Industry practices' (Weaver, 2014).

[36] The following provisions of arbitration regulations consider trade usages to be the basis of its decisions: Art. 21 - 2 of the ICC Arbitration Rules; 35-3 of the UNCITRAL Arbitration rules; Art 31 - 2 of ICDR Arbitration Rules

judge and the arbitrator can determine the mandatory application, after the conclusion of an expert opinion.

The objective of adopting such standards is to ensure the dissemination of the best operational techniques used by the industry, in the form of equipment or services, in the areas of safety, health, and environmental protection. Garcia (2012) points out that in 2010 the International Association of Oil and Gas Producers (OGP) had estimated the existence of around 600,000 industry practices. However, only 5,180 standards developed by 131 organizations had references to the internal technical specifications of seven of the largest operators. This author also points out China as an example, which, although it does not refer to Industry practices in its regulation, has about 1,800 standards developed by the China Petroleum Standards Committee (CPSC) and China Petroleum Equipment Standards Committee (CPEC), some of these being identical to the ISO or API standards or having minor changes. There is also the example of the Indian government, which in 2016 launched a compilation of a 442-page GIPIP. This document contains commonly accepted practices that are adopted worldwide, to be used as an advisory tool by companies operating in India and by state agents in the process of enforcing these practices[37].

Risk Allocation Models

Risk allocation models, also called Industry Risk Liability Models, are mechanisms used to define the share of liability between companies involved in E&P operations in the event of an accident, especially those related to human resources, property, and the environment. They may be established in the provisions of model contracts or in the HCs' regulation. The risk allocation aims to ensure that, if the damage occurs, the companies responsible have sufficient conditions to mitigate the effects of such damage and to pay the appropriate compensation (Zulhafiz, 2017).

The 'knock-for-knock' and 'safety case system' are the two risk allocation models frequently adopted in the industry. Cameron (2013) defines the 'knock-for-knock' or "mutual hold harmless (MHH) indemnities scheme as:

> *"(...) liability regime in global use in respect of pollution offshore emanating from the subsurface or from the well, including control of well, clean up and*

[37] For more information see: http://petroleum.nic.in/sites/default/files/GIPIP_Final_approved.pdf http://petroleum.nic.in/sites/default/files/GIPIP_Final_approved.pdf. Accessed 8 Dec 2018

> *third part liability. Its broad aim is to identify and mitigate the very substantial risks that the contracting parties face in offshore petroleum operations. In addition to limiting the risk to a level that is acceptable to the parties, the regime enables the parties to avoid having to obtain multiple."*

Under this regime, liability for damages is borne by the operator, even if these are caused by the service companies contracted by it, except in the case of damage to third parties and caused by negligence or breach of duty. This is because the operator is responsible for designing the development of E&P activities, contracting for goods and services, and monitoring the performance of the activities carried out by contracted service companies. Furthermore, it is the operator who decides the equipment and standards to be used and how to execute each stage of the field development project. Therefore, the risk is allocated largely in proportion to the party that has the greatest capacity to control and prevent such risks.

The Safety Case is a risk management system to prevent accidents, adopted in the North Sea, Australia, and New Zealand. In this system, the operator is charged with identifying the potential risks of the operation and presenting the regulator with a plan to avoid them through a risk management structure. This system involves the employees that participate directly in operation, and they can be consulted by the regulators in the process of auditing. Hopkins (2012) comments that the safety case is a case - an argument made to the regulator. Thus, operators must convince regulators of the practices selected to deal with identified risks, justifying the reason for the choice. According to this author:

> *"A safety case does not give operators a free rein in how they respond to hazards. They need to specify the procedures and standards they intend to adopt. Where an operator proposes to adopt an inadequate standard, a safety case regulator may challenge the operator to adopt a better standard. For instance, if an operator indicated in its safety case that it intended to rely on a manifestly inadequate standard, the regulator could challenge it to adopt the best international standards. However, the success of this challenge may depend on whether or not the jurisdiction imposes a general duty on the operator to reduce risk as low as reasonably possible (see below), which would in effect mandate that operators adopt the best international standards."*

A relevant characteristic of the safety case system, pointed out by Hopkins (2012), is the duty of the operator to reduce risks to levels "*as low as reasonably practicable*", also called the ALARP principle or the performance standard, as suggested by Weaver (2014). Thus, the operator must take effective precautionary measures that are reasonable, which means the level of the forecast risk and the costs to prevent such risks are not highly disproportionate. In this

way, the operator will be considered liable if the regulator identifies the possibility that the damages could have been reasonably avoided.

Another important point to emphasize about the safety case is that this system relies on a performance-based model of regulation, meaning operators are free to choose the industry practices they consider to be most efficient. There are no references in the regulation about the rules that must be followed, as in the prescriptive model. Referring to the safety case adopted in the North Sea, Bunter (2012) argues that this model is based on results and principles, and relies on the ethics of self-regulation produced by petroleum companies and their commitment to building a safety culture.

Codes of Conduct

According to Weaver (2017), codes of conduct are compilations of Industry practices that serve as consulting material for both petroleum companies and regulators in the performance and monitoring of operations. These codes are created through a multi-stakeholder collaborative process that involves companies, single or associated HCs, NGOs, local communities, and international organizations. Thus, it aims to help in the clear identification of industry practices and their sources by indicating what the best practices among industry practices are, depending upon the circumstances in which they will be applied. They are also a way of enforcing the commitment to the industry practices among the member companies of the industry associations that compile them into such codes of conduct.

F. Ost and M. Kerchove (2002) define the codes of conduct elaborated by the industry as a product of the self-regulation developed by companies in an attempt to fill the gaps in business law. For them, the purpose of these codes is to separate management, have better control, and protect minority shareholders.

Foreign Regulation

The sharing of regulatory policies and experiences informally between producing states is a widespread practice in the upstream sector of the petroleum industry. For unitization and offshore decommissioning, the operations whose regulations will be analyzed in this thesis, there are similar rules in several producing countries, which can be explained, in part, as the use of rules from other countries in the construction of the regulation of another country.

However, although state actors create foreign regulations, these rules cannot be considered national rules because they are external to the national legal order of the country that incorporates them. Nor can they be considered international rules, as they are not developed with the production country's participation that uses it as a reference. Thus, foreign regulation is considered in this thesis as transnational rules.

1.4.2 Features of the Upstream Sector of Petroleum Industry's Transnational Legal Order

Having presented the scope of the specific TLO for the upstream sector, the following sections will detail this order from the elements, attributes, and characteristics used by Halliday and Shaffer (2015) to define the existence of a TLO.

TLO Elements

Starting with the simplified way in which the authors describe TLO, explaining each of its elements, it is possible to identify these elements in the specific TLO for the upstream sector.

Order

As previously mentioned, the upstream sector actors jointly seek to order this sector, developing rules to achieve the common goal of making the upstream activities possible and profitable for each actor in this sector.

Legal

The norms produced by these authors and that make up the TLO for the upstream sector take the form of legal norms in recognizable legal forms, both hard and soft law, which include: the binding rules and the E&P contracts drafted within the HCs; the model contracts produced by industry associations; codes of conduct and guidelines issued by IGOs, international NGOs and informal connecting networks; industry practices produced by industry associations and international NGOs; and contractual clauses that consolidate risk allocation models produced by HCs or industry associations.

Transnational

In addition, the norms that compose the TLO for the upstream sector are adopted in the various HCs where upstream activities are carried out, thus ordering relationships that transcend countries boundaries.

TLO Attributes

Presence of a Transnational Legal Organization or Network

The first attribute pointed out by Halliday and Shaffer (2015) to qualify TLO is that it requires the presence of a legal organization or network whose performance transcends or spans countries' boundaries in the rule-making process. The degree of the legal organization or network's formality can vary considerably. Networks, like industry associations, are more informal, while IOGs have a higher degree of formality.

Transnational rules can also arise from the replication of norms that are part of a powerful nation-state's national legal order. Or norms can be developed by parties or private networks through a bottom-up process, such as norms formulated by companies, industry associations, or NGOs in order to be incorporated or recognized and required by other countries. However, these standards will only form a TLO, have legitimacy, and therefore have authority when they are drafted in conjunction with international or transnational networks and organizations. Thus, these networks and organizations will be present in the process of formation, convincing, and potentially institutionalization of the norm, and will contribute to the communication, interpretation, monitoring, and enforcement of these norms, including their revision and adjudication.

Michaels (2016) criticizes this attribute because he understands that what shapes a TLO is the scope of its rules, thus the production of transnational rules would characterize institutions as transnational, rather than the inverse. Thus, for this author, an institution could be considered transnational if it produces transnational standards. Given this reasoning, the state would be a transnational institution.

Regarding the upstream sector, the participation of a transnational legal organization is indirectly observed at the national level, through the influence these organizations exert on the content drafting of the norms that compose the upstream sector regulatory system of each HC. For example, HCs replicate established forms of E&P contracts launched by other HCs.

At the international and transnational level, this attribute is directly observed as norms are produced by IGOs, international NGOs, oil industry associations, and informal networks of regulators, each of which has operations that transcend the boundaries of a country. Model contracts negotiated between operators, non-operators, and service companies are drafted by industry associations, such as those cited in section 1.2.2. The industry practices are developed by an a plurality of actors that constitutes a transnational legal network, formed by non-state

actors, like operators, service companies and industry associations, and also by some public actors, like IGOs, regulators, and the Petroleum Safety Authority of Norway, or by regulators' networks, like the International Regulators' Forum for Global Offshore Safety (IRF). Risk allocation models are also designed by petroleum industry associations. Regarding the knock-for-knock model, Cameron (2013) highlights the participation of the International Association of Drilling Contractors (IADC) and the International Marine Contractors Association in the elaboration of these models. When it comes to the safety case model, the International Regulators Forum for Global Offshore Safety (IRF) can be viewed as a transnational network that discusses and disseminates this model. upstream sector-related codes of conduct are created, especially by IGOs, international NGOs, oil companies, and industry associations.

Legal Institutions Engagement within Multiple Nation-States

The second TLO attribute Halliday and Shaffer (2015) pointed out is related to the engagement of legal institutions in the adoption, recognition, and enforcement of transnational rules within multiple countries, whether directly or indirectly, formally or informally. Although the concept of law is broader in TLO, it is not entirely disconnected from positivist doctrine. The state remains central to the rule-making process, its recognition and demand facilitating and structuring the process. According to Abbott and Snidal (2009), the state can play an important role in orchestrating the norm-making process of transnational rules and incorporating them into national legal order.

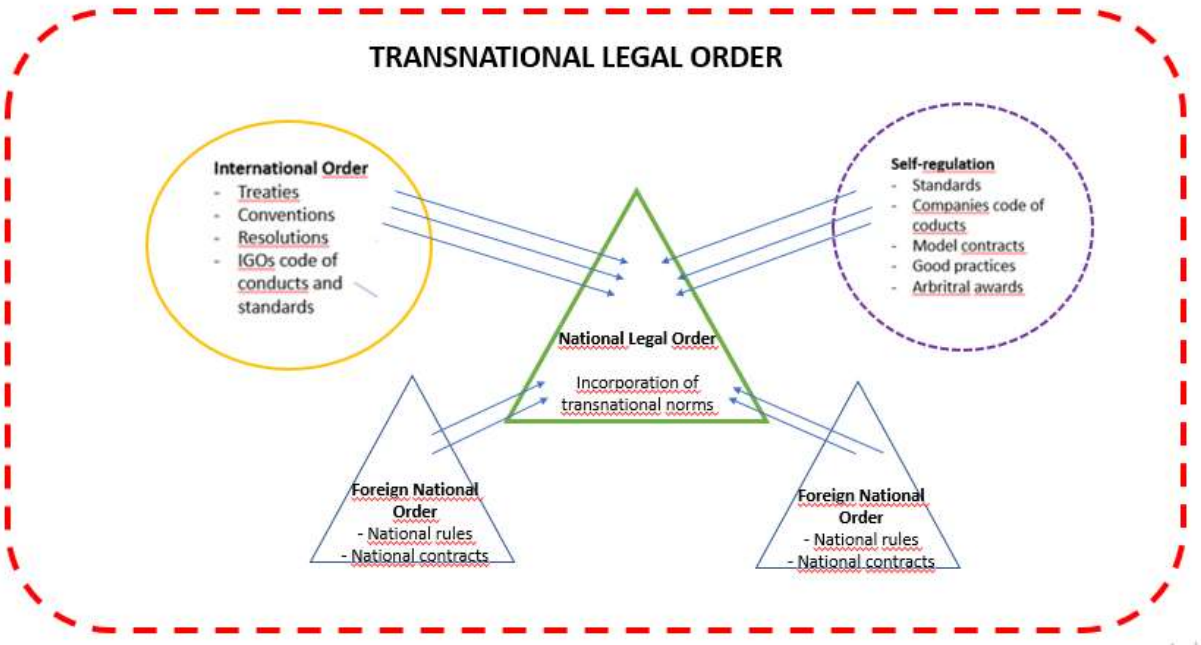
Therefore, TLO must touch the national legal order somehow. This can be through influencing the content of transnational rules on the drafting of domestic statutes, regulations, and their interpretations, or by incorporating transnational rules into national contracts, such as referencing standards created by private international standard-setting bodies such as the International Organization for Standardization (ISO).

In this sense, the national legal order incorporates private rule-making processes, with respect to norms that, although produced exclusively by private transnational institutions, are incorporated by states through references in legislation, contracts, and the adoption of national court decisions, such as fair-trade labels or industry practices.

In discussing the engagement of legal institutions within multiple countries, Michaels (2016) states that this restrictive condition should not be understood as a way of excluding TLO's state law. He recalls that when a rule originating from the national legal order of one country is adopted in an identical manner by another country, it represents the presence of the national

rule in a TLO. For this author "*(u)nder the old, and now, discarded, local law theory, application of foreign law was conceptualized literally as adoption (...) Under modern approaches that assumes that what is applied is actually foreign law, that application can still be conceptualized as an adoption for the concrete case"*. Figure 6 presents a representation of this process of incorporation of different types of transnational rules by a national legal order of a given country.

Figure 6: Representation of the Process of Incorporation of Transnational Rules by States



Source: Developed by the author

The E&P activities that make up the upstream sector are carried out within the limits of a given HC. Thus, the contractual relationship between the HC and the IOCs or NOCs, formalized through the IPA, will be governed by the national regulatory system. Even contractual relations between IOCs, NOCs, and service companies, based on self-regulation that relies on arbitral tribunals for conflict resolution, depend on national institutions to recognize arbitral awards arising from these courts. Thus, upstream sector international and transnational rules will touch the national upstream sector regulatory system when they are replicated in national rules and contracts in a prescriptive manner, when they are required in a general manner as observed in performance-based regulation, or even when they influence the rule-making process of a national upstream sector regulatory system.

Model contracts, despite being adopted in private transactions whose dispute resolution is carried out in arbitral courts, require recognition and enforcement of arbitral decisions by the HC where the E&P activities are carried out. It is also possible to observe the adoption of model contract clauses by HCs in their E&P contracts and the influence of these clauses in the elaboration of their upstream sector regulation.

Reference to industry practices in treaties and contracts, especially in E&P contracts and regulations, is a practice that has been increasingly adopted by HCs. The OGP Report No. 426 of 2010[38] shows the adoption of industry practices in the regulation of 14 countries and Europe, and demonstrates the importance of these practices as resources for the regulators, especially in upstream sector offshore operations. According to Walde (2004), these practices can help keep these instruments up to date since they bring flexibility, or the ability to adapt to technical and social changes much faster than multilateral treaties. As already mentioned, China and India are examples of incorporating these practices into the national legal order.

In relation to risk allocation models, they may be established in an E&P contracts provisions or in the HCs' regulation. Thus, they are directly incorporated into the national legal order by the action of public agencies responsible for drafting E&P contracts or the upstream sector regulation in a given HC.

Concerning codes of conduct, Weaver (2017) comments that they have been applied in national courts as a confirmation of a good practice discussed in a conflict, or in the interpretation of an oil contract or regulation. Its guidelines also influence the content of upstream sector's regulation drafting.

Norms in 'Recognizable Legal Forms'

The third attribute requires that transnational rules must be produced in recognizable legal forms. For Halliday and Shaffer (2015) this means:

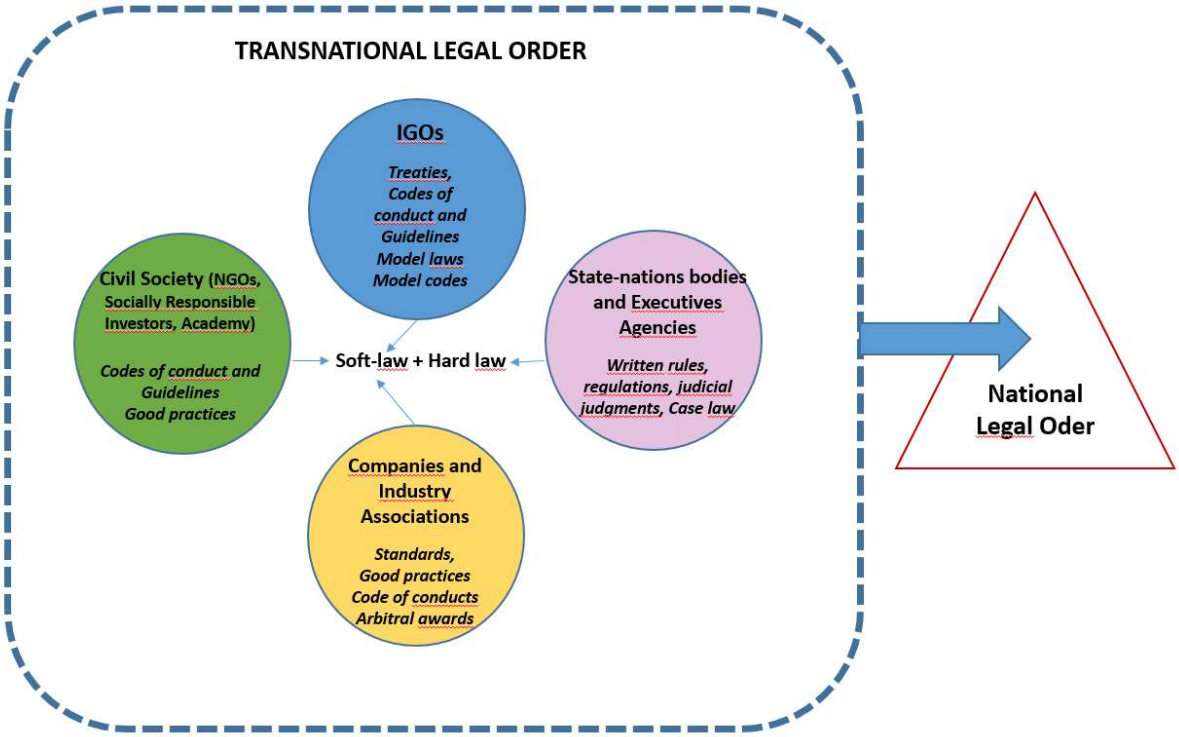
> "*take the form of written rules, standards, model codes, or judicial judgments. Such legal texts include substantive and procedural law in the form of statutory, regulatory, and case law in national settings and their analogues (or family resemblances) in transnational settings, namely treaties, codes, model laws, administrative rules and guidelines, and court-like decisions.*"

Therefore, TLO brings together hard-law and soft-law and also includes rules produced by private actors, such as industry associations and transnational companies, which take the form

[38] For more information see: .https://www.iogp.org/bookstore/product/regulators-use-of-standards/ Accessed 13 Dec 2019

of model contracts and internal guides to practice that shape meaning. Figure 7 is a representation of the norms in ‘recognizable legal forms' launched by the TLO actors.

Figure 7 - Representation of TLO norms



Source: Developed by the author

The upstream sector transnational rules, take contractual forms as model contracts and the risk allocation models, and industry practices and codes of conduct take the form of standards and guidelines, both listed by these authors as 'recognizable legal forms'.

TLO Characteristics

Continuing with the qualification of the TLO for the upstream sector, the following section will analyze the adherence of this specific order to the five procedural characteristics described by Halliday and Shaffer (2015).

First

The first characteristic concerns the contingent, dynamic, and interactive process of lawmaking, implementation, and practice between the transnational, international, and national orders. Laws that are generated with a transnational scope become binding and authoritative through

their incorporation into national legal order and legal practice across jurisdictions, as represented in Figure 6.

Regarding this feature, it is possible to affirm that upstream sector transnational rules are created from a contingent, dynamic, and interactive process of rule-making, implementation, and practice among the transnational, international, and national orders. This is because the process of drafting the transnational rules that compose the upstream sector involves different actors acting in all three orders– national, international, and transnational. Thus, the rules produced by the IGOs, for example, will be influenced by the rules produced by a powerful HCs that have their regulation as a reference, or by standards developed by professional associations, such as the codes of conduct that consolidate the industry practices. Also, self-regulatory rules like Industry practices, contract models, or risk allocation models may reflect rules produced by some reference HC, or may follow guidelines issued by some IGO, international NGOs, academia, or socially responsible investor network. It is also important to highlight arbitration decisions as transnational rules, which, although formulated outside the national system by international non-state organizations, depend on the recognition of the arbitration procedure by the national legal order to be executed locally[39].

As Martin and Park (2010) point out, one of the particular characteristics of the upstream sector is how its actors cooperate, even when competing with each other for new acreages or when they have different interests, such as HCs and oil companies. The use of model contracts, drawn up in industry associations, demonstrates such cooperation, aimed at controlling costs and increasing efficiency. According to Wawryk (2002), petroleum industry associations and non-governmental and intergovernmental organizations cooperate to standardize operational standards and practices on a global scale. Weaver (2017) tells that codes of conduct are created through a multi-stakeholder collaboration process that involves companies, individually or through an association, HCs, NGOs, local communities, and international organizations.

Second

The second characteristic is related to the fact that TLO includes hard and soft laws that are developed by transnational bodies and directed at national legal orders, as represented in Figure

[39]For Michaels (2016), Halliday and Shaffer seem to defend the legitimacy of TLO from the state, when they say that the validity of arbitrations awards depends on the recognition and enforcement of the national order. Thus, they do not recognize that these norms can be recognized and enforced by the international order. Thus, they reject the understanding of the French Cour de Cassation and the arbitration proponents that the international sentence not linked to any state legal order is a decision of international justice.

7. Thus, in the transnational scope, norms are created as hard or soft law, but after being incorporated at national order they will become binding and authoritative.

The TLO for the upstream sector is composed of hard and soft law, thus meeting the second feature presented by Halliday and Shaffer (2015). As previously mentioned, the norms that form the regulatory system of each HC, binding and endowed with coercion and therefore hard laws, integrate the TLO for the upstream sector. This order also integrates international and transnational rules, which take the form of recommendations, such as UN conventions, guidelines, World Bank and international NGO codes of conduct, Industry practices, industry association model contracts, risk allocation models, thereby integrating soft laws.

Third

State and non-state actors could create these norms, and this legal pluralism aligns with the third characteristic. Private actors assume relevant roles by interacting in spheres of discussion and cooperation whose boundaries extend beyond the limits of a given country. The state-centered and hierarchical rule-making process, with its top-down structure, is replaced by an interactive process between national, international, and transnational arenas that bring together public and private actors and incorporate the dynamics of the bottom-up rule-making process. This dynamic contributes to the institutionalization of transnational rules in local practice as cooperation and alignment among the different actors is achieved.

As examples of the actors that develop and convey these norms, Halliday and Shaffer (2015) point out bureaucratic networks of public officials, hybrid public-private networks, and associations of purely private parties. Eric Loquin (Garcia, 2012), argues that the interaction between state regulation and self-regulation produces new rules for sophisticated sectors of the economy. Thus, they regulate transnational relationships and transcend countries' borders, and are submitted to the scrutiny of international arbitration.

The TLO for the upstream sector is characterized by the plurality of actors who participate in the rule-making process. Thus, unlike having state exclusivity in the central position of the rule-making process, as it is in positivist model, non-state actors assume relevant roles in the elaboration of the upstream sector norms, especially companies and industry associations. Walde (2004) justifies this arrangement based on the greater ability of these actors to deal with technical and professional issues.

State actors, represented by public agents, regulators, and IGOs, participate in the elaboration of the HC regulatory system, codes of conduct, and in some cases the elaboration of standards

and contractual clause models. Non-state actors, represented by international NGOs, academia, socially responsible investors, oil companies, and industry associations, create codes of conduct, model contracts, model contract clauses, and Industry practices. Industry practices, for example, are produced by operators, petroleum industry associations, international NGOs, IGOs, and HCs whose regulation is adopted as a reference.

The codes of conduct are created through a multi-stakeholder collaboration process: companies, individually or through an association, HCs, NGOs, local communities, and IGOs bring together public and private actors. Weaver (2017) highlights the work of the International Association of Oil & Gas Producers (OGP, originally named the E&P Forum), which has most of the world's leading private and state-owned petroleum companies as members and works with industry regulators to improve safety, environmental, and social performance. The OGP also helps members to identify and share knowledge about Industry practices in health, safety, the environment, security, and social responsibility, acting transnationally.

Concerning the codes of conduct elaborated by IGOs, Garcia (2015) highlights those published by the OECD and the World Bank as important contributions to the development of transnational rules for the oil industry. These codes set international standards in several areas, including workers' rights, health, safety issues, environmental concerns, compensation, migrant labor issues, human rights, security rules, community involvement, ethical conduct, good governance, and the rule of law.

Fourth

The fourth characteristic is related to the legal realist perspective in which law is constituted by both power and reason to define the TLO concept. According to Halliday and Shaffer (2015), to present their ideas, their interests, and their normative objectives, the actors invest in the elaboration of norms process. For these authors, *"more powerful economic and geopolitical actors often prevail in having their interest and goals reflected and furthered in law."* US and European legal norms are often adopted as a model for transnational rules. However, these authors highlight that these norms can concomitantly transmit normativity outside the control of their initial sponsors.

In the TLO for the upstream sector, stronger players like developed HCs (US, UK, Norway) and the most powerful oil companies will be better able to push their interests within the norms produced. Relatedly, Weaver (2017) says that codes of conduct reflect the efforts of many industry professional associations to devise rules for adoption across the industry, filling the

void of an international "hard law", national statutes, or contractual provisions on the subject. Weaver (Duval et al., 2009) highlights that many of the codes of conduct are produced by powerful multinationals that can insert their own interests in the rules, which she considers as "privatization of standards." That is why it is up to the HC to balance its own triple bottom line of economic, environmental, and social progress. The Safety Case, a risk allocation model, is another example of how the regulation of the most developed HCs, in this case the UK, Australia, and Norway, is adoptedas a reference for the other HCs.

Fifth

The fifth and final characteristic of the procedural perspective of TLO refers to the weight of TLO authority, which will vary depending on the legitimacy of its rule-making process and other properties, like its rationality, proportionality, and rule of law-type characteristics. Transnational rules will be legitimized through their acceptance by those who apply them, and not only through their power and coercion, as sustained by legal positivist theory.

TLO will be institutionalized when relevant actors behave according to a set of norms that they recognize as valid and appropriate for specific situations. The incorporation of these norms into the national order is the most crucial form of institutionalization of a TLO. This institutionalization will be perceptible through judicial or arbitral decisions that refer to these norms and that influence the practices and mentality of the actors who implement and adopt these norms, including regulators, lawyers, and corporate councils. Nevertheless, a TLO will not be fully static and permanent, even if it is incorporated in national rules.

The specific TLO for the upstream sector has its legitimacy conferred by the recurrent use of its norms by the actors operating in this sector. Thus, it is possible to prove the legitimacy of these standards from the following situations: i) use of the same types of E&P contracts among HCs, even with differences in clauses; ii) replication of the two models of risk allocation clauses in both E&P contracts and private model contracts; iii) adoption of the same types of private contracts by companies in this sector; iv) recurrent use of Industry practices in companies' operations and reference to these practices in the regulation of HCs, E&P contracts, and model contracts; v) incorporation into national regulations and private contracts of code of conduct consolidated practices.

Concerning industry practices, Garcia, and Carriere (2018) highlight that these practices must be considered generally accepted practices by petroleum industry actors in order to be considered a transnational source. Thus, only practices that are adopted repeatedly and

efficiently in the industry can be characterized as those the industry uses, that is, Industry practices. A practice that uses the latest technology available and is perhaps considered the best, if untested and unapproved by the industry community, cannot be considered a GIPIP. Regarding the risk-allocation models, Garcia (2012) reports that they have been standardized, and industry players have been consistently incorporating them into contracts for many years. Therefore, transnational rules are incorporated into the legal order by HCs' regulations, provisions, or contracts negotiated between them and the petroleum companies.

With respect to codes of conduct, Walde (2003) comments that although they are published by IGOs without the force of international law and are not legally binding hard law, if they are universally accepted and legitimized they will carry the de-facto force of law, being disregarded only when there is a possibility of risk.

When it comes to the E&P contracts produced by HCs, although there is no global model for these agreements, Garcia (2015) affirms that there is a process of information exchange, rule replication, and standardization among regulatory agencies that elaborates the contracts that legitimize these rules. As an example of a clause replicated between countries, this author points out the 'fifty-fifty rule' adopted by Venezuela in 1943, then adopted by Saudi Arabia, Kuwait and Iraq, and later adopted by other countries.

Considering TLO requires a new position for the state, the next section will aim to suggest new forms of state action, following the approach of Abbott and Snidal (2009). These authors propose that the state act as an orchestrator of this new order, exercising a new form of governance, the transnational new governance. Abbott and Snidal (2009) characterize this new form of governance from the comparison with traditional governance models, which they call national and international old governance. Thus, following the methodology of these authors, the next section will present the traditional forms of governance and the proposed new model, whose applicability in the upstream sector TLO will be analyzed.

1.5 A New Governance Model given the Existence of TLO

Considering a TLO for the upstream sector regulatory system, it is necessary to figure out a new form of governance so that HCs can coordinate the integration of state and non-state rules within the same regulatory system. Following the methodology of Abbott and Snidal (2009), this section will analyze the governance models proposed by these authors: New Governance and New Transnational Governance. In these models, state would play a new role of

orchestrator, coordinating the participation of public and private actors in the rule-making process of the regulatory system. In order to better understand the new models, these authors also present the traditional models of governance, called National Old Governance and International Old Governance.

In the Old National Governance and International Old Governance, the State would be at the center of the regulatory system's rule-making process, individually or organized in IGOs, without direct participation by state actors in this process being allowed. The New Governance and New Transnational Governance models allow for the direct participation of private actors, however in the New Governance model the State maintains its prominent role in the rule-making process. In these two models, the State plays the role of an orchestrator, encouraging and coordinating the participation of non-state actors. The next subsections will detail each type of governance model.

1.5.1 A new role for the state

The previous section presented the various legal orders proposed by legal theories, with the goal of defining, for this thesis, the most appropriate legal order to analyze the upstream sector regulation. Since it goes beyond the public-private and national-international dichotomies, the Transnational Legal Order was considered the most appropriate order for promoting analysis of upstream sector regulation. Also, because this order considers not only state-issued rules as valid, but, contrary to legal positivist theory, also recognizes rules produced by private actors and connection networks formed by public-private actors as valid, with the goal of regulating a sector with a transnational scope.

TLO presents a new context of normative plurality, in which other non-state actors participate in the rule-making process alongside the state. Thus, TLO requires the state to exercise a new type of governance, with the aim of coordinating the plurality of actors and harmonizing the adoption of rules resulting from state and non-state rule-making processes. In order to analyze the role of the state in the specific TLO norm-making process for the upstream sector, this section will present the governance model proposed by Abbott and Snidal (2009), the Transnational New Governance.

According to these authors, there is a new configuration of the international regulatory system, composed predominantly of rules produced by non-state actors through Regulatory Standard-Setting (RSS) schemes. Therefore, it is essential for the State to adopt new functions to deal

with this new context. These authors then propose a new role for the state, where the state is acting as an orchestrator, taking measures to engage public and private actors in regulatory activities, and facilitating the process of adopting and enforcing these private rules.

The methodology adopted by Abbott and Snidal (2009) to describe the Transnational New Governance model is based on the comparison of the model with three other governance models, namely: old national governance; old international governance, also considered traditional models; and new governance, an innovative model for these authors, but restricted to the domestic sphere.

These governance models are detailed regarding four points: i) position of the state in the regulation rule-making process; ii) level of centralization of the regulatory authority; iii) type of expertise on which the rule-making process is based; iv) form of the established rules, whether hard or soft law. These four governance models will be characterized in the following sections.

1.5.2 Brief considerations on governance

Before presenting the governance models, it is important to briefly address some considerations regarding what will be understood as governance for the purposes of this thesis.

According to Ost and Kerchove (2012), governance can be defined as a process of coordination of state and non-state actors that aims to achieve collectively defined objectives in fragmented and uncertain environments. Social and political order would be achieved through a polycentric and negotiated process, through a multitude of partial adjustments, and through a network of relationships in search of coordination principles. For these authors, governance differs from government in that the latter is an institution, not a process, and is based on the sovereignty of the nation-state in its public authority, in which a self-centered and hierarchical apparatus establishes order. In Joerges's (2004) view, governance means “policy arrangements” that emerge outside the administrative system of a single nation-state (government), but which nevertheless have a significant impact on a globally or regionally defined set of recipients.

For Ost and Kerchove (2012) the nation-states would be shifting from the government to governance model; from the hierarchical and pyramidal rule-making system to the coordinated network model; from the Westphalian model to the transnational model. For these authors, such a transformation would be a response to factors such as the globalization of financial markets, growing economic and cultural interdependence, the emergence of a digital society resulting

from the development of digital technologies, the loss of the nation-state's capacity for action, the emergence of strong private actors (transnational corporations and non-governmental organizations), and multiculturalism even within the same nation-state.

Following the definition of Ost and Kerchove, for the purposes of this thesis, governance will be understood as the form in which state and non-state actors coordinate themselves to regulate the upstream sector. Thus, the objective of this thesis is to analyze how a governance process, which coordinates state and non-state actors through a polycentric and negotiated processes, can contribute to a more adequate regulation for the upstream sector.

Relatedly, it is necessary to understand regulation in a broader way, different from the understanding of regulation in the old governance's models, which only recognize the legal rules originating from a nation-state in a centralized and hierarchical way. This type of regulation, based on positivist doctrine, will be called conventional regulation in this thesis. Thus, the new governance's understanding and model of regulation will be adopted, which define it as an effort to organize a particular sector of society based on mandatory and voluntary rules, elaborated by a multiplicity of state and non-state actors endowed with specific expertise. Then the rules would be elaborated in a frequently negotiated process, making them more flexible, decentralized, adaptive, and evolutionary, and may rely on mechanisms of standard-setting, information gathering, and behavior modification (Black, 2002; Meidinger, 2007; Ost and Kerchove, 2002 and Abbott and Snidal, 2009).

It is also important to highlight the concept of meta-regulation, proposed by Coglianese and Mendelson (2010), as opposed to conventional regulation. Meta-regulation would be the result of the voluntary rules creation by private actors - self-regulation, based on State guidance or orchestration.

1.5.3 National Old Governance

Abbott and Snidal (2009) propose the term Old Governance to designate the ideal model of conventional regulation, in which "*the state regulates from the top down, often exercises 'command and control' over regulated activities, and coercively enforces its rules when necessary*". According to these authors, this model occurs at the national level and it is characterized by the state's central role in the rule-making process and the imposition of sanctions, rooted in legally binding and mandatory regulations - hard law, as proposed by the positivist doctrine. Its structure is hierarchical, so state organs, like parliaments and

administrative agencies, centralize the regulatory authority. This model assumes that professional regulators own all the expertise needed for regulating, also called bureaucratic expertise.

In this model, private actors are considered self-interested and unaccountable, only the objects of regulation. Thus, they would not have the authority to produce rules or to exercise any direct role in state regulation. Authority is restricted to public regulators, who are considered the only ones capable of acting in the public interest. There is a presumption that public regulators are independent, disinterested, and public-spirited, possessing or capable of developing all the expertise necessary to produce effective regulation and implement appropriate policies. And to preserve these attributes, procedures are created to remove such regulators from the influence of private actors.

However, there are formal and informal procedures and mechanisms of representative democracy, such as consultations, public hearings, or lobbies, in which private actors are allowed to influence regulators' decisions. And such influence provides important information for state regulators, since private actors are an important source of technical expertise. Thus, the private actors' participation would help legitimize the regulatory decision-making process and achieve effective regulation.

Abbott and Snidal (2009) affirm that expertise is essential for effective regulation, which means not only knowing how to regulate but also who and what to regulate. Due to the complexity of regulatory problems, these authors point out four areas of expertise that are relevant: technical, regulatory, economic, and social. Technical expertise is related to social and environmental problems and regulatory solutions. Normative expertise is related to social values and the normative context. Economic expertise is related to the operations of the target companies. And finally, social expertise is linked to how beneficiaries and the target audience feel the effects of regulation.

In the Old Governance model, there is a presumption that the public agents know the public interest and, therefore, the appropriate regulatory objectives, based on previously established hierarchically superior norms, as determined by the logic of positivist doctrine. Thus, the state produces legally binding and mandatory rules, hard laws, which are enforced by legal procedures backed by civil, administrative, or criminal sanctions.

Thus, regulation takes the form of command and control, being generally detailed and precise, also known as prescriptive, and requiring specific processes, designs, or actions. According to

Abbott and Snidal (2009), the state uses "police patrols" to monitor compliance officially, but also uses the citizen complaint "fire alarm" mechanism widely.

For Abbott and Snidal (2009) the assumption that the state is independent and pursues the public interest is fallacious. They claim that:

> *"This assumption is vulnerable to the economic and public choice critique that there is "no public interest", only private interests with varying degrees of influence. Interest groups lobby, contribute to campaigns, pay bribes, and otherwise seek to persuade regulators to advance their interests; they may even "capture" regulators outright. Regulators, in turn, are not public-spirited and disinterested, but respond to the highest bidders in pursuit of their private goals, such as remaining in office, expanding their bureaucracy, or enriching themselves."*

1.5.4 International Old Governance

Abbott and Snidal (2009) report that the 20th century featured attempts to give international governance the same structure as the national old governance model, based on positivist theory, seeking to create world federalism and a sense of world peace through law. That is why these authors refer to this type of governance in a manner similar to the governance exercised at the national level. However, the international system has an anarchic structure, in which no state exercises global authority over the others. In fact, there is resistance on the part of nation-states to delegate authority to international institutions, based on attachment to sovereignty and freedom of action. Furthermore, the differences between countries when it comes to power levels and form of organization introduce divergences that hinder the negotiation of international agreements and distance them from a possible common public interest. For these reasons, these authors label international Old Governance as a failure.

The actors that participate in International Old Governance are sovereign states, which make up part of IGOs. Thus, this model is characterized by being member-centric, or formed from the meeting of nation-states in IGOs, to promote cooperation or integration. According to Dupuy and Kerbrat (2014), in most cases, nation-states abdicate part of their sovereignty in order to integrate an IGO, without renouncing the right to exercise their own competences in the same area. The European Union would be one of the few exceptions to this situation. According to these authors, IGOs are spaces for institutionalized cooperation where sovereignties are coordinated or conditioned, since member states are subject to the rules approved in a specific IGO creation treaty and to the competencies recognized by the bodies of these organizations.

Nevertheless, Abbott and Snidal (2009) emphasize that representativeness, independence, and orientation towards the global public interest can be affected by the actions of more powerful member states, which generally exert substantial, sometimes disproportionate, influence over IGOs. Furthermore, it is unlikely that member states will stop pursuing their national interest, and will instead tend to retain political and financial control over important issues.

Unlike the National Old Governance ideal type, IGOs' centralization of regulatory authority is limited. This is because although member states centralize administrative and operational functions in IGOs, they continue to retain the capability to adopt and implement rules. And this limited authority is further restrained by the fact that IGOs operate through consensus among their members, even when formal decision-making procedures are outlined.

The bureaucratic expertise found in IGOs is even more concentrated than in the National Old Governance model. These organizations select international civil servants for their experience and knowledge, while also considering the need for geographic representation and other political issues. National delegates' technical expertise is also a criterion for selecting them to compose IGOs.

IGOs mainly produce recommendations or other non-binding soft-law. And as these rules are not coerced, it is up to the IGOs to make managerial efforts to convince member states to adopt these rules. Mandatory rules are rarely adopted by IGOs, even when they have rule-making authority. Binding rules, like treaties for example, after being adopted by IGOs, require ratification by the state to take effect. And even the IGOs authorized to adopt regulation are unable to impose their implementation on nation-states. In addition, it is up to the nation-state to decide whether to follow or not.

With International Old Governance, private actors are coordinated indirectly. IGOs address their recommendations to member states, hoping that they implement these norms in the form of regulation and thus reach private actors. However, Abbott and Snidal (2009) highlight the difference between member states in terms of their level of development.

Developing countries, those hardest hit by the negative impacts of transnational businesses, are generally inadequate regulators, unable to regulate their economies efficiently. These countries are often afraid that the implementation of stricter rules in areas such as the environment or workers' rights will harm the attraction of investments. Thus they allow lower standards to promote growth and meet other local needs. However, the legitimacy of such decisions is questioned when these same countries face problems of corruption and capture.

Developed countries, on the other hand, have a better structure to establish their regulations. They are usually the home of multinational companies, IOCs in the case of the upstream sector, and therefore they can establish regulations for the conduct of these companies abroad. However, there is concern about the legitimacy of these unilateral state actions within international governance, since a nation-state could not unilaterally impose its international policy option, at the risk of establishing inadequate standards and cultural values.

1.5.5 New Governance

The New Governance model of regulation, according to Abbott and Snidal (2009), is "*a diverse range of innovative domestic regulatory practices*". Thus, as it is domestic, this model's governance process occurs within the limits of the national legal order. These authors characterize this new governance model based on four elements, which reflect the new way for the state to deal with the regulation norm-making process.

The first element refers to the permission that the state grants to private actors and institutions, in a decentralized way, to participate in the regulatory system. Thus, the state starts to negotiate standards with companies, encourages and supervises self-regulation, and sponsors voluntary management systems.

The second element is linked to the change in the state's understanding of expertise, ceasing to rely exclusively on bureaucratic expertise and coming to rely on the private actors and institutions' expertise included in the regulatory system as well.

The third element is related to a new responsibility for the state to assume in this model. Instead of promulgating and directly demanding compliance with the rules, the state begins to orchestrate the plurality of actors and institutions in the regulatory system.

Finally, the fourth element concerns the use of soft law to complement or replace hard law. And 'soft law', for the purposes of this thesis, includes guidelines, codes of conduct, recommendations, and technical standards, as proposed by Walde (2004).

Thus, the state remains a relevant actor, but changes its usual role of unique actor promulgating rules through a top-down process to the role of orchestrator. Public interest starts to be pursued through a network of public agents, from the private sector and civil society. The State, then, is in charge of promoting this connection and empowering it, encouraging these multiple actors to participate in regulatory activities. For Abbott and Snidal (2009):

> *"State "orchestration" includes a wide range of directive and facilitative techniques for supporting and steering this network, such as initiating voluntary and cooperative programs; convening and facilitating private collaborations; persuading and providing incentives for firms to self-regulate; building the capacities of private actors; negotiating regulatory targets with firms; providing incentives to exceed mandated performance levels; and ratifying or scaling up successful approaches."*

Furthermore, the state acting as an orchestrator can guarantee the harmonization of standards. Thus, the state can point out select standards that must be followed when there is a variety of standards for the same regulation issue. It may also require private actors and institutions to comply with public law procedures, such as accountability mechanisms and due process. Thus, even acting in a more subtle way, the state maintains the possibility of establishing mandatory rules, especially when the softer methods fail. This ability to catalyze orchestration and establish parameters for decentralized regulatory actions is essential to effective and legitimate regulation according to Abbott and Snidal (2009).

The regulatory authority in the domestic New Governance Model of Regulation is decentralized, since private actors share regulatory responsibilities with public actors through a partnership. Self-regulation is encouraged in the private sector, and civil society is encouraged to participate in the regulatory system by establishing closer relations with state agencies. Such decentralization adds to the state the private actors' resources and capabilities at a time when many states suffer from reduced resources and are increasingly pressured to act.

As Ost and Kerchove (2002) sustain in their theory of 'Droit en Reseaux', the domestic New Governance Model regulation follows the dynamics of a network and the state helps to form it, interacting with non-state actors to discuss, facilitate, legitimize, publicize, ratify, and supervise regulation. By considering non-state actors as partners, the state softens the rivalry relationship, reducing the negotiation costs. Acting in collaboration, the flow of information between these actors is facilitated, as well as the learning process between them.

Thus, the state authorizes, empowers and orchestrates private actors and institutions, delegating part of its regulatory authority and retaining the possibility of intervening to limit the excessive influence of more powerful groups or to demand the observance of public law procedures.

1.5.6 Transnational New Governance

The Transnational New Governance is proposed by Abbott and Snidal (2009) as a more adequate model to deal with a new transnational regulatory system that is emerging from the proliferation of Regulatory Standard-Setting (RSS) schemes. For these authors, RSS schemes are private, public-private, and IGO initiatives that establish voluntary transnational standards to be applied directly to companies or other economic operators. These schemes complement, compete with, and sometimes replace the regulatory model of the national and international Old Governance.

Abbott and Snidal (2009) assume that the rules issued by private actors at the international level are part of a transnational regulatory system, constituting a transnational order for a given sector. Thus, these authors' proposal of the Transnational New Governance model of regulation will be presented regarding the broader concept of regulation, as discussed at the beginning of this section, and the transnational legal order approach, as sustained by Halliday and Shaffer (2015) and described in the previous section.

Difference between Private Governance and Transnational New Governance

Before characterizing the new governance model proposed by Abbott and Snidal (2009), it is important to distinguish it from private governance, since both models adopt RSS or self-regulation schemes.

Mayer and Gereffi (2010) define private governance as the movement of private, non-governmental actors to develop their own rules, motivated by the inadequacy of regulation proposed by nation-states in the face of transnational economic issues. These authors cite the rules issued by private governance as examples:

> *"standards governing a vast array of environmental, labor, health, product safety, and other matters; codes of conduct promulgated by corporations, industry associations, and non-governmental organizations (NGOs); labels that rely on consumer demand for "green" and "fair trade" products; and even self-regulation by corporations under the banner of corporate social responsibility (CSR)."*

Pattberg (2005) defines private governance using three dimensions: procedural, structural, and functional. The procedural dimension emphasizes the practice of private actors. The structural dimension highlights the architecture of this governance model, which includes norms, rules, networks and constellations of actors, as well as formal and informal links with other areas of

governance. Finally, the functional dimension highlights the material and conceptual results of the private governance arrangements, which uses the national and international old governance forms.

Nevertheless, as it is possible to observe in the definitions presented, private governance involves only private actors in the dynamics of developing their own rules (self-regulation), without the participation of state actors. In the transnational new governance model, despite the fact that private actors play a relevant role in RSS schemes, the presence of state authority is essential to orchestrating the regulatory system. The state, autonomously and organized in IGOs or connection networks, incorporates the norms arising from RSS schemes into its norm-making process. However, in this governance model, the state adopts an active posture, stimulating and supporting the creation of these processes, learning about the process of drafting standards, and dedicating itself to bringing it closer to the public interest. The state still works for harmonization and optimization in the adoption of the standards from RSS schemes.

In an approach that understands state orchestration as meta-regulation, Coglianese and Mendelson (2010) argue that when the state identifies a problem, it would request help from regulators to present their own rules to solve that problem. These authors understand that meta regulation is an appropriate solution especially when the problems are highly complex and poorly understood or when the actors are diverse, as the general state rules will not reach the specificity of each regulated agent. Making specific rules for each agent would require overwhelming investment in time and resources. Meta regulation take advantage of private actors superior knowledge of their operations.

Features of the Transnational New Governance Model of Regulation

Abbott and Snidal (2009) characterize the transnational new governance model by the new role of the state, which shifts from the central position as the sole regulatory authority to the coordination of private and public-private RSS schemes, and by the voluntary character of its rules. These schemes would be governed mainly by companies, industry groups, and by NGOs and other civil society groups, such as labor unions and socially responsible investors, as well as by the combination of these actors. The authors point out the UN Global Compact and the OECD Guidelines for Multinational Enterprises among the few initiatives made up of IGOs, which establish standards for business conduct addressing companies directly.

Similar to what was proposed in the New Governance model of regulation, the state, formally organized in IGOs or through informal networks, would autonomously act by orchestrating these schemes in the transnational regulatory system, with the objective of producing more adequate rules. However, the state orchestration would be performed in a more limited way compared to the new governance model, due to the high decentralization of regulatory authority.

Decentralization is accentuated in this model because it is highly plural, and because of the significant and growing number of RSS schemes. As the barriers to entry in the system are relatively low, these schemes proliferate easily. Even low budget organizations or networks can design and promote their codes. However, this multiplicity results in parallel actions, generating competition and sometimes collaboration, without one scheme exercising authority over others.

The multiplicity of actors also results in a higher level of expertise, as they combine complementary sources of expertise. As in the New Governance model, expertise is diffuse and is not based solely on bureaucratic expertise. According to Abbott and Snidal (2009), for an RSS scheme to be effective, it is necessary to rely on technical, regulatory, economic, and social expertise. However, the level of expertise of each RSS scheme will be defined by the actors who create and govern this scheme. The more diverse the actors that participate in an RSS scheme, the greater the level of expertise. Conversely, schemes formed by a single actor will have a very limited level of expertise.

Soft law, understood as non-binding and unbacked by coercive rules issued by public and private actors (Walde, 2004), is the main legal form used in the transnational new governance model. These schemes are based on voluntary principles, codes, and procedures. Considering that the majority of the schemes are formed by private actors, without the authority to enforce compliance with their standards, some mechanisms are adopted to induce companies to adopt and observe these standards. Among these mechanisms, the authors cite the economic and social pressure from consumers, the commercial benefits offered to those who adhere to the rules, and the threat of using state tax regulations.

IGOs like the UN and OECD, aiming to provide flexibility and attractiveness to their standards, have increasingly used soft law to address companies directly instead of adopting binding instruments that require a process of incorporation within each nation-state. Ribeiro and Xavier Junior (2017) highlight the growing importance of the use of soft law by IGOs, especially in the form of codes of conduct, and warn of the challenge of establishing these recommendations' effectiveness.

Nation-states, when members of some RSS scheme, have favored the techniques adopted by the New Governance model, such as performance-based regulation, for example, to incorporate such standards into their ordering. However, direct incorporation, as used in the coercive regulation model of old governance, continues to occur through the direct citation of standards in national regulation.

As stated earlier, the role played by the state is quite limited in this model, both in relation to the orchestration of the transnational regulatory system and in relation to its direct participation in RSS schemes. NGOs frustrated by the state and IGOs' inability to provide satisfactory responses to transnational regulatory problems and groups of companies designed to influence prescriptive state regulation from their interests, lead RSS schemes, following bottom-up dynamics.

Ribeiro (2017), analyzing the dynamics of foreign investments, point out that the state's unilateral regulatory action is insufficient to regulate transnational issues. In this way, global and non-national entities assume regulatory powers traditionally exercised by the State to present regulatory solutions that feed on, overlap, or influence those proposed by the old governance system.

Transnational New Governance presents itself, then, as a proposal to coordinate a specific transnational legal order formed from multiple RSS schemes, organized mainly by private actors, companies, and NGOs, but also by IGOs and other public or private-public networks. This coordination would be carried out by IGOs or the states, acting autonomously or organized in connection networks, in the form of the orchestration. The state orchestrating the system would avoid replication of standards, would promote the harmonization of the adoption of the standard among a given transnational community, and would bring the standards closer to social interests.

Abbot and Snidal (2009) propose two types of state orchestration that occur in this model: the 'directive orchestration' and 'facilitative orchestration'. In the first type of orchestration, the state or IGOs would influence RSS schemes, pointing out the desired direction through mandatory rules, binding conditions on public benefits, and other similar measures. In the second type of orchestration, the state or IGOs carry out actions to support the formation or exercise of RSS schemes, sometimes providing material resources and immaterial support, as replicating the standards of these schemes. Directive orchestration is less frequent than facilitative orchestration in the transnational new governance model. The next two chapters of

this thesis will analyze the occurrence of these types in the pré-salt unitization and in offshore decommissioning regulation in Brazil.

The table below shows the principal features of each type of governance model as presented in the Halliday and Shaffer's study:

Table 1 - Principal Features of the Governance Ideal Types

TYPES / FEATURES	NATIONAL OLD GOVERNANCE	INTERNATIONAL OLD GOVERNANCE	NEW GOVERNANCE	TRANSNATIONAL NEW GOVERNANCE
POSITION OF THE STATE IN THE REGULATION RULE-MAKING PROCESS	**State-centric** The state is in the center, regulating from the top down. State coercion is used when necessary to enforce rules. The 'command and control' approach is often adopted in regulated activities.	**Member-centric** Member states that make up the IGOs are in the center. As states are reluctant to grant authority to IGOs, they don't have the same state authority over mandatory regulation and enforcement. In order to be state-centric, as in the Old Governance model, the IGOs would have to possess the same authority of the state to establish mandatory rules and power to enforce them.	**State orchestration** The state isn't in the center as in Old Governance model, but still has a significant position. It isn't regulating from the top down, but it acts as orchestrator. It promotes and empowers other actors (network of public, private-sector, and civil society actors and institutions), public and private, encouraging them to regulate activities, including self-regulation. The domestic state retains the ability to interfere in the actions of private regulators to correct them, and if necessary, to bring them closer to the public interest (e.g. requesting that schemes follow basic procedural and substantive norms or keeping firms or other groups from excessive influence within private schemes)	**Limited state orchestration** The state does not occupy the central position. The rule-making process occurs predominantly through RSS schemes created by private actors, from the bottom up, with little direct state participation. The possibility of state interference to correct bottom-up regulation is limited. State can orchestrate the regulatory international system in two ways: i) "directive orchestration," (in which the state uses its authority to direct RSS schemes in directions it deems most convenient); ii) "facilitative orchestration," or supportive actions where the state and IGOs are not directly involved in predominantly private schemes, but can stimulate and improve the development of the desired forms of RSS.

LEVEL OF CENTRALIZATION OF THE REGULATORY AUTHORITY	**Centralized** State organs, as executive departments and administrative agencies, centralize regulatory authority through a hierarchical structure.	**Limited Centralization** IGOs centralize administrative and operational functions, but member states retain the rule adoption and implementation functions. IGOs act by consensus among member states, even when they have formal decision procedures. Member states retain political and financial control over important issues, protecting their national interests. Thus the regulatory authority is shared among IGOs and member-states.	**Decentralized** The state, through its agencies, shares regulatory authority with private actors. Self-regulation is encouraged, as well as the participation of other civil society actors in the rule-making process. The civil society actors' participation is stimulated through many forms of private ordering and relationships with state agencies.	**Highly decentralized** As this model is highly pluralized, the regulatory authority is more decentralized than in the New Government model. The numerous RSS schemes do not exercise authority over one another. The barriers to entry are relatively low, which promotes the easy multiplication and diversity of these schemes, facilitating the participation and engagement of different actors.
TYPE OF EXPERTISE ON WHICH THE RULE-MAKING PROCESS IS BASED	**Bureaucratic expertise** The expertise comes from state bureaucrats and professional regulators. There is the assumption that regulators have or can develop all the expertise necessary to implement policies.	**Bureaucratic Expertise** The expertise comes from IGO bureaucrats. These organizations are important centers of bureaucratic expertise. The IGOs' secretariats concentrate the necessary expertise to carry out the most common and significant functions of these organizations.	**Dispersed expertise** The expertise is dispersed, coming from state bureaucrats and from private actors. It assumes that knowledge is dispersed and seeks to bring together a large number of stakeholders who have local knowledge, often unavailable to state bureaucrats.	**Dispersed expertise** The expertise comes from the actors that make up the RSS scheme. The more complementary the sources of expertise (regulatory, technical, economic and social), the more effective the system will be. However, state regulators or IGOs are also sources of expertise.
FORM OF THE ESTABLISHED RULES	**Mandatory rules (Hard Law)** This model adopts hard Law, legally binding and mandatory rules.	**Recommendations (Soft Law)** IGOs acts mainly through recommendations or other non-bidding soft law. Mandatory	**Soft Law with mandatory rules where softer methods fail** This model's regulatory process adopts more flexible norms and procedures. Rather than detailed	**Voluntary codes (Soft Law)** As the regulatory system of this model is based on private schemes that have no capacity for coercion

	Regulation takes the form of command-and-control, often prescriptive, precise, and detailed, requiring specific processes, designs, or actions. These rules are enforced by coercion based in civil, administrative, or criminal Law. Assumes that private actors can be directly regulated by the state.	rules are rarely adopted since IGOs often aren't authorized to establish these types of rules. Even treaties and other legally binding rules depend of state ratification to enter into force. When IGOs are authorized to adopt regulation, state-members can decide to opt in or out. Since they rarely can use coercion, IGO efforts are mostly managerial and indirect in order to convince states to adopt regulation designed to order the conduct of private actors in their jurisdictions.	rules, regulation may be drafted in general terms and require flexible standards, targets, guidelines, or benchmarks (e.g. 'performance-based' and 'management-based' regulation). Management practices (e.g., Environment Management System) are privileged at the expense of specific inputs or outputs, or call for disclosure or dialogue.	and enforcement, or in other words, to establish hard Law, it is predominantly based on soft law (voluntary principles, codes, and procedures). Some techniques of New Governance are adopted when the state is involved. The rules resulting from this governance model will only take the form of hard law when they are incorporated into legally binding instruments.

1.5.6.2 Advantages and Disadvantages

However, there are advantages and disadvantages that are currently seen in the implementation of this model, linked to decentralization and orchestration. The next subsection will describe both sides of the new transnational governance model.

Decentralization

In relation to decentralization, the major problem is linked to the fact that RSS schemes are spontaneous and unplanned, created through independent decisions by private actors and some public actors, without effective coordination. This issue is evident in relation to the technical RSS schemes produced by companies or groups in the industry. As companies are closer to the production process and have specialized technical knowledge, and therefore greater expertise to produce technical standards and update them than public regulatory agencies, they can easily propose their own standards. This fact, added to the low barrier to entry into RSS schemes and the flexibility of soft-law, can generate an inefficient replication of standards. This excessive plurality leads to disorder and difficulty identifying the best standards.

The wide variety of RSS schemes has the advantage of including a diversity of actors and distribution of regulatory authority. Such a configuration brings expertise together in the regulatory system that is dispersed in the old governance model, increasing the level of resources and capacity to present answers to regulatory questions. On the other hand, the absence of orchestration of this tangle of schemes can lead to gaps and overlapping rules in the regulatory system. Schemes can be oriented according to the financial interests or profit of the actors that compose them. So social issues that compromise the profit of companies, or issues of less visibility for NGOs, can be overlooked.

These multiple schemes have the ability to address regulatory issues in different ways, reaching actors, issues, sectors, and regions where the action of the State, through old governance, is limited. In this way, transnational new governance expands the impact of old governance standards at the national and international levels, filling gaps in international regulation and establishing rules that are often more demanding than national rules. The RSS schemes use tools, such as private certifications, the use of labels in support of international standards, and technical assistance programs, which increase regulation and strengthen direct regulation promoted by states.

Nevertheless, this multiplicity of schemes can also represent an increase in transaction costs for companies, as they are driven to adapt to a plurality of standards, as well as facing the difficulty

of evaluating the merits of each standard when they have to make choices between them. The multiplicity also offers the option to choose between less demanding, more business-friendly standards, creating incentives for competing schemes to weaken their standards or to commit to the lowest common denominator only (Weaver, 2014). Thus, without effective orchestration, which orders and evaluates the standards offered by the multiplicity of RSS schemes, the multiplicity can undermine the objectives of transnational new governance to strengthen national and international regulation.

The specialization of standards is also a result of the diversity of schemes, in contrast to the uniformity produced by old governance. Thus, RSS schemes are better able to meet the regulatory requirements of the current global and diverse economic context. NGOs and industry players manage to create highly specialized standards and codes, based on the expertise of local actors, who operate very close to the object to be regulated, as opposed to public regulators who are in an office far from the reality to be regulated. However, this adaptability advantage can be compromised by the internal interests of each organization. The business sector looking for profit and NGOs seeking funding and public opinion may end up weakening the quality of standards.

The diversity of schemes also creates opportunities to learn from tried and successful standards. In this way, associations and consultants disseminate the successful practices of self-regulation among companies, encouraging other actors to adopt such schemes. As an example, we can consider the US Center for Offshore Safety (COS) that provides awards for best practices in improving offshore safety management[40], and the AIPN, which promotes courses to instruct companies on how to adopt their model contracts.

Otherwise, through collaborative actions, companies and NGOs, for example, can exchange experiences aimed at mutual learning and the formulation of more appropriate standards. The guidelines for exploring and producing in the Arctic and in mangrove swamps developed by the International Union for Conservation of Nature (IUCN) jointly with the International Association of Oil and Gas Producers (IOGP), cited in the previous section, exemplify a collaborative action. Another example is the UN Global Compact program that promotes learning forums and encourages cooperation between companies and NGOs. Notwithstanding, these actions occur in a diffuse way. The orchestration of these actions by a central agent, an

[40] In 2018 the Center for Offshore Safety (CO) awarded Exxon Mobil Corporation, in the operator category, and Baker Hughes, a GE Company, in the contractor category, for their best practices for improving offshore safety management. For more information see: https://www.oceannews.com/news/milestones/center-for-offshore-safety-selects-exxon-mobil-and-baker-hughes-for-safety-leadership-awards. Accessed 24 Fev 2020

IGO or a connection network to assess standards, select successful lessons, and promote their replication, would increase the benefits provided by decentralization in the transnational new governance model.

Another advantage of the multiplicity of schemes is the reduced risk of regulatory capture by competing for legitimacy and public support. If an RSS scheme is captured, it is likely that the other competing schemes will make this fact public quickly. Collaborative schemes formed by multiple actors also contribute to avoiding the risk of capture, since the mechanisms to facilitate self-monitoring among its participants make these schemes more transparent, facilitating external monitoring.

The model of transnational new governance creates, according to Abbott and Snidal (2009), new avenues of participation for various groups formed by different actors gathered in RSS schemes, providing opportunities for actors who do not actively participate in the old governance decision process in order to address their wills. This model allows private actors to go beyond the typical roles of the old governance, as lobbyists and objects of regulation, to participate directly in the norm-making process. Among these actors are: *"NGOs, firms, and their employees, unions (WRC[41]); universities (FLA[42], WRC); socially responsible investors (CERES[43], PRI[44]); organic and small farmers (IFOM[45], FLO[46], FTO[47]); indigenous groups and forest owners (FSC[48]); and scientists, advocates, and concerned individuals*."

The ease of multi-actor participation in the regulatory system promoted in the transnational new governance system makes this model more democratic, increasing its legitimacy. However, the representativeness in the RSS schemes remains asymmetric. There are disparities in the participation of different actors that make up the sector regulated by an RSS scheme or between the schemes that target the same sector. Schemes that represent workers' rights, for example, do not always involve workers from the poorest countries in their decisions. Thus, groups with

[41] Worker Rights Consortium, 2000

[42] Fair Labor Association ; apparel industry scheme, 1999

[43] CERES Principles on environmental practices , 1989

[44] Principles for Responsible Investments, UN institutional investors scheme, 2006

[45] International Federation of Organic Agriculture Movements, 1972

[46] Fair trade Labeling Organization, "fair trade" umbrella scheme, 1997

[47]World Fair Trade Organization ; standard for fair trade organizations, 2004

[48] Forest Stewardship Council certification, labeling scheme, 1993

better economic conditions or representative elites generally dominate the decision-making process for these schemes.

Another advantage of the transnational new governance model is that it guarantees a broader arena for participation when the decision-making process is carried out in an IGO or a highly representative RSS scheme. Issues that transcend the limits of a single nation-state must consider interests that are widely distributed internationally. Therefore, it is difficult for a single country to be able to consistently decide on a transnational issue involving other countries. The participation of IGOs in the decision-making process enables the grouping of diffuse interests that, when considered to establish regulation, make it more legitimate. However, there is again the problem of asymmetry in participation, since more powerful countries can dominate IGOs and address their interests in the production process. There is also the question regarding the democratic quality of the countries that make up an IGO. However, despite such problems, the transnational new governance model expands civil engagement and the voice of diffuse actors in relation to international old governance.

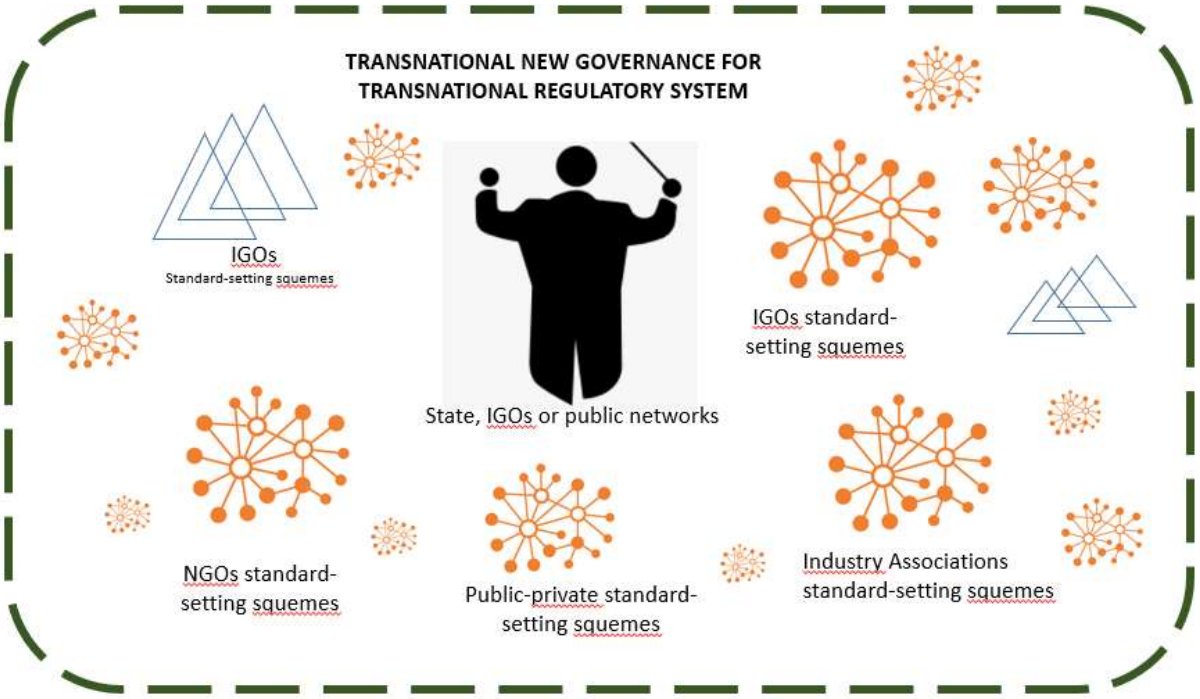
Orchestration

With regard to the orchestration carried out by the state, by an IGO, or by a connected network of states, the main advantages for RSS schemes are related to the increase in legitimacy and to the impact and orientation of their standards towards the public interest. This is due to the participation of an organization that represents the public interests and is committed to the principles of public law. By endorsing certain standards, selecting best practices, and requiring the observation of public law mechanisms that increase representation, transparency and accountability, orchestration can contribute to increase the legitimacy of RSS schemes. On the other hand, public institutions also benefit from orchestration by adding the expertise of private actors and saving resources and time in the internal norm-making process, by adopting the standards produced by RSS schemes.

This orchestration aims to motivate RSS to also consider social results, correcting bias in favor of financial interests and asymmetry of representativeness. Through the empowerment of weaker and more diffuse groups involved in the norm-making process, the deliberative and participatory character of these schemes would be leveraged, contributing to increasing their legitimacy.

The presence of the state authority can also promote the uniformity of standards among competitive schemes by pointing out which ones would be closest to the public interest and encouraging the dissemination of the best standards, stimulating their adoption. It could also correct overlapping standards that are intended for the same object or uneven coverage in relation to transnational regulatory demands. The State would be the orchestrator in the interaction of state and non-state rules, as shown in Figure 8 below.

Figure 8 – The State as Orchestrator



Source: Developed by the author

Without a state authority orchestration, RSS schemes operate on the basis of benefits and sanctions established in the sphere of private governance. Thus, the actors' adherence to these schemes will be carried out based on the calculation of costs and benefits obtained from participation in these schemes. In the absence of the state authority committed to correcting flaws, RSS schemes can distance themselves from the best solutions that take into account the interests of all stakeholders in the sector to be regulated.

The participation of public institutions as RSS scheme orchestrators also has the advantage of giving them a transnational dimension, making them closer to the regulatory issues that arise beyond the borders of the nation-state. Also, as orchestrators, states engage less intensively than

in international old governance, pledge less time, fewer resources, and avoid the legal and political setbacks of extraterritorial regulation. With regard to IGOs, the orchestration allows these organizations to achieve their regulatory objectives by avoiding opposition presented by some states, as is the case in international old governance since that model requires consensus decisions.

However, orchestration still represents a state intervention in self-regulation. The requirement for public law procedures can compromise the speed with which standards are produced and updated. Furthermore, authoritarian states, with a high level of corruption or less democracy, will not always focus on the international common good. Also, in general, states will be able to use RSS schemes to defend their national interests.

1.5.6.3 Proposed alternatives to improve orchestration

In order to expand the state or IGOs orchestration in the transnational new governance and, according Abbott and Snidal (2009), "*strengthen high-quality private regulatory standards, improve the international regulatory system, and better achieve their own regulatory goals*", these authors propose alternatives for states and IGOs to perform this function more effectively, realizing its full potential. However, it should be noted that orchestration in the new transnational governance model will never reach the same level as orchestration in the domestic new governance model.

The next subsections will describe how Abbott and Snidal (2009) suggest that the two types of orchestration, directive and facilitative, could be exercised by states and IGOs.

Directive Orchestration

States

States can carry out direct orchestration, providing in their national regulations benefits for companies that adhere to RSS schemes chosen by them, as well as incorporating the most successful standards into their government programs. States can also influence the adoption of standards in the operations carried out abroad by their national companies, demanding compliance with these standards by home-based parent companies. They can, for example, use transparency requirements, demanding that your national companies present information on socio-environmental practices carried out abroad or the quality of products sold internationally,

if these follow certifications of schemes approved by the state. The transparency of this information enables NGOs and public audiences to monitor companies and hold them accountable for their reports and their actions.

Another form of directive orchestration is the use of benefits, especially for procurement processes. In this sense, firms that adopt the standards of RSS schemes approved by the state would receive a better score in the qualification process. States could require procurement criteria for participation, or even certificates issued by third-party auditing firms attesting the adoption of these schemes by companies in a particular sector as a requirement for contractual monitoring (as US COS certifies third party auditing firms that audit the API RP 175). Abbot and Snidal (2009) comment that this practice is currently widely adopted, especially to promote sustainable practices, through "green public procurement". Nevertheless, these authors point out that procurement processes involve more complex issues because they are generally based on the lowest price. Also, these processes must establish accessible, transparent, and egalitarian conditions of participation, avoiding discrimination. To deal with these issues, these authors suggest that procurement processes seek to choose the most advantageous proposal according to the parameters established in the tender protocol. These parameters must consider sustainable practices, be based on international standards, and must consider more than one RSS scheme, accepting private certifications when possible.

The constant possibility of the state establishing prescriptive regulation may also be an incentive for the companies and other target actors to adopt principles and procedures developed by a given RSS scheme.

However, not all states have the technical capacity and resources to promote directive orchestration, especially developing states. Even developed states find it difficult to regulate transnational issues. Furthermore, because they act in a unitary manner, they lack legitimacy because they lack global representation. One way to get around these issues is to insert a reference to RSS schemes or standards into bilateral investment treaties or other international contracts, such as E&P contracts.

For Abbot and Snidal (2009), in order to promote orchestration, it is essential that states coordinate their actions with other states or with IGOs, aiming to reduce costs, confusions, and conflicts caused by divergent actions. In addition, coordinated actions add capacity and increase the scope of action. Adding state resources and directive capacity to IGOs global performance, as well as greater representation legitimacy and independence of national interests, make the "directive orchestration by states and IGOs highly complementary.

IGOs

IGOs are less able to exercise directive orchestration because they do not have the authority to impose mandatory rules on private agents without requiring state consensus. However, the transnational new governance model creates more opportunities to promote the adoption of standards developed by RSS schemes.

Also, procurement processes are present IGOs with one of the main opportunities to promote RSS schemes by requiring them as a condition for participation in the bidding process. However, Abbot and Snidal (2009) warn that the transnational new governance model will be stronger if IGOs are not based exclusively on their own schemes, promoting other schemes as well. So they must incorporate equivalent or complementary standards in their public notices and promote a beneficial race-to-the-top competition between schemes. Even though they have to observe basic principles of procurement, such as best value, acting fairly, and avoiding discrimination, IGOs have more freedom to act than states and are not bound by any specific law that requires them to follow specific procedures.

Financial IGOs, especially, have the advantage of being able to exercise directive orchestration by imposing conditions for granting loans. The World Bank, for example, does so by promoting ‘sustainable forest management’. Its private sector arm, IFC, requires its clients to meet certain social and environmental conditions, as Weaver (Duval et al, 2009) recalls with the requirement for native population consent for oil and gas projects. However, in relation to these IGOs, the same problems that has already been mentioned can occur because they are usually based on their own standards. It is necessary for them to use their special ability to promote directive orchestration to promote other RSS standards in a process of beneficial commitment, strengthening transnational new governance.

Abbot and Snidal (2009) point out that few IGOs can exercise directive orchestration with the ability to offer sufficient financial benefits. However, when they do, they are questioned regarding the legitimacy of acting in such role. IGOs can use other strategies, such as starting an RSS program defining the basic principles and then granting approval to participants. They can also grant non-tax benefits, such as access to advisory committees and meeting sessions to participants in previously approved RSS schemes. Also, they can give a "seal of approval" to companies highly engaged in RSS schemes, granting them a voice in this governance regime and counting on their expertise. Nevertheless, these authors warn that IGOs must pay attention to the adoption of these strategies so that they are not accused of promoting discrimination, which could affect their representativeness and legitimacy.

Directive orchestration raises power issues given its top-down imposing character. Although many similar regulatory objectives are shared, differences between important points remain, such as economic growth. Developing states can oppose the actions of developed countries, citing external interference in domestic policies and the imposition of inappropriate trade-offs. The same is true for IGOs dominated by developed countries, such as the World Bank. Thus, more independent IGOs are better suited to exercise orchestration without generating as much resistance, but even these will not be free from issues related to power. According to Abbot and Snidal (2009) "RSS is inherently political and will always be contested."

Facilitative Orchestration

Because of the state and IGOs' directive orchestration limitations, Abbot and Snidal (2009) affirm that the facilitative orchestration is the most important form of transnational orchestration. States and IGOs can support and collaborate with RSS schemes by advancing their regulatory objectives and using a vast network of connections, which presents low-cost opportunities. Thus, they can use New Governance tools to convene, facilitate, legitimize, negotiate, publish, ratify, supervise, associate, and interact with various RSS schemes and their actors. And since this form of orchestration involves fewer top-down actions by state actors, it reduces conflicts of power, although it does not eliminate them.

States

For Abbot and Snidal (2009), states can collaborate with RSS schemes by giving them material support, like providing work facilities, as the Netherlands and the city of Bonn do in relation to the Forest Stewardship Council (FSC). Other examples are the UK Department for International Development (DFID) which has provided material support to the Ethical Trading Initiative (ETI) since the creation of this scheme and the Swiss State Secretariat for Economic Affairs (SECO) which funded the start of the Max Havelaar Foundation in Switzerland, aiming to encourage fair trade certification[49]. In addition to being a cheap investment, supporting these schemes allows these national agencies to gain some independence from exclusively national interests. In this way, they increase the level of legitimacy and effectiveness of their actions, as they come to be seen as committed to global development, not just local.

[49] For more information see : http://www.ecolabelindex.com/ecolabel/max-havelaar

In addition to material support, states may convene with various actors to encourage them to set up an RSS scheme, acting jointly or collaborating with its installation. Thus, through a collaboration policy, states can influence the process of drafting the rules, imprinting their considerations in the structure and procedures. States can also reinforce the legitimacy and moral support of RSS schemes installed within the limits of their territory. However, states must take a position regarding the standards quality and their governance type in order to differentiate them in relation to other competitive schemes. They should also take a stand on the effectiveness of their procedures and how these schemes are oriented towards the public interest, strengthening those that best meet public objectives and encouraging others to adapt. States can also support these RSS schemes by sharing important information on various regulatory issues and helping to disseminate information on high-quality schemes and successful RSS practices.

IGOs

According to Abbot and Snidal (2009), IGOs perform facilitative orchestration by initially promulgating their own standards and rules that are used as a reference by RSS schemes. By incorporating the standards of certain schemes into their international policy, IGOs contribute to the strengthening of these schemes. Thus, IGOs could continue to use traditional processes to enact rules to be adopted by states, yet give them a format that can be adapted to companies through RSS schemes. IGOs could encourage these schemes to adapt these international rules to be applied to companies by incorporating their schemes into their own rule-making process and providing assessments of these schemes. More proactively, IGOs can learn the best way to reach out to companies from RSS schemes, and publish their standards in a similar way. Still, according to these authors, IGOs can contribute to the dissemination of the schemes by launching compilations of the best standards, as the World Bank did through the Company Codes of Conduct and International Standards: an Analytical Comparison for the oil and gas sector[50].

In the understanding of Abbot and Snidal (2009), many IGOs are considered as neutral forums, relatively independent from states and companies, and endowed with legitimacy and a high level of expertise. Thus, they can act as "honest brokers", having the authority to bring together the various actors involved in a given sector to be regulated, even if they have different interests,

[50] For more information see : http://documents.worldbank.org/curated/pt/442691468349802764/pdf/346620v20CompanyCodesofConduct.pdf

acting in order to mitigate differences in power. In this way, IGOs would contribute to minimizing transaction costs and collaboration bargain problems.

IGOs can also act to bring together states and private agents in the development of an RSS scheme, increasing its representativeness and thus the legitimacy of this scheme. Bringing together various actors, IGOs would facilitate the promotion, negotiation, feedback and other interactions required by RSS schemes. The participation of non-traditional actors, such as investors and insurance companies, in these schemes can also be encouraged by IGOs.

Abbot and Snidal (2009) suggest that IGOs can use their influence to request existing RSS schemes address issues that are of less interest to those schemes, but important for serving the public interest. An optimal level of multiplicity can also be coordinated by IGOs, by promoting learning forums to discuss the best references among actors engaged in a given sector. And they also can coordinate the orchestration between the states and promote a closer relationship between the regulatory states and the private RSS schemes.

Despite having fewer resources than the most powerful states, IGOs can also contribute to material support, as the United Nations Environment Programme (UNEP) does with the Global Reporting Initiative (GRI)[51]. They can also participate in local experiments and project demonstrations that bring new transnational lessons, as well as provide technical assistance to participants in these projects. Like states, IGOs can participate in the negotiation of structures, rules, and procedures as part of their collaboration policy. IGOs can develop criteria to define acceptable principles, structures, and processes to be adopted by RSS schemes, which for Murphy (2005) would be a code of codes, or adopt criteria to guide the creation of other schemes, such as ISO social responsibility standards.

According to Abbot and Snidal (2009), by adopting RSS standards, IGOs grant public support to the scheme, generating a strong sign of approval. This public approval helps high-quality schemes to compete for resources and support vis-à-vis their supporters, consumers, or public audiences. It can also help to improve the appeal of companies that adhere to such schemes.

Finally, IGOs can engage in the production of knowledge, based on their expertise and independence. Thus, they can produce and disseminate information about the impacts of particular approaches to some RSS schemes, their equivalencies and differences in relation to standards and procedures, and can point out the best practices among the RSS schemes and the most successful ones. IGOs can replicate best practices, as in the World Bank example, and

[51] For more information, see : https://www.globalreporting.org/information/about-gri/alliances-and-synergies/Pages/UNEP.aspx

encourage their adoption. Specialized IGOs can contribute technical assistance to private actors who wish to promote self-regulation in the IGO's area of specialization, and to developing countries that wish to promote transnational new governance. For Abbot and Snidal (2009) these actions would generate multiple positive effects: they would promote comparative and dialogical studies on RSS approaches, stimulate race-to-the-top competition between schemes, increase standardization, and the effectiveness of schemes.

The table below will summarize the advantages and disadvantages of transnational new governance model:

Table 2 - Advantages and Disadvantages of Transnational New Governance

TRANSNATIONAL NEW GOVERNANCE		
FEATURES	ADVANTAGES	DISADVANTAGES
DESCENTRALIZATION/MULTIPLICITY OF SCHEMES	Gathers dispersed expertise due to diversity of actors and the distribution of regulatory authority.	Inefficient replication of standards, disorder and the difficulty of individualizing the best standards. The absence of orchestration of this tangle of schemes can lead to gaps and overlapping rules in the regulatory system.
	Ability to address regulatory issues in different ways, reaching actors and issues, sectors and regions where the action of state, through old governance, is limited. Thus, expands the impact of old governance standards at the national and international levels, filling gaps in international regulation and establishing rules that are often more demanding than national rules.	Schemes can be oriented according to financing or profit interests of the actors that compose them. So social issues that compromise the profit of companies or issues of less visibility for NGOs can be overlooked.
	Specialization of standards in contrast to the uniformity produced by old governance. RSS schemes are able to better meet the regulatory requirements of the current global and diverse economic context. NGOs and industry players manage to create highly specialized standards and codes, based on the expertise of local actors, who act very close to the object to be regulated, different from public regulators, who are in the office far from the reality to be regulated.	It can increase the transaction costs for companies, as they are driven to adapt to a plurality of standards, and they may have to make choices between them, which means facing the difficulty of evaluating the merit of each standard.
	Creates opportunities to learn from tried and successful standards. Associations and consultants disseminate the successful practices of self-regulation among companies, encouraging other actors to adopt such schemes. Through collaborative actions, companies and NGOs, for	Possibility to choose between less demanding, more business-friendly standards, creating incentives for competing schemes to weaken their

	example, can exchange experiences, aiming at mutual learning and formulation of more appropriate standards.	standards or to commit to the lowest common denominator only.
	Reduced risk of regulatory capture by competing for legitimacy and public support. If an RSS scheme is captured, it is likely that the other competing schemes will make this fact public quickly. Collaborative schemes formed by multiple actors also contribute to avoiding the risk of capture, since the mechanisms to facilitate self-monitoring among its participants make these schemes more transparent, facilitating external monitoring.	Adaptability of standards can be compromised by the internal interests of each organization. The business sector looking for profits and NGOs seeking funding and public opinion may end up weakening the quality of standards.
	Creates new avenues of participation for various groups formed by different actors gathered in RSS schemes, providing opportunities for actors who do not actively participate in the old governance decision process in order to address their wills. Allows private actors to go beyond the typical roles of old governance, as lobbyists and objects of regulation, to participate directly in the norm-making process. The ease of multi-actors participation makes this model more democratic, increasing its legitimacy.	Representativeness in the RSS schemes remains asymmetric. There are disparities in the participation of different actors that make up the sector regulated by an RSS scheme or between the schemes that target the same sector. Groups with better economic conditions or representative elites generally dominate the decision-making process for these schemes.
	Guarantees a broader arena for participation when the decision-making process is carried out in an IGO or in a highly representative RSS scheme. Participation of IGOs in the decision-making process enables the grouping of diffuse interests that, when considered to establish regulation, make it more legitimate.	Problem of asymmetry in participation, since more powerful countries can dominate IGOs and address their interests in the production process. There is also the question regarding the democratic quality of the countries that make up an IGO.
ORCHESTRATION	Increase legitimacy, impact, and orientation towards the public interest of RSS schemes' standards. By endorsing certain standards, selecting best practices, and requiring the observation of public law mechanisms that increase representation, transparency, and accountability, orchestration can contribute to the increased legitimacy of RSS schemes.	Represents a state intervention in self-regulation.

	Public institutions also benefit from orchestration, by adding the expertise of private actors and saving resources and time in the internal norm-making process, and by replicating the standards produced by RSS schemes.	The requirement for public law procedures can compromise the speed with which standards are produced and updated.
	Empowerment of weaker and more diffuse groups involved in the norm-making process, increasing the legitimacy of the deliberative and participatory character of these schemes.	Authoritarian states, with a high level of corruption or less democracy, will not always focus on the international common good. In general, states will be able to use RSS schemes to defend their national interests.
	Promotes the uniformity of standards among competitive schemes, by pointing out which ones would be closest to the public interest, and encouragse the dissemination of the best standards, stimulating their adoption. It could also correct overlapping standards that are intended for the same object or uneven coverage in relation to transnational regulatory demands.	
	Transnational dimension for public institutions, making them closer to the regulatory issues that arise beyond the borders of the country. As orchestrators, states engage less intensively than in international old governance, pledge less time, fewer resources, and avoid the legal and political setbacks of extraterritorial regulation.	
	Allows IGOs to achieve their regulatory objectives by avoiding opposition posed by some states, as is the case in international old governance, since in this model decisions must be taken in consensus.	

1.6 Conclusion of the First Chapter

Having described the governance models based on the methodology proposed by Abbott and Snidal (2009), the next chapters will analyze the unitization and decommissioning regulations, both as part of upstream sector TLO. These chapters aim to analyze the type of governance that occurs in the norm-making process of each regulation, and whether it would be possible to adopt the transnational new governance. For this analysis, the directive and facilitative orchestration instruments that could be adopted to regulate of each of these processes will be evaluated.

CHAPTER II – CASE STUDY OF UNITIZATION REGULATORY SYSTEM IN BRAZIL

2.1 Introduction

The first chapter present a TLO for the upstream sector of the oil industry (upstream sector) from a broader approach to this sector's regulatory system. For the description of this System, state and non-state rules were developed, elaborated by private actors or public actors external to the national legal order.

This second chapter will demonstrate how the TLO for the upstream sector influences the Brazilian regulatory system for unitization. For this purpose, the second section will describe the practice of unitization in general. In the third section, the Brazilian regulatory system for unitization will be presented. In the fourth section, concrete examples of the influence that foreign regulations, Industry practices, and model contracts have on this regulatory system's rule-making process will be pointed out.

Analysing the concret examples, it is possible to observe in the rulemaking process of the Brazilian concession contract the influence of: i) regulations and E&P contracts from other HCs, through the contribution of Braspetro technicians; ii) regulations and international practices brought by consultants from Gaffney Cline, hired by Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP); and IHS, hired by Brazilian Institute of Petroleum and Natural Gas (IBP), in addition to those obtained by the international experience of representatives of interested industries; and iii) the academy, through the participation of Federal Universy of Bahia (UFBA) and University of Campinas (UNICAMP) in the process of analyzing the areas to be retained by Petrobras.

However, this influence occurs, in most cases, indirectly and informally. It is possible to affirm that the State regulators does not know broadly the transnational rules that touch the Brazilian regulatory system for unitization and, therefore, is unable to choose which of these norms should permeate its regulatory system. The clearest example that emerges from this analysis relates to the central point of unitization, the definition of the fixed portion of each of the parties that holds E&P rights over the shared deposit or tract

participation (TP). There are several ways available to calculate the reservoir volume, called technical bases. However, as shown throughout this chapter, the Brazilian State does not fully know all the technical bases available. Nor does it seek to approach professional associations that develop methodologies for such a calculation.

In this context, it is essential to question whether the governance model on the rule-making process for the Brazilian regulatory system for unitization is the most appropriate to deal with the influence of transnational rules. From the analysis carried out in this chapter, it can be seen that the State, in most cases, exercises the type of traditional governance, called by Abbott and Snidal (2009) the Old Governance model. In this model, the State remains in the central position, regulating from the top-down, concentrating its expertise in state bureaucrats and professional regulators. There is, however, an inconsistency between this type of governance model and the realization of the influence that transnational rules have on the national legal order.

Thus, in the fifth section of this chapter, it will be asked whether it is important for the State to adopt a new form of governance in order to give validity to private rules and to monitor the elaboration of these rules, engaging private actors to participate in the rule-making process of the regulatory system. For this analysis, the governance models proposed by Abbott and Snidal (2009) that consider the presence of private actors in the rule-making process - new governance and transnational new governance models - will be considered. It will also be analyzed the proposal of these authors for the State to exercise the role of orchestrator, take measures to engage public and private actors in regulatory activities, and facilitate adopting and enforcing private rules.

The analysis of the Brazilian regulatory system for the unitization rule-making process already indicates that the State has already acted as an orchestrator in some moments in an incipient way. At the end of the fifth section, suggestions will be made for the State to act as an orchestrator in a directive and facilitative manner.

2.2 Presenting the Unitization Practice

2.2.1 Definition of Unitization

Petroleum is formed from sediments rich in decomposed organic matter, chemically transformed by bacterial action and heat, assuming liquid and gaseous forms. As a result and due to the expansion caused by chemical transformation, oil migrates from the source

rocks to the reservoir rocks, which is characterized by porosity and permeability, creating the necessary conditions for hydrocarbons to accumulate in empty, interconnected pores. However, these can only remain deposited if there is a barrier that prevents migration from continuing. This barrier will be formed by the impermeable cap rocks, characterized mainly by its low permeability and plasticity, which allows it to maintain its condition even after being subjected to strain deformation efforts. In this way, the impermeable cap rocks will act as a containment barrier, thus delineating the limits of the reservoir. Such limits will not necessarily correspond to the surface properties' boundaries. In other words, the reservoir will not always be within the limits established by the producing state for the performance of E&P activities by a company or consortium of companies. Therefore, if the reservoir extends over more than one property, there will be a potential problem among the surface areas in defining the property of the mining product present in the subsoil. (Daintith, 2010) This issue will be subject to regulation by the State, through the definition of the rights of appropriation of subsoil resources. One of the proposed solutions is unitization[52].

Unitization, according to Worthignton (2020), can be defined as follows:

> *"The unitization of subsurface oil and gas fields is an important part of petroleum industry practice because the natural accumulation of hydrocarbons within host rocks takes no account whatsoever of man-made demarcations such as international borders or boundaries of domestic licences for exploration and production. Unitization formalizes the development and production of a petroleum accumulation that straddles such a boundary. It creates a seamless Unit so that the boundary becomes virtual and wasteful competitive drilling and consequentially weakened recovery of petroleum are avoided. It is conducted in accordance with the prevailing petroleum legislation in each jurisdiction."*

To better understand the unitization practice, it is necessary to briefly address comments about the beginnings of the petroleum industry and the Rule of Capture. The next section will address these two points.

[52] Worthington calls attention for the terminology inconsistency. Some terms are used in place of unitization, such as “unification”, “individualization of deposits”, “unitary work program”, “cooperative agreement”, “unit agreement”, “field consolidation”, “coordinated petroleum activities”, and “joint development ”. However, this author recommends using the term unitization to oppose the Rule of Capture.

2.2.2 Brief Report on the Emergence of the Petroleum Industry and the Rule of Capture

The emergence of petroleum exploration mechanically occurred in Baku, today the Republic of Azerbaijan's capital, where the first petroleum well was drilled mechanically in the Bibi-Eibat field in 1844. Before that, many other wells were drilled manually, and the crude oil was refined in paraffin to be sold in local markets (Bunter, 2002).

The ownership of mineral resources in the Russian colony belonged to the Crown, represented by the Czar specifically. Local officials, acting on behalf of the Czar, granted rights to drill and extract petroleum through what is now known as the Contract System. Under this system, the government allowed petroleum exploration activities to be carried out for four years. However, the contract could be terminated at any time, and there was no preemptive right to renew it. The short contractual term favored efforts to maximize production, encouraging overproduction, and waste (Bunter, 2002).

The petroleum produced in Baku went through a "primitive"[53] refining process, resulting in paraffin (kerosene), which was transported to other parts of the Russian Empire and Western Europe, leading to the emergence of international trade. However, the initial production of petroleum amounted to only seventy-five barrels per day (Bunter, 2002).

In the United States, petroleum exploration began in the 1850s, in Titusville, a remote region of Pennsylvania. Pennsylvania Rock Oil Company, led by New York lawyer George Bissell, made its first investments in the search for petroleum. This company hired "colonel" Edwin L. Drake, who coordinated the drilling of a twenty-one meter well, in which oil was found on August 27, 1859. In this operation, a steam engine was used to provide energy to the drill created by Drake and salt well drills. Since then, the race for land acquisition and well drilling has started. Oil, refined as kerosene, became "the light of the age" (Yergin, 1992).

With Drake's discovery, the USA became the first petroleum-producing power in the world (Daintith, 2010). However, Russian annual production was higher than that of the United States in the early 1900s (Bunter, 2002). The first oil export from the United States

[53] The term 'primitive' is used by Michael Bunter (2002), in his book '*The Promotion and Licensing of Petroleum Prospective Acreage'*. There is no definition of what this process will be, but, by supposition, it should be a very rudimentary refining containing, probably, an atmospheric pressure distillation, without many heat exchange dishes.

took place in 1861, just two years after the first discovery when the Elizabeth Watts vessel transported 900 (nine hundred) kerosene barrels from Philadelphia to London. In 1864, the USA already exported 25% (twenty-five percent) of its kerosene production from Philadelphia, and a year later, the export of kerosene and lubricants already reached the sixth place among the most exported items in the country (Tusiani, 1996). Thus, the race for properties in which oil could be obtained was followed by another, that of producing it as quickly and in the highest amount as possible (Yergin, 1992). As in the United States, from this period until nowadays, the private owner of the surface is also the owner of the mineral resources found in the subsoil, the migration of oil in the exploration of reservoirs extended by two or more neighboring properties began to be questioned (Daintith, 2010).

Such questioning was resolved using the Rule of Capture, in practical effect since the discovery of Colonel Drake to the present day. It is important to note that the Rule of Capture is a Common-Law rule, that was applied in judicial decisions by American courts to disputes involving petroleum property rights, without any legislation providing for it (Daintith, 2010; Kramer and Anderson, 2005).

The most direct definition for the Capture Rule was formulated by attorney Robert E. Hardwicke, who says: "*The owner of a tract of land acquires title to the oil and gas which he produces from wells drilled thereon, though it may be proved that part of such oil or gas migrated from adjoining lands"*. (Hardwicke, 1935 apud Kramer and Anderson, 2005)

Thus, the owner of the surface on which a well was drilled also owned all the oil extracted, even if this resource was obtained by migration from beneath another surface. Therefore, it was legally possible to drain disproportionately or reduce adjacent wells' production located on neighboring properties. This rule encouraged accelerated production by well owners in order to avoid draining their wells by other neighbors, causing two major problems: excessive drilling and a decrease in the reservoir's natural energy (Yergin, 1992; Kramer and Anderson, 2005).

In the words of Weaver (2017), a well-known consequence of the Rule of Capture is the Tragedy of the Commons. By producing individually from a shared reservoir the E&P rights holders will not achieve the best recovery rates and, therefore, reduce the field's life. HCs will also experience economic losses since excessive drilling will reduce the reservoir energy, leading to the field's early abandonment. And investments in unnecessary facilities will lead to higher cost recovery by the contracted company.

Therefore, the revenues due to HC from exploiting petroleum resources will be minimized if the unitization process is not carried out. However, it is worth remembering that in some cases, unitization may not produce the best results, as warned by Libecap and Smith (2001), when some failures are observed. These will be dealt with in the next subsection.

Before being applied to oil ownership disputes, the Rule of Capture was already widely known by American courts, given that it was a rule that guided decisions related to groundwater ownership disputes (Kramer and Anderson, 2005). Its premises came from the adoption of the entire body of English Common Law, with roots in the ancient rules of Roman Law (Drummond et al., 2004). According to Worthignton (2020), the Pandects of Justinian, codification carried out by Byzantine Emperor Justinian I (483-565 A.D.), already addressed conflicts related to water ownership.

Regarding the use of groundwater rights as a reference for the regulation of property rights of petroleum reserves in the subsoil, Worthington (2020) cites two leading cases that bring opposite approaches. The landmark case of Acton v Blundell, at Lancashire, England, in 1841, which established the absolute-ownership rule or the Rule of Capture, otherwise known as the "English rule." And the case of Bassett v Salisbury Manufacturing Company at New Hampshire, US, in 1862, who adopted the approach of the reasonable-use rule based on the correlative rights of adjoining owners, otherwise known as the "American rule."

However, regarding petroleum, Worthignton (2020) reports that the Rule of Capture prevailed over the reasonable-use rule, based on the correlative rights of adjoining owners approach. This choice was taken due to the interpretation that petroleum was not an essential resource for life or livelihood, but a simple commodity that should be transported to be used elsewhere. Thus, as this author states: "*The Rule of Capture is rooted in early law concerning groundwater rights as held in Acton v Blundell*." Kramer and Anderson (2005) confirm this statement by maintaining that the earliest oil and gas cases were based on the premises of the Acton v Blundell case.

The Rule of Capture is of crucial importance in the initial development of the Petroleum Industry in the USA and can be identified as the most relevant in defining the legal context of North American petroleum production. The Rule of Capture was, properly speaking, the structure of Industry in its beginnings (Yergin, 1996; Daintith, 2010).

2.2.3 The beginning of the use of Unitization as an industry practice

However, since the 1920s, the Rule of Capture has faced campaigns against its adoption, due to the waste it causes by stimulating excessive drilling to take place at an accelerated rate. (Daintith, 2010). The first to be concerned with the social costs created by continued adherence to the Rule of Capture was the petroleum engineer, Henry Doherty, who was the leading proponent for a statute for unitization[54] (Kramer and Anderson, 2005).

Henry Doherty maintained, in the movement to adopt compulsory unitization, in the USA, that the Rule of Capture encouraged a predatory production that caused a waste of capital and labor force, besides leading to an excess of oil supply, causing the fall of petroleum prices (Daintith, 2010). Henry Doherty was director of the American Petroleum Institute (API), an association that, according to Weaver (2017), was "*driven by an ideology of private property rights and anti-regulation fervor*." Because the API has treated him as a pariah, Henry Doherty was free to write a letter directly to President Coolidge in 1924 in the following terms:

> *"If the public [some day] awakens to the fact that we have become a bankrupt nation as far as oil is concerned, and that it is too late to [practice conservation], I am sure they will blame both the men of the oil industry and the men in public office at the time conservation measures should have been adopted." (Weaver, 2011)*

Another character that stands out in the movement to promote unitization, according to Weaver (2017), is the petroleum engineer, William Murray, the regulator of the Texas Railroad Commission[55]. After WWII, Murray issued a series of orders that had the effect of unitizing many of the most significant fields in Texas, even in a context that Weaver describes as 'antipathy for compulsory unitization.' In order to avoid waste, Murray developed the "Doctrine of Co-equal Coercion. By threatening to close the field that was flaring or wasting gas, he led small and large operators to think of solutions to prevent waste, resulting in voluntary unitization agreements to enable development under such conditions. Weaver reports that she "*tracted each no-flare and no-waste order and linked*

[54] It was in Henry L. Doherty's campaign in favor of the practice of unitization that the expression "Rule of Capture" came about.

[55] The Railroad Commission was established in 1891 as the regulator of the rail industry of the 1800s, but nowdays it has the regulator of natural resources and the environment of Texas, US.

it to a RRC order approving a voluntary unitization agreement in that field shortly thereafter."

To mitigate the effects of the Rule of Capture, two remedies were introduced at an early stage to deal with the wastage that comes with competitive drilling of wells and make the exploitation of petroleum resources more efficient and effective: 'onshore well spacing' and 'pooling.'

According to Worthington, the practice of onshore well spacing is adopted in the USA, Canada, and other producing countries. It is a practice applied, especially in neighboring producing properties, where there is a risk of capture. This practice requires a minimum spacing between the wells to be drilled. However, small landowners may have their requests for drilling permits hampered by not having enough space as required by regulation, which can lead to the drainage of production by others.

Pooling is a practice that complements the regulation that establishes well spacing. As Weaver and Asmus (2006) explain, to achieve the required size in the regulation that sets the minimum spacing for drilling wells, small tracts of land are grouped into drilling units or spacing units. This author argues that, like unitization, pooling avoid unnecessary well drilling but is more suitable for the primary recovery phase of production. And the fair share of the unit well's production is due to each owner of land pooled.

However, according to Worthington (2020), the effectiveness is limited in eradicating the effects of the Rule of Capture, although they help preserve equity, especially for the minority shareholders in a given onshore accumulation. Only unitization, according to this author, imposes project efficiency and effectivement, and also improve the aggregate economics relative to competitive development. Summarizing, Worthington argues that unitization will increase revenues without environmental compromise and with Pareto-optimization[56].

Unitization was regulated in the US for federally owned lands by amending the leasing Act. This diploma foresaw the requirement for unitization whenever the Secretary of the Interior judged that this process was the best way to serve the public interest. This rule

[56] Pareto-optimization is a concept developed by the Italian Vilfredo Pareto, which defines an ideal resource distribution state. Any modification made to improve the situation of one participant implies damage to the individual situation of another participant.(Barr, Nicholas (2012). «3.2.2 The relevance of efficiency to different theories of society». Economics of the Welfare State 5th ed. [S.l.]: Oxford University Press. ISBN 978-0-19-929781-8)

later evolved into compulsory unitization. According to Worthington (2020), unitization has become a refinement of pooling practice in the US. This assertive is especially true for offshore fields, "*where well spacing across a given pool is neither feasible nor an option*." However, the Rule of Capture continued to be adopted for primary recovery by artesian or pumped flow from wells. Currently, in the US, all producing states have limited compulsory unitization statutes, except for Texas.

2.2.4 Unitization Features

The main object of unitization is to remove the existing boundaries between areas subject to different contracts. The unitization purpose is to enable joint development and the unified production of a reservoir that extends through these areas. Thus, when considering the areas involved as the seamless unit, the development plan will be prepared without considering the initially existing borders. Therefore, unnecessary costs will be avoided, and a higher volume of oil can be recovered for a smaller outlay.

Worthington (2020) maintains that the unitization process leads to Pareto-optimization. This author explains that:

> *"although Pareto efficiency is a state in which it is not possible to make a participant in an economic venture better off without making another participant worse off, as would be the situation with Tract Participation in a straddling asset of fixed value, unitization improves the aggregate economics relative to competitive development. According to this theory, unitization seeks to align the incentives of coventurers with those of the State through Pareto-optimization. Theoretically, this allows a Pareto-efficient situation to be improved to an optimum level so that no coventurer is worse off as a result of unitization."*

Weaver and Asmus (2006) point out the following reasons that qualify unitization as the best method for producing oil efficiently and fairly:

> *a) "It avoids the economic waste of unnecessary well drilling and construction of related facilities that would otherwise occur under the competitive rule of capture.*
> *b) It allows sharing of development infrastructure, thus lowering the costs of production through economies of scale and operating efficiencies.*
> *c) It maximizes the ultimate recovery of petroleum from a field according to the best technical or engineering information, whether during primary production operations or enhanced recovery operations.*
> *d) It gives all owners of rights in the common reservoir a fair share of the production (in U.S. terminology, it "protects correlative rights").*

e) It minimizes surface use of the land and surface damages by avoiding unnecessary wells and infrastructure."

According to Anderson (1984), unitization is generally a slow and complex process, which begins with the formation of an operational committee made up of companies that have E&P rights over the shared deposit. This committee will analyze the feasibility of the unitization from the technical and economic aspects. It will determine the best method to achieve an advanced recovery, which results in maximizing the hydrocarbon recovery of the deposit and ensures a reasonable profit.

Weaver and Asmus (2006) classify unitization in two categories: i) unitization in a single country, when the area to be unitizedis located entirely in a single country, being governed exclusively by the laws of that country; and ii) cross-border unitization, when the reservoir to be unitizedextends beyond the borders of a country. Generally, in the first category, unitization processes involve only one type of International Petroleum Agreement (IPA), concession, PSA, or service contracts with risk. In the second category, unitization processes are more likely to include different kinds of E&P contracts.

As the object of this chapter is to analyze the influence of the transnational legal order on the Brazilian unitization regulatory system, which is part of the Brazilian national legal order, only the first category will be considered as an object of analysis. However, the agreements signed to consolidate cross-border unitization, arising from the international legal order, will be regarded as transnational rules.

2.2.5 The Unitization Process

Weaver and Asmus (2006) divide unitization into three stages: i) the conclusion of a pre-agreement after the shared reservoir discovery or appraisal, before the declaration of commerciality; ii) the signing of the unitization agreement (UA) and the unit operating agreement (UOA), generally coinciding with a development plan agreed between the parties; and iii) the redetermination of Tract Participations (TP), as established in the unitization agreement when more development and production data about the reservoir is obtained.

The first stage begins when the parties recognize and accept that there is a petroleum reservoir shared by them, which extends beyond and across the borders of the areas over

which they have E&P rights. Aiming to sign the pre-agreement, Taverne (1999) believes that it is necessary to consider the following factors:

i. the reservoir whose production will be unitized limits, extension and configuration;
ii. the reservoir rock mineral characteristics and mechanical conditions, as well as the characteristics of the petroleum inside;
iii. the definition of the petroleum volume to be shared between the parties holding E&P rights;
iv. the form in which the reservoir should be divided (calculation of initial TP);
v. the period scheduled to carry out the redeterminations of the reservoir limits, the total petroleum volume and the TP;
vi. the single operator;
vii. the development plan outline; and
viii. the division or non-division of the costs of the pre-agreement.

According to David (1996), the pre-agreement stage involves entering into at least one and probably several preliminary contracts, through which the parties will make the reservoir assessment feasible. The first one is the confidentiality agreement concerning the data acquired by the companies to provide the sharing of information about the reservoir. However, the ownership of the data remains with the company that acquired it, which, through the confidentiality agreement, ensures that, although the data is disclosed to the other parties, they will not be able to make use of those that go beyond the sphere of unitization. The acquisition of new data, jointly, will also encourage the signing of other contracts, such as the joint well and joint studies agreement.

The second stage is complex, as it consists of negotiating the Unitization Agreement (UA) and the Unit Operating Agreement (UOA), although the two may be combined in to one agreement. The UA is signed by the companies that hold the E&P rights for the shared reservoir but must be approved by a producing country. This agreement provides for Initial Tract Participation (ITP) and rights and obligations that affect the producing country, such as payment of government take, local content obligations, and data sharing.

The UOA is an agreement also signed between the parties involved in the unitization to govern day-to-day operations for the shared reservoir joint development. The UOA is similar to the Joint Operating Agreement and provides for private deals that are not relevant to the knowledge of a producing country, such as the process of contracting

goods and services by the unit operator, the payment process due by each of the parties, etc.

Among the upstream sector agreements, the UA would not be among the International Petroleum Agreements, which means the contracts negotiated between the HCs and the IOCs or NOCs to grant E&P rights. But it would also not be a pure example of private agreements negotiated between the oil companies, as it requires the approval of a producing country and addresses public interest issues. The UA would be a type of contract between these two main categories of upstream sector contracts.

The new AIPN contractual model of 2020 suggests the signing of a single document, the Unitization and Unit Operating Agreement (UUOA). According to this Association, by combining the unit agreement with the unit operating agreement, inconsistencies between the two agreements would be minimized, the relationship between the parties would be simplified, and a more transparent process would be offered to HCs. Worthington (2020) also argues that signing a single document would avoid duplication of clauses and result in the simplification of the negotiation process, which would already represent a large volume of work economy.

However, signing a single agreement brings as a disadvantage the increase of complexity in the HC analysis for approval purposes. For this reason, some countries like Brazil advise the parties to sign separate contracts. Bucheb (2007), a researcher of Brazilian regulation on unitization, maintains that the agreement to be submitted to the HC approval must have only clauses required by its regulatory body, and the other covenants must be in a complimentary private agreement. In this way, the unitization process's regulatory analysis would be concentrated on clauses that deal with issues of public interest, such as government participation, technical data, and local content. Private issues could be freely addressed by the parties involved in the unitization process without any interference from the producing country.

Considering that this chapter will analyze the Brazilian regulatory system for unitization, concerning the interaction between the State and private actors, only the UA will be addressed in detail.

For Taverne (1999), sharing costs, obligations, oil and natural gas production, and other benefits of joint exploitation is the primary purpose of UA. The agreement will establish

each party's share over the shared reservoir so that a fair sharing of rights and obligations will be carried out.

The main UA clauses, according to Duval et al. (2009) and Taverne (1999), are:

i. Parties: the agreement must present all the oil companies, relating the E&P contracts to which they are signatory, individually or in the form of a consortium. Even in the case of a consortium, all companies must be included in the UA and sign it;

ii. Definitions: specific terms must be defined, using, whenever possible, the same definitions adopted in the Joint Operating Agreements (JOA);

iii. Objective and scope: these should be the joint exploitation of the unitized area, in which the parties will share costs, obligations, the oil and natural gas production, and other benefits in proportion to their defined in the TP. Rights, according to Worthington (2020), will become indivisible;

iv. Unitized area: it is defined when the parties identify the limits of the shared reservoir, which can be corrected. This definition does not need to be made using geographical coordinates, but it can be based on technical characteristics of the subsurface structures that make up the oil deposit. Worthington (2020), points out that for the definition of the unitized area, the previous borders, established on the surface to delimit the field, become virtual;

v. Duration: this should be established according to the E&P contracts that govern the shared reservoir duration, considering the longer terms and the possibility of extensions;

vi. Tract Participations: they are the reserve percentage assigned to each party that holds E&P rights over the shared reservoir. It is generally calculated according to the portion of hydrocarbons in place of each part. Derman and Melsheirman (2010) argue that TP is not only determined by the volume of oil in place, but also by additional factors. Among these factors are the ratio of oil to gas, the quality of oil and gas, production time, reservoir location on the structure, and cost related to issues such as pre-unitization, investments, and infrastructure. According to Worthington (2020), the straddling reservoir characteristics – e.g. porosity, gas-oil ratio, pressure and temperature - must guide the technical basis choice for calculate the TPs. It is important to note that the TPs are derived from the participation stipulated in the E&P contracts that govern the unitized area;

vii. Operational committee: it is a decision-making body made up by representatives duly appointed by the parties, responsible for supervising and conducting the shared reservoir exploitation, as in the JOA operational committee. The main tasks of the Operational Committee are a) to oversee the implementation of the development plan for the unitized area; b) award the most important contracts; c) supervise the redeterminations following the rules and procedures established in the UA. The powers of the operational committee must be well defined, since it will only be able to act on the unitized area, in other words, inside the shared reservoirs limits included in the UA, deciding on the methods of operation, the drilling of wells, the production rate, the expenses up to specific values, the removal of the operator, audits and other operational issues;

viii. Unitized Area Operator: who has the exclusive right and obligation to conduct operations on the unitized area, in compliance with UA provisions and under the supervision of the operational committee;

ix. Effective date: it is essential to define it, mainly when the development of the unitizedarea has been carried out in different periods. In this way, it is possible to evaluate if some party spent much more resources on the area development than others. If so, a cost equalization must be made between the parties, which should take into account the duration of the UA;

x. Development Plan: It is necessary to submit a specific Development Plan for the unitized area, different from the Development Plans submitted for each field in which the shared reservoir is placed. The particular Development Plan presents how operations will be conducted for exploiting the unitized area, as well as estimates the volume of hydrocarbons in place for future production. Development Plan also defines the expenses of each party according to their TPs in the unitizedarea, being possible to set adjustments to compensate for any inequality;

xi. Redetermination: The initial TP can be recalculated later when more technical and geological data are obtained. This procedure is named for the doctrine of redetermination, and it can be done several times during the development and production stages. The parties can define a redetermination schedule or milestones in the reservoir development for its realization, stipulating the criteria which it will be based on. However, since redetermination is an expensive, time-consuming and controversial procedure (some parts will gain a larger share of the

reservoir and others will lose part of it), some UAs establish a non-determination clause;

xii. Exclusive Operations: in the context of redeterminations, each party must have the right to carry out seismic activities and drill within the limits of the unitized area, at its own risk, to obtain more data to subsidize the redetermination;

xiii. Production Division: the production of the unitized area should be shared according to the TP of each UA member, during the period the agreement is in force. Cumulative 'liftings' will be regulated by the 'lifting' schedule defined in the UA, which may be changed from time to time to deal with 'over-lifting' and 'under-lifting';

xiv. Payment of government take: each party must pay for government take and taxes under the terms of the respective E&P contracts, just as if the petroleum were produced only in the area defined in the IPA;

xv. Joint Accounting Procedure: generally, the parties follow the same accounting procedures adopted in the JOA. They must consider the fact that different parts of the unitized area may be in various stages of exploration or development; therefore, when signing the UA, equalization mechanisms between the parties must be envisaged to resolve this issue;

xvi. Non-Unitized Operations: the agreement may provide for the use of development facilities placed outside the unitized area, provided that it will be charged. This procedure is beneficial when small, independent reservoirs surround the unitized area;

xvii. Assignment and Withdrawal: each party has the right to transfer its E&P rights partially or fully. The UA must address the conditions of the transfer, establishing the transferor's obligation until the transfer is made. It can be voluntary, choosing the assigning party to whom it will assign, as long as there is approval from the other parties, or compulsory. In this latter case, the assigning party must assign to the other parties of the UA, when is in default concerning its obligations;

xviii. Approval: the HC approval must be inserted as a condition for the UA to be in force, including for the redeterminations.

The third stage of unitization may or may not occur at the discretion of the UA parties. Generally, TPs are stipulated before the reservoir development or without a reasonable production history. Once additional information is obtained, it is necessary to establish

an adjustment of the TPs. This adjustment may also include an increase in the unitized area. The criteria for defining the TPs can be maintained or changed, depending on the available data. These should be made available to all parties, including those used by experts outside the UA. The parties must also define in the UA whether the effects of redetermination will be retroactive or not. If retroactivity is allowed, compensations can be made from the temporary change of interests, allowing the payment of differences in kind (Smith et al., 2010).

The redetermination process involves extensive reviews of technical data and is generally coordinated by the unitized area operator. However, if the parties do not agree with the operator's proposal, they may require the hiring of specialists in redeterminations, with the possibility of litigation, arbitration or another dispute-resolution approach, such as an expert determination. Therefore, redeterminations represent a complicated process and can result in bulky costs, which leads to the restriction of the number of redeterminations defined in the UA. It is frequent to forecast in UAs only one or two redeterminations, and it should occur only when there is a substantial volume of data capable of substantiating changes in TP. It is important to emphasize that carrying out a redetermination in the final stage of production must be avoided since the small gains with the adjustment will not justify the costs (Smith et al., 2010).

Worthington integrates the stages of unitization in the life of a petroleum field, as shown in Table 3. The unitization pre-agreement must be signed at the reservoir appraisal stage. It aims to confirm the borders and evaluate the volumes of hydrocarbons in this reservoir. With this information, it will be possible to define the TP among the E&P rights holders. The UA must be signed after the declaration of commerciality when the parties that have E&P rights over the shared reservoir define that the exploitation of the reservoir will be economically viable. After the production beginning, the redetermination process can redefine the TPs. The coventure parties must reach a unanimous agreement. They must consolidate the deal in a Side Letter Agreement (SLA) that will modify the UA.

Table 3 - Key Stages in the Life of a Straddling Oil or Gas Field

Stage	Event	Agreement	Classification of remaining, recoverable petroleum volumes [25]
Exploration	Wildcat drilling Discovery of petroleum	JOA	Prospective Resources Contingent Resources (uneconomic)
Appraisal	Confirmation of straddle	PUA	
	Commerciality		Contingent Resources (economic)
	Unitization	UUOA	
Development	Approval of development plan Construction of facilities		Reserves (undeveloped)
Production	Production begins Redetermination(s) of Tract Participation	SLA	Reserves (developed)
Decommissioning	Production ceases Field abandoned		None

Source: Worthignton (2020)

Unitization impacts E&P contracts, according to Weaver and Asmus (2006), as follows:

i. The unitized production portion, as well as the corresponding costs, will be allocated to each E&P contract;
ii. Generally, cost oil, profit oil, and royalties continue to be calculated under the scope of each E&P contract, using the individual production portions and the corresponding costs provided for in each E&P contract. This effect is particularly noteworthy when the unitization involves different E&P contracts with different tax regimes;
iii. Taxes, if charged by E&P contract, should continue to be charged, but the shareholding applicable to each agreement should be used as a basis for the calculation of income and expenses;
iv. Local content obligations continue to be calculated based on each E&P contract;
v. Any remaining minimum work program must be carried out based on the E&P contract.

It is also worth highlighting the importance of unitization as it avoids the physical waste of oil and natural gas, which would cause the reservoir early abandonment, as it would not be profitable in future stages, leading to an economic waste in large amounts. Both financial and physical waste represent direct economic impacts on the producing country resources, in the form of reduced revenue from production. Due to the decrease in the recovery rate, the production would be lower, consequently leading to a reduction in the amount paid as the government take or even reducing the production government share (Smith et al., 2010).

2.2.6 Unitization's Shortcomings

However, the unitization process represents some risks and brings some flaws. The risks may arise from the asymmetry of information resulting from unequal data collection, absence of effective regulation and problems in negotiation. According to Anderson (2020) unitization allocation are difficult since reservoirs are generally heterogeneous, parties are not homogeneous and E&P contracts involved in this process may not be identical.

Libecap and Smith (2001) point out that in the event of some situations, the unitization process may not lead to pareto optimum, penalizing some of the parties. In an update of the study by these authors, after analyzing the regulation on unitization of 90 HCs, Worthington (2020), describes the following problems shortcomings that prevent the pareto optimum from unitization

Shortcomings related to information asymmetry

Shortcomings related to information asymmetry occur when agreements are not complied with, mainly related to data sharing. When the company that has collected the most data and feels hampered by disclosing this data to the other party tends to hide such data. According to Worthington (2020), it is easy to omit the data, given that many companies do not have centralized management for data acquisition, continuity, storage, and management. This problem is aggravated when the parties' conflicts are submitted to the arbitration process, resulting in a slow process. Another example of this problem is the

Non-uniformity of available information, leading to information asymmetry, primarily related to technical data, distorting the fairness, equitability, and Pareto-optimization of the unitization process.

Shortcomings related to inefficient regulation

Shortcomings related to inefficient regulation occurs when regulation on the ownership of petroleum subsurface resources sets that underground resources' property is private. Remedies like well spacing regulations and pooling will not wholly prevent the Rule of Capture;

Another example occurs when there is no effective regulatory prescription and no rules imposing the unitization process when a shared reservoir is identified. Even if a voluntary unitization tries to be negotiated, the absence of regulations can lead to contractual failures.

Regulation enforcement failure is also another shortcoming example. When the lack of due diligence on the regulator's part to enforce the unitization can lead to failure to assure compliance with unitization statutes and implementing petroleum regulations.

When legislation is over-prescriptive and imposes an unnecessary cost, the unitization process's result can be harmed, leading to another shortcoming.

Shortcomings related to trading

Disparate Tract Participations can make negotiation difficult, especially when TPs are highly disproportionate, such as when one party has 99%, and the other party has 1%. This disproportion can lead the party with more participation to impose conditions or even to carry out the capture if allowed.

Unaligned commercial priorities, related to the difference in the priority level that each party will give to the shared reservoir development also make negotiation difficult. The parties with greater participation will be more interested in developing the reservoir. Those with less participation may prefer to postpone this asset's development, generating a conflict of interest. This disparity can also occur due to the corporate level of the companies. Majors may have strategies to deal with unitization processes different from independent companies;

Another example of shortcomings related to trading occurs when there are multiphase reservoirs. When a reservoir has oil and gas is a challenge since it is hard to convert gas volumes to barrels of oil equivalent to determinate TPs.

Post-production unitization also creates difficulties in negotiation[57]. When the production has already started in one field (brown-green fields) or both fields (brown-brown fields), it is challenging to balance correlative rights and fairness with maximizing economic returns, especially through enhanced-recovery scenarios.

Anderson (2020) still highlight the delay that arises in reaching an agreement as a serious risks to unitization. He points out the Talos Zama discovery as an egregious example. The Zama Field overlaps Talos's Block 7 and a Pemex area, all placed on offshore Mexico. The discovery was made in 2017 and no final investment decision is forthcoming because Pemex refuses to negotiate the TPs and a UA. In order to avoid problems like that, Anderson suggest that fairly strict deadlines must be set in advance.

For Worthigton (2020), the industry practices coupled with effective regulatory governance and diligent Unit management, can contain the problems listed above, as well as the risks related to regulatory changes.

This chapter will present the industry practices and other transnational rules related to unitization, which are part of the upstream sector Transnational Legal Order (TLO). Aware of these rules, it will be possible to study the Brazilian regulatory system's case regarding unitization to analyze whether the upstream sector's TLO touches the Brazilian national legal order. Subsequently, it will be explained the governance model adopted in Brazil for the unitization regulation rule-making process. The objective will be to assess whether this model is effective for managing the interaction between TLO and Brazilian National Legal Order related to unitization or whether the adoption of another governance model pointed out by Abott and Snidal (2009) would result in more effective governance.

[57] According to Anderson (2020), this is one reason why US unitization practices are not a model for use elsewhere. Except where federal lands are involved (and even in this case, the practice is not universal), nearly all field-wide unitizations are post production in the US. Instead the US states rely on "spacing and drilling/production units" that typically are designed for only one well or perhaps several horizontal wellbores, but not for the entire field.

2.3 Unitization regulation as part of the TLO for the upstream sector

The first chapter presented the structure of the TLO for the upstream sector in general. This section, in a more concrete way, will show how the transnational rules related to the unitization regulation integrate the structure of the TLO for the upstream sector. In brief, the elements, attributes, and characteristics of the TLO for the upstream sector will be revisited, aiming to highlight the references to the unitization regulation.

Elements

The next lines will describe the three elements of TLO - order, legal and transnational - according to the approach of Halliday and Shaffer (2015), with a focus on the unitization regulation.

Regarding the order element, the oil community's joint effort to regulate unitization, in other words, to order this process, is remarkable. Most HCs have specific rules for the unitization process, as reported in the Worthington (2020)' analyses of 90 producing countries. Also, industry associations such as the Association of International Petroleum Negotiators (AIPN), Petroleum Joint Venture Association of Canada (PJVA), the American Petroleum Institute (API), and the Rocky Mountain Mineral Law Foundation (RMMLF) offer specific contract models for the unitization (Cameron and Stanley, 2017). Still, there are some statutes and regulations models to regulate unitization, as the ones created by the Interstate Oil and Gas Compact Commission (IOGCC) models.

Considering the legal element, the unitization rules that make up the TLO of the upstream take recognizable forms, hard and soft law sector, as already pointed out by Weaver and Asmus (2006) and Worthington (2020). These rules are made up of oil laws, implementing regulations and contracts, both E&P contracts and private agreements between companies. There are also the principles of cooperation, prevention of waste, and protection of correlative rights that guide unitization. Worthington (2020) also highlight the Industry practices as part of to the unitization regulation, in which it can be pointed out the practices to calculate TPs. Cameron and Stanley (2017) still emphasize the importance of the UN Law of the Sea Convention (UNCLOS) for cross-border unitizations in maritime waters.

The fact that the unitization process is required in more the ninety producing countries, as demonstrated by Worthington (20200 research, already confirms the transnational

aspect of the unitization rules that make up the TLO of the upstream sector. The initial regulation adopted by the USA was replicated, with due differences in the form of the wording and the structure of the legislation, by several countries, as reported by Worthington's research (2020).

Attributes

Halliday and Shaffer (2015) list three main attributes of TLO: The first is the presence of an organization or legal network whose performance transcends or exceeds the borders of countries in the rule-making process. The second is the involvement of legal institutions that make up the TLO in several countries, directly or indirectly, formally or informally, in the adoption, recognition, and compliance with transnational rules. The third requires that transnational rules be produced in recognizable legal forms.

The transnational performance of a given organization in the rule-making process, which characterizes the first attribute, can already be seen in the first HC that regulated unitization, the USA. The unitization for oil and gas deposits, established in the 1930s, based on British groundwater jurisprudence, was replicated by several HCs, as shown by Worthington's research involving 90 countries. Industry associations, such as AIPN and API, also present a transnational performance insofar as their contractual models are adopted by companies, acting in several HCs, for UA negotiations.

According to the second attribute, the institutions that make up the TLO must influence the national legal order somehow. This influence occurs when the TLO rules are reflected, directly or indirectly, in the content of national rules, such as statutes, regulations, and their domestic interpretations, or through the incorporation of transnational rules in national contracts. Regarding unitization, the influence of TLO in the rule-making process of national standards is observed when the regulation of HCs with more experience, such as the US, Norway, and the UK, is used as a model. Or even when the clauses of UA models from industry associations are used as a reference for the elaboration of domestic rules. In the unitization domestic statutes, the explicit reference to Industry practices is also recurrent, through the requirement to observe them in operations related to unitization.

The third attribute requires transnational standards to be produced in recognized legal forms. For Halliday and Shaffer (2015), this means to take the form of written rules,

standards, model codes, judicial judgments, treaties, codes, model laws, administrative rules and guidelines, and court-like decision. Transnational rules related to unitization take the form of written rules, such as those provided for in the petroleum laws and the implementing petroleum regulations. They also take the form of standards, such as UA model contracts drawn up by industry associations, or Industry practices, such as the ones related to reservoir evaluation in order to define TPs.

Characteristics

Halliday and Shaffer (2015) also list five essential characteristics that structure TLO. These characteristics reflect the interactive process of creating rules between national, international, and transnational orders; the legal forms adopted, both hard and soft law; legal pluralism; the realistic legal perspective; and the authority of TLO.

Regarding the interactive process pointed out in the first characteristic, it is possible to affirm that the transnational rules related to unitization are created from a contingent, dynamic and interactive process of elaboration, implementation, and practice of rules between the transnational, international, and national orders. The first evidence is the replication of the process as modeled by American regulators. Another proof of this interactive process is seen by the role of oil and gas consultants, such as IHS Markit; Gaffney Cline, and others. These consultancies advise HCs in the rule-making process of their oil & gas regulatory frameworks and bring as reference for this process: the regulation of other countries, international treaties already signed for cross-boundary unitization, the standards applied to this process, UA already negotiated between companies, etc. On the other hand, the contractual models of industry associations are also elaborated considering the domestic rules of the main HCs, seeking better adaptation to the negotiations. These associations hold forums for the debate of contractual models in several HCs seeking inputs to construct their models.

Regarding the second characteristic, related to the legal forms adopted in TLO, it can be said that the transnational rules related to unitization are predominantly composed of hard law. This is because unitization involves natural resources property rights almost always owned by the State. So, the rules regarding the appropriation of these resources are part of petroleum laws, administrative regulations, and guidelines. But there are also rules in the form of soft law, such as contract models and industry practices.

The legal pluralism pointed out in the third characteristic is perceived by the participation of several actors in the rule-making process of transnational rules. HCs are responsible for drafting domestic rules, but as stated earlier, it is common for them to be advised by consulting companies and to use the national rules of HCs with more experience as a reference. Companies and industry associations participate in the drafting of model contracts and Industry practices related to unitization. IGOs also join in the unitization rule-making process, such as the UN, concerning shared deposits in maritime water.

The fourth characteristic is related to the realistic legal perspective, which considers that the law is constituted by power and reason. Thus, stronger players, such as developed HCs and majors, more powerful oil companies, will be better able to promote their interests within the standards produced. Regarding unitization, the regulation of countries with more experience in conducting this process, such as the US, the UK, and Norway, are used as a reference in the development of the regulatory framework of other HCs. Majors will also have more strength in developing contractual models within the scope of industry associations.

The fifth and final characteristic of TLO refers to the weight of TLO's authority. In other words, its legitimacy will be conferred by the recurrent use of its rules by the actors operating in this sector. Regarding the transnational rules related to unitization, it is possible to prove the legitimacy of these rules in replicating the requirement of compulsory unitization in the regulation of HCs and the use of UA model contracts, especially the AIPN model, in negotiations carried out in different HCs, for example.

2.4 Transnational rules related to unitization

Once the integration of the transnational rules related to the regulation of unitization with the TLO for the upstream sector has been demonstrated, it is appropriate to detail these rules from the three orders described in the first chapter.

2.4.1 National Legal Order

To address the rules related to unitization inserted in the national legal order, it will be using the same legislative framework for domestic unitization adopted by Onorato (1999), Weaver & Asmus (2006), and Worthington (2020). Following these authors, three rules

categories will be analyzed: petroleum laws, unitization regulations, and E&P contracts. These rules could be considered transnational for their ability to influence the national legal order rule-making process of other HCs. They can also impact the rule-making process of others transnational rules, as model contracts or industry practices.

Petroleum Law

Within the positivist logic, the petroleum law is the highest norm in the hierarchy of this tripartite legislative framework, just below the HC Constitution. The petroleum law establishes the policy and objectives that must be observed to elaborate specific regulations on unitization. In the words of Worthington (2020):

"From a unitization perspective, the following should form the basis for prescription at this level: Reasons for Unitization; Confirmation of Straddle; Notification to Regulator; Subsurface Appraisal; Requirement of Commerciality; Unitization Trigger; Negotiating the UUOA; Referral to Expert; Uncooperative Coventurers; Unallocated Tracts; Regulatory Enforcement of Petroleum Statutes."

Unitization Regulations

Unitization regulations generally detail the specific rules for the unitization process provided for in the petroleum law. However, as Worthington (2020) reported, some HCs have unitization regulations without the petroleum law giving specific rules for this matter.

These regulations represent the main legislative governance of petroleum unitization, providing practical issues to reach the unitization agreement. They regulate onshore and offshore; domestic or cross-border unitization, jointly or separately.

The rules provided for in the unitization regulations can also be considered transnational rules for their ability to influence other HCs and other transnational rules — especially the regulations from HCs with more experience in unitization process.

As an example of national rules that become transnational, there is the 'Maximizing Economic Recovery Strategy for the UK', published by the Oil and Gas Authority[58], the British regulator. In an analysis of the impacts of the OPEC oil embargo and the Iranian

[58] For more information see: https://www.ogauthority.co.uk/media/3229/mer-uk-strategy.pdf

Revolution on the USA, Weaver (2017) suggests that the MER strategy should be replicated by the American regulator, as noted in the following transcript: "*Why didn't the federal government step in during this time of energy crisis to ensure that operators produced the oilfields at MER rates*"?

E&P Contracts' Provisions on Unitization

E&P contracts, in their three conventional forms - concession, production sharing, and service (Duval et al., 2009) - generally bring specific rules for unitization that deal with operational and fiscal issues. For Weaver and Asmus (2006), HCs prefer to use E&P contracts to regulate unitization, rather than establishing rules in laws or regulations. This preference is explained by the fact that E&P contracts are prepared by administrative regulation of the licensing authority. Most of the time, there is no need for legislative approval, which simplifies the regulation process through these contracts.

2.4.2 International Order

The unitization rules that make up the International Legal Order are intended to regulate cross-border unitization. This type of unitization deals with a typical international petroleum deposit. In the words of Onorato (1999), *"an international common petroleum deposit is a single petroleum structure or field which underlies in part the territory of two or more States. Such a deposit may be situated on land or offshore."* In this case, international treaties are drawn up to establish a specific regime for the joint exploitation of petroleum resources, harmonizing the regulations particular to each HC. Worthington (2020) reports that these agreements were recurrent in the North Sea, where international treaties were signed to regulate cross-border unitization. Among the fields that were submitted to these treaties, he points out: Frigg, Murchison, Statfjord, and Markham.

Another international rule on unitization that stands out is the UN Law of the Sea Convention (UNCLOS). Cameron and Stanley (2017) highlight the relevance of this convention for cross-border unitization in maritime waters.

Some principles of international law apply to cross-border unitization, such as the principles of cooperation, prevention of waste, and protection of correlative rights. In this line, Lima and Ribeiro (2012) highlight the rule of customary law. According to this rule,

each State has, in principle, concerning its neighboring State, the duty of notification, negotiation, and cooperation, regarding the exploitation of "deposits" that go beyond the boundaries of an agreed or potential boundary.

2.4.3 Transnational Order

In addition to the rules that integrate national and international legal orders, the TLO of the upstream sector comprises regulations developed by the private and transnational actors and networks. As already described in the first chapter, for the purposes of this thesis, four types of transnational rules are considered: a) model contracts, b) industry practices, c) risk allocation models, and d) codes of conduct. Regarding unitization, it is possible to point out transnational rules in the form of model contracts and industry practices. The risk allocation models do not apply to the case of unitization directly and, to date, there are no published codes of conduct developed exclusively for the practice of unitization. The research by Weaver and Asmus (2006) and Worthigton (2020) point out a set of good practices for unitization and could support specific codes of conduct for this area. The following lines will detail the model contracts and the Industry practices related to unitization.

Model Contracts

UA negotiation involves complex issues, requiring multidisciplinary specialists (economists, lawyers, engineers, and geologists) to be discussed. This technical complexity and the diversity of opinions in finding the "perfect" participation formula (Weaver and Asmus, 2006) can make negotiations long and complicated. For Worthington (2020), contractual models, together with clear and understandable regulation, can help make negotiation more efficient and less costly.

In the same vein, Martin and Park (2010) maintain that contractual models reduce negotiation costs and increase efficiency since they are negotiated in industry associations by several specialized professionals and are updated continuously.

Specifically, about unitization, the contractual models that apply are the Unitization Agreement and the Unit Operation Agreement. Cameron and Stanley (2017) highlight the Association of International Petroleum Negotiators (AIPN), the Petroleum Joint Venture

Association of Canada (PJVA), the American Petroleum Institute (API), and the Rocky Mountain Mineral Law Foundation (RMMLF) in drafting these agreements.

However, during negotiation, other more general contractual models can also be adopted. As already mentioned, during the preliminary negotiation phase, the Confidentiality Agreement, the Joint Well Agreement, and the Joint Studies Agreement (David, 1996) can be signed. In a report on PPSA's experience in negotiating UA involving Brazilian pre-salt areas, David (2020) [59] cites the use of the AIPN's Accounting Procedures model and a contractual model more associated with the Brazilian case, the Equalization Agreement of Spending and Volumes, jointly developed by Petrobras and PPSA[60].

Industry practices

Nearly all domestic unitization standards require Good International Petroleum Industry Practices (Industry practices) to be followed. These should be considered when drafting the national unitization rules, the Unitization Agreement (UA), and the Unit Operating Agreement (UOA).

Worthigton (2020) emphasizes that the first concern must be regarding the correct terminology used to describe the operations related to unitization. The very use of the term 'unitization' can be considered as an industry practice. This author reports that other words are misused to describe this process, such as unification, individualization of deposits, unitary work program. There are also incorrect uses of terms to refer to the UA, such as cooperative agreement or to refer to the unitization as field consolidation, coordinated petroleum activities, or joint development.

Worthigton (2020) also reports the inconsistency in the use of terminology in the rules on unitization that make up the regulatory structure of an HC. This inconsistency occurs, for

[59] Interview granted by Olavo Bentes David, PPSA's chief legal advisor, on 08/10/2020

[60] David (2020) informs that the AIPN's UUOA does not provide for equalization. Rather, what is recommended is that species and compensation be made through changes in tract participations. In the AIPN UUOA model, when the redetermination results in an increase in TP, instead of equalizing, it "simulates", for a time, a larger TP in order to compensate for the time in which the part that received less volume and arched with less expenses. In Brazil, this would configure tax evasion, because a "simulated" increase in TP makes that ICMS not be levied on a part of the Production from the part on which it should be levied (we here make a fiscal distinction between the original acquisition - on which it does not ICMS is levied - the derivative - which presupposes the circulation of goods and, therefore, the taxable event of the ICMS).

example, when, to refer to the unitization process, the petroleum law uses one term; the regulation uses another, and E&P contracts use a different word.

Considering that the unitization main objective is to define the Tract Participations (TPs) in order to get closer to the Pareto Optimum, the industry practices used for calculating and evaluating the reservoir volume, related to subsurface operations, assume great importance in the process unitization.

The computation of tract participation is carry out from technical bases driven by fluid and reservoir character. According to Worthington (2014), "*(t)he most commonly utilized bases can be grouped into static, dynamic and hybrid bases, where the last category encompasses some combination of the first two."* Concerning static bases, Worthington (2014) cites the following methods as examples: Initial Hydrocarbon Pore Volume (IHPV) and Hydrocarbon Initially in Place (HIIP), considered as high-level bases, and Net Acre Feet (NAF) and Surface Acres (SA) as lower-level bases. On the dynamic bases, Worthington (2014) cites the following examples: Movable Hydrocarbons Initially in Place (MHIIP), Estimated Ultimate Recovery (EUR) and Estimated Economic Recovery (EER), considered by this author as high-level bases, and Total Recoverable Volumes (TRV) and Total Estimated Recovery (TER) as lower-level bases. There are also hybrid bases, which combine factors of the static and dynamic bases. As examples, Worthington (2014) cites the following arrangements: Gas initially in place (GIIP) and Transmissibility (T); Net acre-feet (NAF) and Production over a specified period time (Pt); Stock tank oil initially in place (STOIIP) Production over a specified period time (Pt).

Worthigton (2020) points out that it is necessary to choose the bases that result in a "single numerical outcome" with a deterministic ethos, and to avoid the geomathematical approach, which "assumes a range of uncertainty associated with each parametric input and uses inferred probability distributions to generate a range of outcomes." Thus, it will be easier to audit and replicate the results from calculating the reservoir volumes, a task that must be performed by each party involved and by the HC body responsible for UA approval.

However, Anderson (2020) highlight that there are two "fundamental" ways analyse the tract participation:

> *"Under the historical idea that the concessionaire owns the oil in the ground (ownership in place rule, e.g., Texas), all other things being*

> *equal (which they seldom are), the tract participation should be determined based upon the oil in place beneath each tract. But based on the modern idea that the concessionaire only owns the oil after production (non-ownership in place rule, e.g., Oklahoma), all other things being equal (which they seldom are), the tract participation should be determined based on the oil that each block could produce. Due to geology and reservoir mechanics, one block might naturally produce more of the reservoir's oil (e.g., because it is higher on the geologic structure such as at the top of an anticline) than the other block—especially if the reservoir was a water drive reservoir."*

In Table 4, Worthigton (2014) presents some comments on the methods of the high-level base, making considerations on the frequency of their adoption and the most suitable reservoir types for each method.

Table 4 - Comments on the Most Frequently Adopted Methods for Defining TPs

Basis	Comment
Initial Hydrocarbon Pore Volume	Technically the simplest basis with the least uncertainty. Use for reservoirs with gas condensate or variably volatile oil.
Hydrocarbons Initially in Place	Most commonly used method as GIIP or STOIIP. Use for reservoirs that show no lateral trends in reservoir quality at the producing-interval scale.
Movable Hydrocarbons Initially In Place	Falling into disuse with the industry move towards oil-base mud and logging-while-drilling (which is done before invasion takes hold). Use where oil reservoirs show lateral trends in reservoir quality at the producing-interval scale through wireline logs run in water-base mud.
Estimated Ultimate Recovery	Minority option because it is expensive and uncertain. Use where straddled licence areas show different recovery factors for the same unit substance.
Estimated Economic Recovery	Rarely used: most expensive, uncertain and time-consuming option. Avoid unless commercial considerations dictate otherwise.
Reserves at a Fixed Point in Time	Best option for belated unitization following long-term production from one or more licence areas. Use in deterministic mode only.
Hybrid Parameter	Sometimes used where in-place volumes are inadequate as indicators of cross-boundary differences in recovered volumes.

Table 4 *Use of high-level parametric bases for tract participation.*

Source: Worthington (2014)

Summarizing, to define the TPs, it is necessary to calculate the volume of hydrocarbons present in the shared deposit, based on a technical basis that will govern these calculations. These basis can be grouped into three categories: static, dynamic, and hybrid. The calculation methods can follow a deterministic approach, which produces a single result, or a probabilistic approach, which generates a range of outcomes. According

to Worthington (2014), "(t)here are several different algorithms available for calculating tract participation, and these are governed by the technical basis that is selected." It is about these algorithms, the calculation methods, that the industry will propose some 'good international subsurface practices.' These industry practices will be debated and disseminated by the industry, in a general way, within the scope of professional organizations that bring together petroleum geologists, geophysicists, and petroleum engineers.

Worthington (2020) lists five professional associations most relevant for unitization, whose standards aim to define Industry practices from the point of view of the subsurface:

These are the American Association of Petroleum Geologists (AAPG); the European Association of Geoscientists and Engineers (EAGE); the Society of Exploration Geophysicists (SEG); the Society of Petroleum Engineers (SPE); and the Society of Petrophysicists and Well Log Analysts (SPWLA).

Simões Filho[61] (2020) emphasizes considerable differences in the calculation formulas adopted by each of these professional organizations. There are also differences in adopted nomenclature and rigor concerning the required data. He uses the example of measuring the oil depth variable to illustrate these differences. The SEC is more restrictive in obtaining this data, accepting only the value as far as it was able to measure. This organization only works with proven, developed, or undeveloped reserves. The SPE is already more flexible, allowing more freedom of interpretation. This organization admits other classifications in addition to the proven reserves, such as probable and possible reserves.

Simões Filho (2020) informs that the details of these calculations are confidential. However, during the negotiation of the UA, the formulas must be presented for the parties. Thus, the parties can audit the percentages obtained for the definition of each participation. A confidentiality agreement is usually required to ensure data non-disclosure.

After analyzing 90 regulatory frameworks about unitization, Worthington (2020) states that there is little material to guide regulators for the application of Industry practices in the regulatory context of each HC. This author cites the experience of India, which has

[61] Interview granted by Ivan de Araújo Simões Filho, a SEG's regional coordinator for Latin America from 2005 to 2009, on 29/09/2020

developed a guideline, compiling the industry practices to be adopted in the Indian oil industry. However, Worthington (2020) points out that among the practices listed in this guideline, few apply to the unitization process, and they are insufficient to guide the regulator. Thus, there is a space to be filled so that the elaboration of specific codes of conduct for unitization, which could be published by IGOs, industry associations or informal networks among actors in the upstream sector interested in unitization. It is also relevant to mention the effort of the IOGCC to develop models of statutes and regulations on unitization aiming to make national rules compatible with international practice.

Foreign Regulation

Despite being created by sovereign countries, foreign regulations cannot be considered international rules, because it is elaborated out of the national legal order of a given producing country, without the participation of the national state, that is, without the consent of this country. Thus, foreign regulations are rules that cannot be classified as national or international. Therefore, they will be treated in this thesis as transnational rules.

2.5 The Upstream TLO's Influence over the Brazilian Regulatory System for Unitization

Initially, it is essential to clarify the choice of the Brazilian regulatory system for unitization as a case study of this thesis. The productive petroleum province of the Brazilian pre-salt[62], due to its geological configuration and the limits of the blocks in this area, led to several processes of unitization. Considering the production volumes in this area and the complexity of regulation, unitization in Brazil has become an important case to study. The pre-salt unitization process is extraordinarily complex for four reasons: the first is the requirement of an UA when a deposit extends to an open area., in other worths, when the reservoir extends to an area for which E&P rights have not yet been grantedIn addition to the companies holding E&P rights over the shared deposit, the UA must be negotiated and signed by the public company Pré-sal Petróleo S.A. (PPSA). PPSA will

[62] It is important to distinguish the Pre-salt Polygon and Pre-salt geological. The Pre-salt Polygon is the area of around 150.000 km2 established in the Pre-salt Law. The Pre-salt geological is a geological province located below a layer of evaporite deposits formed approximately 120 million years ago.

represent the Brazilian Government in managing oil resources found in the open area placed in the Pre-salt.

The second reason is the coexistence of three types of fiscal regimes in the Pre-salt polygon, resulting in three types of agreements in force in this area: production-sharing agreement (PSA), concession agreement, and transfer of rights agreement[63]. As the blocks and fields that make up the Pre-salt polygon are subject to different types of IPA, it is very likely that the negotiation of the unitization will involve at least two different types of contracts. The need to harmonize different fiscal regimes for joint production makes negotiations more complicated.

The third reason is the high productivity of the fields placed in the Pre-salt polygon, whose production already corresponds to more than 70% of the total Brazilian oil production according to ANP's Monthly Bulletin of the Production of May 2021[64]. Therefore, any loss concerning TPs' definition can represent a high financial loss.

The fourth and final reason is the high probability that the deposits will be shared in the Pre-salt polygon due to geological features, requiring the negotiation of UAs. Amui e Melo (2003) attribute this high probability of unitizations to the block definition methodology adopted by the ANP from the fifth round that reduced the size of the blocks. According to PPSA (2021), eight UA was signed and twelve are under negotiation.

Therefore, due to the high importance of pre-salt production in Brazilian and even worldwide production, it is crucial that regulation on unitization preserves national interests and, at the same time, encourages investments in this area. This section will aim to assess the level of influence of the upstream TLO on the regulation of Brazilian unitization, since Abbott & Sindal (2009) and Worthington (2020) consider that transnational rules can contribute to more effective regulation.

Thus, this section will present the Brazilian regulation for unitization. It will identify the presence of transnational rules, according to the rules shown in the second section of this chapter. For this analysis, the same structure will be used to analyze the National Legal Order in the context of the upstream TLO, which means the legislative framework

[63] This is a specific Brazilian E&P contract signed between the MME and Petrobras with the aim of capitalizing the company to be able to explore the pre-salt areas.

[64] For more information, see: https://www.gov.br/anp/pt-br/centrais-de-conteudo/publicacoes/boletins-anp/bmp/2021/2021-05-boletim.pdf. Accessed on 21/07/2021

proposed by Onorato (1999), Weaver & Asmus (2006), and Worthington (2020). Therefore, the Brazilian regulation for unitization will be analyzed according to the three categories: petroleum law, unitization regulations, and E&P contracts.

2.6 Brazilian Regulatory System for Unitization in Pre-sal Polygon.

2.6.1 Petroleum Law and Pre-Salt Law

Petroleum Law, in its article 27, brought the first provision in law for unitization in Brazil in 1997. The law that regulated the previous national petroleum policy[65], the one that created Petrobras, did not deal with this topic, as Petrobras carried out E&P activities exclusively. Article 27 established that concessionaires were obliged to sign an UA when the fields extended into neighboring blocks, where different concessionaires operated. Besides, it set the competence of the ANP to define how the rights and obligations would be appropriated, based on an arbitration report, when the parties did not reach an agreement.

Pre-Salt Law revoked the unitization rules in Petroleum Law and defined a new regulation in much more detail, which applies not only to the pre-salt area, but also to unitizations outside this area and which involve all three E&P contracts adopted in Brazil.

Pre-Salt Law uses the term 'individualization of production' in place of unitization and defines this term as:

> *"procedure that aims at sharing the production outcome and the rational use of the Government's natural resources, through the joint development and production related to the deposit that extends beyond the block granted under concession regime or contracted under the production sharing regime."*[66] *(Brazil, 2010)*

The Pre-salt Law requires mandatory unitization whenever deposit is identified as extendig beyond the limits of a granted block. According to the Brazilian Petroleum Law, the term deposit means reservoir already identified and possible to be put into

[65] Federal Law 2,004 of 1953

[66] Free translation from: “procedimento que visa à divisão do resultado da produção e ao aproveitamento racional dos recursos naturais da União, por meio da unificação do desenvolvimento e da produção relativos à jazida que se estenda além do bloco concedido ou contratado sob o regime de partilha de produção” (BRASIL, 2010)

productions. Therefore, the UA must be signed only after the submission of the declaration of commerciality.

ANP's competence is defined in the Pre-salt Law to: i) regulate the procedures and guidelines for the preparation of the UA, indicating the minimum information that the agreement should bring - however, this Law already expressly requires that the operator must be informed in the UA, and ii) monitor the agreement negotiations.

This Law also requires an UA to be negotiated when the deposit extends to an open area. PPSA is the representative of the Brazilian Government to deal with the UA with the other parties involved when the shared deposit is, at least partially, located in the Pre-salt polygon. ANP must subsidize PPSA with technical data. For open areas, the E&P regime's adoption does not depend on the regimes in force in adjacent areas. This provision is at odds with the views of Weaver and Asmus (2006) about open areas. These authors maintain that the same parameters should be replicated in the adjacent areas.

Still about the open areas, during the negotiation of the UA between private companies and PPSA, Petrobras may be hired by the ANP to carry out the activities of shared deposit appraisal. However, this possibility has not been used yet, as Petrobras participated as a party in all UA signed in the Pre-salt polygon[67]. Furthermore, Petrobras is not a service company. Therefore, its structure available for the appraisal activities is allocated to its E&P projects.

The Pre-salt Law establishes the competence of the ANP to approve the UAs. The Agency has 60 days to comment on the submitted UA. Until the UA is approved, the development and production activities must be suspended, unless the ANP authorizes the continuation of these activities by defining conditions to be followed.

If the parties involved cannot reach an agreement, the Pre-salt Law determines that the ANP must define the rights and obligations on the shared deposit. ANP has 120 days to decide, based on a technical report. The party that refuses to sign the UA based on the ANP report will have its IPA ended.

It is still important to mention the references that both the Petroleum Law and the Pre-salt Law make to Industry practices. Both Laws state that companies must adopt "best

[67] For more information, see: http://www.anp.gov.br/exploracao-e-producao-de-oleo-e-gas/gestao-de-contratos-de-e-p/fase-de-producao/individualizacao-da-producao. Accessed in 06/10/2020

practices in the international oil industry". And the Pre-salt Law requires the ANP must enforce the "best practices in the international oil industry" in petroleum activities.

2.6.2 ANP Unitization Resolution and National Council for Energy Policy (CNPE[68]) Unitization Guidelines

ANP Unitization Resolution

The ANP Unitization Resolution from 2013, amended in 2017[69], is structured with a preamble and 12 chapters, dealing with the object; definitions; communications; specific requirements for the submission of the three types of agreements: conventional UA, UA involving open areas, and unitization promise (UP); access to data and information; redetermination process; government take; local content; technical report and general provisions. For the purposes of this thesis, provisions that govern the unitization process in the Pre-salt polygon will be addressed in more detail.

The preamble sets the Resolution under constitutional principles and rules that meet the national development objective of the Federative Republic of Brazil. Once conducted in a balanced manner, it shall result in the rational, conservative, and environmentally sustainable use of Brazilian energy resources, especially nonrenewable ones.

Chapter 1 establishes that the unitization procedure must be adopted upon identification that a reservoir extends beyond the limits of a granted block, under any of a concession, production sharing agreement, or transfer of rights agreement regime.

Chapter 2 presents the definitions, which, for a clear understanding of the regulation, must be added to those listed in the Petroleum Law, the Pre-salt Law, and the E&P agreements. For the purposes of this section, the definition of 'the open area' stands out, namely: any area that is not granted by a concession, production sharing, or transfer of rights agreement.

Chapter 3 covers the rules upon which the operator shall communicate the reservoir extension and the procedures for preparing the UA. Following the CNPE guidelines, it is required that the operator must inform ANP as soon as it identifies the possibility of a shared reservoir. Also, the mere possibility of extension of a shared reservoir beyond the

[68] CNPE is the acronym for the description in Portuguese of Brazilian National Energy Policy Council.

[69] ANP Resolution No. 25 of 2013, amended by the ANP Resolution No. 698 of 2017.

border of the area under the E&P agreement is reason enough to compel the notification of extension.

Chapter 3 also gives ANP the power and the duty to notify the parties whenever it identifies a shared reservoir. This chapter outlines the hypotheses for the negotiations of UA. It ratifies the representation of the Brazilian Government by PPSA whenever the unitization involves an open area placed in Pre-salt polygon.

According to Chapter 3, the parties can sign a Pre-UA when joint appraisal operations are required for the shared reservoir (note that, by definition, the shared reservoir could be identified before the parties declare commerciality). This chapter also provides for ANP to establish: the deadline for submission of the UA and the shared reservoir development plan, the obligation of the parties to keep ANP updated quarterly about the negotiations, and suspension of share reservoir development and production until the UA has been approved, except as otherwise authorized by ANP, and following the conditions laid down by ANP.

The generic rules concerning the UA's contents are set out in Chapter 4 of the ANP Unitization Resolution. They require certain minimum information to be present in the UA, the possibility to include more than one shared reservoir in the same UA, the calculation criteria for the participation of each holder of E&P rights, the rules about UA terms, and provision for divisible and indivisible obligations.

Chapter 5 contains the most controversial aspect of the ANP Unitization Resolution, dealing with the procedure for the submission of UAs involving open areas. As these cases are frequent in the Pre-salt polygon[70], these rules will be analyzed in more detail in the next subsection.

Chapter 6 deals with the Unitization Promise (UP) that deals with cases in which the shared reservoir extends into areas under different E&P contracts, but whose owner of E&P rights is the same.

Chapter 7 sets out the obligation of the parties to exchange available data and information on the shared reservoir, regardless of ANP's approval, if such data are necessary for the definition of participation. The rights guaranteed to the parties by other ANP Resolutions

[70] Sete UA envolvendo open áreas no polígono do Pré-sal foram assinados e quatro estão em negociação.

dealing with this subject and corresponding E&P contracts are kept. In this chapter, it is also ratified that the data and information about open areas shall be regarded as public.

Chapter 8 regulates the redetermination process, allowing ANP to require its performance where it is justified.

The rules about government take are set out in Chapter 9. As they are divisible obligations, their payment must comply with contractual regulations governing the areas under the E&P agreement in which the shared reservoir sits. There is no retroactivity concerning the government take in case of redetermination processes. For open areas, the unit operator must pay the Brazilian Government the take and later deduct it from the oil and natural gas share due to the Brazilian Government.

Chapter 10 provides the general criteria for determining the percentage of local content observed in the exploratory and production phases of shared reservoirs. In the exploratory phase, it must comply with the original local content percentage for each contract area. This because the UA must be signed after the declaration of commerciality, that is, after the exploratory phase. In the development of production, the local content requirement shall be calculated based on the weighted average between the original volumes of oil equivalent in each area and the initial percentage of the local content. In any case, the detailed rules for definition, verification, and oversight of the local content of the activities subject to the unitization process are set out in specific regulations issued by ANP (Borges et al., 2014). The CNPE guidelines that prevent the UA from involving open areas create additional commitments for the areas under an E&P agreement and must also be observed (CNPE Resolution No 7/2017).

In the case of no voluntary UA, ANP must decide how the rights and obligations relative to the shared reservoir should be appropriated, based on a technical report. ANP must notify the parties to sign the UA on these bases. The rules about the requesting and elaboration of the technical report are set out in Chapter 11.

Before ANP's decision, the parties must submit, within 60 days, a petition describing the points of divergence and proposed solutions, in addition to the necessary data, information, and interpretations to back up ANP's technical report. At the discretion of ANP, this technical report may be prepared by a third party paid by the parties who hold E&P rights over the area under the E&P agreements.

Chapter 12 deals with general provisions. As settled in the Pre-salt Law, the ANP Unitization Resolution also states that the refusal to sign the UA after ANP has established the terms, based on a technical report, shall imply the termination of the IPA by the party which refused to sign it. It also determines that the conduct of E&P rights holders that oppose the ANP Unitization Resolution shall be penalized following the applicable law.

Provisions about UAs involving open areas in Pre-salt polygon

As determined by the Pre-salt Law, whenever a reservoir extends into an open area, the parties must sign a UA with the Brazilian Government, represented by PPSA for the blocks located in the Pre-salt Polygon, to continue with the E&P activities.

In this case, the owners of E&P rights must submit to ANP a preliminary proposal of joint appraisal of the extension, based on the available technical data. ANP then has 180 days to inform the parties how the appraisal will be carried out. ANP can carry out the shared reservoir appraisal with the parties and can also hire Petrobras to perform this activity. Considering the strategic importance of Pre-salt, it is likely that PPSA will join the private parties in the drafting of this preliminary proposal of joint appraisal of the extension.

While the open area is not contracted, the E&P rights owner of the area under the E&P agreement must choose one of these two options: (i) suspension of the contractual term of the E&P agreement until the open area is contracted or (ii) continuation of the activities in the shared reservoir, since authorized by ANP and under the conditions established by ANP. Choosing the second option, the unit operator will be the same for the area under the E&P agreement. The ANP Unitization Resolution also says that when there is more than one area under E&P contracts, the parties can choose the operator. After the contracting of the open area, the parties can freely define the operator in the UA.

If the production of the shared reservoir starts before the UA comes into force, the owners of E&P rights of the area under an E&P agreement will have full ownership of the petroleum production of the shared reservoir. In order to monetize the shared reservoir production, the parties must use the reference price of the month of production defined by ANP. The same rule is valid for extended well tests.

If the declaration of commerciality is submitted for at least one discovery related to the shared reservoir, the costs incurred by the contract area owners of E&P rights with the previous activities may be reimbursed up to the limit of the Brazilian Government's stake

in the production and before the UA comes into force. The owners of the E&P rights must report the cost incurred separately, along with the government take and the monetized production. The debtor must pay the balance resulting from the difference between the revenue and expenses. If the Brazilian Government is in debt, the payment must be deducted from the amount to which it is entitled in the production of the shared reservoir, calculated using the reference price of the month of payment. The Brazilian Government will not reimburse: the signature bonus, the costs related to the minimum exploratory program, and the cost of activities that have not produced technical data about the shared reservoir.

If the production of the shared reservoir starts before the hiring of the open area and after the UA comes into force, monetization of the entire volume of petroleum production of the shared reservoir must be apportioned between the private parties and the Brazilian Government. It must be based on the participation proportion, UA's clauses, supplementary documents, and a second proportion related exclusively to production costs and investments associated with the production development stage. This second proportion is based on the ratio of the volume of hydrocarbons produced up to the signing of the new PSA and the total recovery foreseen under the development plan of the shared reservoir.

This second proportion aimed to limit the reimbursement by the Brazilian Government to the time when it appropriated a portion of total production. According to the ANP Unitization Resolution, the difference between the total expenses incurred by the E&P rights owners, with the costs of production and investments of the production development stage, and the amount reimbursed by the Brazilian Government, shall be negotiated between the owner of E&P rights and the future E&P rights owner of the new PSA.

The E&P regime to be adopted in the open areas is independent of the current regime for adjacent areas, as settled in the Pre-salt Law. The local content commitments and the operator for the open area must be the same for the area under the E&P agreement while there is no bidding round.

The future E&P rights owner of the open area will be required to comply with the provisions of the UA signed by PPSA. Nevertheless, after granting the open area, the parties, including the E&P rights owner of the former open area, can submit any adjustments to the UA for ANP's approval.

After starting the shared reservoir production, the Brazilian Government will pay the development and the production costs and investments in the proportion of its participation, since the UA is in force. This payment will be proportional to the ratio between the volume of hydrocarbons produced up to the hiring of the open area and the total recovery estimated in the development plan. The Brazilian Government will not make any disbursement. Still, it will pay the cost and investments using its share of the hydrocarbons produced, considering the reference prices of the production month and the payment month, all according to the Brazilian regulation, to carry out the monetary restatement of the costs and the Brazilian Government's revenue.

The Brazilian Government will not reimburse the costs and the investments already incurred by the parties when the production has started without ANP's approval. However, the Brazilian Government will be refunded of its portion in the shared reservoir production. As soon as the open area is contracted, it will need a UA amendment, indicating the costs that the Brazilian Government has not reimbursed yet.

CNPE Unitization Resolution

The preamble of the CNPE Unitization Resolution from 2016[71] establishes CNPE's competence to make proposals to the Brazilian President regarding public policy related to the rational use of energy resources, the unitization fundamentals, and PPSA competence to sign UAs involving open areas.

The CNPE Resolution determines that ANP must communicate with the Mines and Energy Ministry immediately about the suspected straddle in open areas. Thus, to perform this duty, ANP must require that parties notify it of the mere expectation of a straddle involving an open area.

The CNPE Unitization Resolution states that the open area must be promptly offered, preferably before the parties declare the commerciality of the shared reservoir. Thus, the mere possibility of a shared reservoir is reason enough to prioritize the offer of an open area.

The CNPE Unitization Resolution established that the Brazilian Government will be creditor or debtor of the eventual balance amount. This will happen when the hiring of an

[71] For more information, see: https://www.gov.br/mme/pt-br/assuntos/conselhos-e-comites/cnpe/resolucoes-do-cnpe/arquivos/2016/resolucao_cnpe_8.pdf. Accessed in 23/09/2020

open area occurs before the payment of the value resulting in the difference between the dispending and recognized costs, and the oil and gas produced and settled by the parties to the UA (the Brazilian Government and the owner of E&P rights of the contract area).

Regarding the costs that the Brazilian Government has not recognized, the future owner of E&P rights must negotiate with the E&P rights owner of the contract area, following the best practices of the petroleum industry. According to the CNPE Unitization Resolution, the future owner of E&P rights of the open area will not subrogate the Brazilian Government's rights and prerogatives.

The recognized costs and the Brazilian Government revenue obtained by its portion in a shared reservoir must be updated monetarily by the Brazilian economic index IGP-M[72], or another index that replaces it. The CNPE Unitization Resolution prevents the return of untaxed capital from the original investment.

Before the UA has entered into force, CNPE determines that royalties must be charged from the oil and gas production of the open area in a shared reservoir. The royalties' rate will be the rate established for the area under the E&P agreement. Special Participation, a particular form of government take in Brazil, also must be charged in the case of a concession agreement. And expenditures identified as relating to research and development will not be charged against production from the open area.

2.6.3 Brazilian E&P contracts: Risk Contract, Concession Agreement, Production Sharing Agreement, Transfer of Rights

The first reference to unitization in Brazilian upstream regulation was the risk contract, a type of E&P contract that was in force in Brazil from 1976 to 1988. According to Ribeiro (2014), through this contract, a petroleum company, international or national, provided services to Petrobras, being remunerated according to conditions specified in the contract. This author reports that the draft of this contract was prepared based on a comparative work by Petrobras technicians who worked at this company's international subsidiary, Braspetro. Among the contracts analyzed and used as a reference, the Iran contract (exploration / purchase contract) stands out. Under the risk contract, Petrobras maintained

[72] Market General Price Index calculated by the Fundac ¸~ ao Getu´lio Vargas (FGV). For more information <http://portalibre.fgv.br/main.jsp? lumChannelId¼402880811D8E34B9011D92B6B6420E96> accessed 21 September 2017.

control over exploration and development activities and directly performed the production phase. Therefore, a unitization agreement was thought to be unnecessary because the total production would always be Petrobras'. However, Ribeiro recalls in a recent report[73], that the Braspetro technician Remo Mannarino suggested the inclusion of the unitization clause in the risk contract, as he studied in the State of Lousianna, United States and had learned the regulation on unitization while he was there.

The risk contract unitization clause[74] required a unitization agreement in three situations: i) when a deposit discovered by Petrobras extended to an area under the risk contract and the estimated reserves in the adjacent area were equal to or greater than 40%; ii) when a deposit discovered by the company contracted by the risk contract extends to an area retained by Petrobras and the estimated reserves in the adjacent area were equal to or greater than 40%; and iii) when a deposit discovered by the company contracted by the risk contract extends to another area under risk contract as well. If the parties did not reach an agreement for the realization of the unitization, an arbitrator would be hired for the first two hypotheses. For the third hypothesis, Petrobras would decide how the rights and obligations would be assigned. This clause protected the contracted company's right under the risk contract to withdraw from the contract if it were dissatisfied with a third party's decision on the unitization agreement. However, in this case you would not be entitled to any remuneration related to the contract.

As the Petroleum Law did not provide a detailed regulation on unitization, the concession contracts dealt with this issue in more detail until the Tenth Bidding Round in 2008. The transfer of rights contract, for being signed months before the publication of the Pre-salt Law, also dealt with unitization in detail.

Thus, the concession contracts and the transfer of rights contract established the procedure for the UA signature. These contracts require the companies to inform the ANP of the extension of the deposit to start the process. And to finish the procedure, ANP must approve the UA. These contracts also anticipated some of the provisions explained in the Pre-salt Law, such as: i) the use of the term deposit, instead of the field; ii) the prediction of the UA negotiation by the ANP when the deposit extends over an open area; iii) the

[73] Interview granted by Marilda Rosado de Sá Ribeiro, former employee of Petrobras and former Superintendent of ANP, on 19/10/2020

[74] The risk contract's unitization clause analyzed dates from 1978, and was provided by Adauto Pereira, retired geophysicist at Petrobras.

minimum information that should be included in the agreement; iv) the monitoring of negotiations by the ANP; v) and the forecast of suspension of operations. From the Fifth Round, the possibility of termination was also foreseen, in case one of the parties refuses to sign the agreement.

For Bucheb (2007), although the unitization clause has changed over the Bidding Rounds, its basic structure has been maintained in all concession contracts. Bucheb identifies there are three generations of concession contracts: one for First to Fourth Round contracts, another for the Fifth Round, and yet another for the Sixth Round onwards. The most notable differences are observed in the rule that provides for the possibility of joint discovery appraisal by neighboring concessionaires, present in the Third and Fourth Round contracts. And in the rule that requires the signature of a new concession contract, after the UA submission and ANP approval, valid only for the unitizedarea, present in the Contracts of the Sixth to Eighth Round.

After the Pre-salt Law launched, the clauses on the unitization present on the concession contracts models and the models of production sharing contracts determined, very briefly, the observance of the Brazilian legislation in force on this subject.

2.7 Influence of TLO on the rulemaking process of the unitization Brazilian regulation

This subsection will analyze how the rules that integrate the Brazilian regulatory system for unitization, presented in the previous subsection, were influenced by the upstream TLO during its rulemaking process. This analysis will follow the same regulatory structure as the last section, focusing on the Petroleum and Pre-salt Laws, Unitization Regulations, and E&P contracts.

2.7.1 Petroleum Law and Pre-Salt Law

Petroleum Law

After the approval of Constitutional Amendment No. 9 of 1995, which ended Petrobras' monopoly, the regulatory framework for the petroleum industry began to be discussed under the coordination of the Ministry of Mines and Energy (MME[75]). At the request of

[75] According to the reports of Ribeiro, Simões Filho and Prates, this process was conducted by the MME Secretariat of Mines and Metallurgy, led at the time by Giovanni Toniatti

the president Fernando Henrique Cardoso, Petrobras and external consulting companies participated in this discussion. Among these consulting companies, Expetro's performance stands out. This consultancy company consisted of retired Petrobras technicians with considerable international experience, as they worked at Braspetro[76] (Petrobras' international subsidiary) and worked in all areas of the industry chain. Some bills for the petroleum national policy were pending in Congress and Expetro was hired by the MME to compile them and propose a government-specific bill.

Regarding the rules related to the upstream sector contained in the Petroleum Law, reports Jean Paul Prates[77] (2020), one of the founding partners of Expetro, that the UK and Norway E&P rights grant models, through licenses, were used as reference. Prates also says that Expetro analyzed the production sharing contracts in Libya and Angola and the Colombian association contract, where Braspetro had operated. According to Prates, replicating these models would represent the intention to go slowly in the process of opening the market, maintaining Petrobras' participation. However, as it was necessary to capitalize Petrobras, which at the time was having difficulties in developing its most recent offshore fields, this company would not be able to receive the assignments to carry out the audit of accounts required by the production sharing contract. For Prates, Expetro technicians were aware of the difficulties of these contracts, as they had already had similar experiences with Braspetro operating in countries that adopted the production sharing contract. The contracts in Norway and the United Kingdom were easier to perform and more modern. Furthermore, in the process of drafting the regulatory framework, the implementation of regulatory agencies was considered, what would be more compatible with the concession contracts in Prates' view.

There are no precise records of the influence that cited foreign regulations have had on specific topics. Thus, it will not be possible to make a more accurate analysis of the influence of these transnational rules in the drafting of unitization provisions. However, it is possible to say that the simple prediction of compulsory unitization already means incorporating a regulatory practice that is adopted in many producing countries.

[76] Braspetro was created to carry out Petrobras campaigns in Iraq, in North Africa. Braspetro discovered the Majnoon field in Iraq in 1975, among the largest fields in the world. But soon after, the contract was terminated and compensated by Saddam Hussein. And the indemnity money was used to expand Braspetro in other areas. Braspetro operated in the Arab countries, in the countries of North and West Africa, in Latin America, in the Gulf of Mexico and in the English and Norwegian North Sea.

[77] Interview granted by Jean Paul Prates, co-founder of Expetro, on 13/10/2020

Pre-salt Law

Foreign regulations also influenced the rulemaking process of the Pre-salt Law. To support the construction of this Law, ANP, EPE and BNDES researched the regulation of other producing countries.

In 2007 ANP prepared a comparative analysis between Brazilian E&P contracts and those adopted by the following countries: Saudi Arabia, US, Russia and Venezuela, entitled: Models of contracts for oil and natural gas exploration and production: A critical analysis of the Brazilian experience and selected countries. ANP also carried out missions to Angola and Russia to learn about the experience of these countries in adopting production sharing contracts

Energy Research Office (EPE in its Portuguese acronym) has prepared several studies in 2008. Among them, the study "Aspectos conceituais dos sistemas regulatórios de exploração e produção de petróleo e gás natural e a experiência internacional - Relatório A do Grupo de Trabalho MME-EPE[78]" stands out in the context of this thesis. This study analyzed the E&P regulatory systems of ten HCs (Algeria, Angola, Azerbaijan, Kazakhstan, Colombia, Indonesia, Iran, Libya, Venezuela, Norway). However, this study focused on analyzing the tax regimes of each HC.

The Brazilian Development Bank (BNDES) also prepared studies to support the rulemaking process of the Pre-salt Law. The first was launched in December 2008, under the name "Estudos sobre o Pré-sal"[79]. It analyzed the international experiences of the Middle East and North Africa (MENA), Norway, the USA (Alaska), and Canada (Alberta) HCs, with a focus on managing revenues from petroleum exploitation.

The second study published by BNDES in June 2009, was named “Estudos de alternativas regulatórias, institucionais e financeiras para a exploração e produção de petróleo e gás natural e para o desenvolvimento industrial da cadeia produtiva de petróleo e gás natural no Brasil”[80] This study made a brief presentation on the various rules that make up E&P

[78] The free translation is : « Conceptual Aspects of Regulatory Systems for Oil and Natural Gas Exploration and Production and International Experience - Report A of the MME-EPE Working Group »

[79] The free translation is ‘Studies on the Pre-salt’. For more information see: https://web.bndes.gov.br/bib/jspui/bitstream/1408/17960/1/FCEst214768_Estudos%20sobre%20o%20Pre-sal_compl_P.pdf. Accessed in 21/09/2020

[80] The free translation is “Studies of regulatory, institutional and financial alternatives for the exploration and production of oil and natural gas and for the industrial development of the oil and natural gas production chain in Brazil”. For more information see: file:///C:/Users/lbraga/Downloads/Estudosdealternativasregulatorias_P.pdf. Accessed in 21/09/2020

regulation, including the unitization issue. The regulations of the following HCs were analyzed..

From the analysis of these clauses, it is possible to affirm that the rules on unitization of the Pre-salt Law are similar to those rules of Norway and Indonesia in some points. Concerning Norway, the similarities occur in the requirement for the submission of the UA, the need for UA approval by the regulatory agency, and the definition by the regulatory agency of the parties' rights and obligations in cases where there is no agreement. Regarding Indonesia, Brazilian regulation is similar in relation to the need for companies to notify the regulatory agency after verifying the existence of a shared deposit.

2.7.2 ANP Unitization Resolution and CNPE Unitization Guidelines

The drafting of the initial version of ANP Resolution no. 25/2013 was based on some transnational rules. On ANP Technical Report n. 116/2012 (ANP, 2012), which tells about the ANP Unitization Resolution rulemaking process, there are references to the UA model contract from AIPN of 2006; to the UK regulation on trans-boundary unitization; to the doctrine of HCs with more experience in this subject, US and UK in this case. This statement can be seen from the excerpt of the cited Report below:

> *"It was adopted as bibliographic references the following resources: "Petroleum, Industry and Governments: An Introduction to Petroleum Regulation, Economics and Government Policies" by Bernard Tavene; "International Petroleum Exploration and Exploitation Agreements: Legal, Economic & Policy Aspects" de Claude Duval e outros; the article of AIPN, "Unitizing Oil and Gas Fields Around the World: A Comparative Analysis of National Laws and Private Contracts", by Jacqueline Lang Weaver and David F. Asmus, and also the guidelines of Department of Energy and Climate Change (DEEC),of UK: "UK-Norway. Trans-Boundary Oil & Gas Fields: Guidelines for Development of Trans-Boundary Oil & Gas Fields"*[81].

[81] Free translation of "Foram utilizados como referências bibliográficas os livros "Petroleum, Industry and Governments: An Introduction to Petroleum Regulation, Economics and Government Policies" de Bernard Tavene e "International Petroleum Exploration and Exploitation Agreements: Legal, Economic & Policy Aspects" de Claude Duval e outros. O artigo disponibilizado pela AIPN, "Unitizing Oil and Gas Fields Around the World: A Comparative Analysis of National Laws and Private Contracts", de Jacqueline Lang Weaver e David F. Asmus, também foi utilizado como referência, bem como o guia do Departamento de Energia e Mudanças Climáticas (DEEC), do Reino Unido: "UK-Norway. Trans-Boundary Oil & Gas Fields: Guidelines for Development of Trans-Boundary Oil & Gas Fields".

The criterion for defining the ITP Original Volume of Equivalent Oil, a Industry practices was expressly mentioned in the ANP Resolution for Unitization, to be adopted preferentially in the negotiations of the UA signed in Brazil.

Besides, during the preparation of the initial version of this Resolution, the Brazilian Institute of Petroleum, Natural Gas and Biofuels (IBP) and the companies involved in unitization processes forwarded their suggestions for the public consultation process. These suggestions reflected industry practices and international regulations.

However, ANP drafted the rules for processes involving open areas were without practical experience. The adoption of the ANP Unitization Resolution rules for open areas processes highlighted the necessity to change some of its provisions, as David and others (2014) pointed out, and filled some gaps for this category of unitization. Thus, the CNPE Unitization Resolution was published, which established some guidelines for open areas.

As reported in the article by Braga and David (2018), the rulemaking process of the CNPE Unitization Resolution went through an intense debate with the industry, represented by the IBP and the companies that were negotiating the UAs involving open areas. Intending to give inputs to the rulemaking process, these actors presented industry practices and international regulations to the working group formed to prepare the CNPE Unitization Resolution[82].

The ANP Unitization Resolution amendment reflected the provisions presented on the CNPE Unitization Resolution. This review also considered the suggestions of the IBP and the companies involved in unitization processes, especially those involving open areas. In its presentation during the public hearing, IBP stated that it was based on the best practices in the petroleum industry, as can be seen in the transcript: "IBP's proposals for improving Resolution ANP 25/2013 are based on the best practices of the petroleum industry[83]" (IBP, 2017).

[82] For more information, see: Braga, Luciana Palmeira and David, Olavo Bentes. Why the unitization process is an important issue when dealing with the Brazilian Pre-salt Polygon.

[83] Free translation of “As propostas do IBP de melhoria da Resolução ANP 25/2013 estão baseadas nas melhores práticas da Indústria do Petróleo”.

2.7.3 Brazilian E&P contracts: Concession Agreement, Production Sharing Agreement, Transfer of Rights

Round Zero Concession Agreement

MME also hired Expetro[84] to prepare the basic draft of the Brazilian concession contract. This first draft would be signed by Petrobras and the ANP to formalize the areas that Petrobras would retain, due to the end of the monopoly. Simões Filho (2020) reports that the MME hired the Federal University of Bahia (UFBA) and the University of Campinas (UNICAMP) to analyze Petrobras' requests to retain areas where it was developing E&P activities. UFBA analyzed the areas under exploration and UNICAMP, the areas under development and production. These requests were instructed with a portfolio containing the relevant information for each area (reserves, well profile, PDs summaries, exploratory programs). Almost all of Petrobras' requests have been approved. The few exceptions disapproved were related to areas under exploration.

Prates (2020) reports that in the preparation of this first draft, conducted mainly by the retired Petrobras technicians José Carlos Trinta Allen and Sandoval Amui, the E&P contracts where Braspetro (Petrobras' international subsidiary company) had carried out operations were used as references. This first draft was named a Round Zero concession contract and regulated the beginning of ANP's inspection activity for E&P operations.

According to Sandoval Amui (2020)[85], the unitization clause of the Round Zero draft was based on the E&P contracts where Braspetro had acted, and on the legislation of other producing countries (such as the UK and Norway).

First Round Concession Agreement

When the ANP started operating, with established headquarters and collegiate board, Simões Filho (2020) reports that the ANP held a public tender to hire a consultancy to draft the concession contract to be adopted in the First Bidding Round. Expetro, Gaffney Cline, IHS, and another consulting firm participated in the competition. Gaffney Cline

[84] According to the Service Provision Certificate of 07/13/1998, MME hired Expetro through an agreement signed between MME and the University of Campinas - UNICAMP. Available at http://expetro.com.br/wp-content/uploads/2015/10/Ministerio_Minas_e_Energia.pdf. Accessed on 13/10/2020

[85] Interview granted by Sandoval Amui, former employee of Petrobras and Expetro, on em 28/10/2020

was the winner. Bill Cline led the team that drafted the First Bidding Round tender protocol and contract.

According to Bill Cline (2020)[86], the contents of the contract reflected in part elements of the Zero Round contract as well as the Gaffney Cline's experience in developing and fitting petroleum contracts to the underlying technical (resources and costs) and legal realities. Among the regulations that this consultancy company had helped to format recently in relation to what they operated in Brazil, the contracts fof Venezuela (the 1995 Association Agreement and the 1997 3rd Round), Australia, Indonesia, UK and Norwegian North Sea stand out.

Ribeiro (2020)[87] recalls that the first round contract draft were discussed in meetings held with the IBP. This institute had created a legal sub-committee to unify and harmonize the suggestions and forward them in an organized manner to ANP. This legal sub-committee brought together technicians from interested companies that participated in the AIPN meetings and knew the operations of the companies abroad. Therefore, these technicians brought industry practices to the discussion.

In addition, these technicians participated in training courses promoted by IBP. Ribeiro (2020) remembers that Thomas Walde taught the first international short course about upstream legal issues at IBP in 1997. Walde worked in the UN Department of Mineral Law and Policy and visited countries around the world that were implementing E&P regulation, taking the UN guidelines to the process of drafting upstream sector regulation. According to Ribeiro (2020), it was possible to perceive the UN Soft Law power through Walde's actions in seeking to influence the rulemaking process of the HCs he visited.

Simões Filho (2020) reports that the concession contract drafts were put up for discussion through a legal-fiscal workshop held in Rio. IBP hired Daniel Yergin, head of IHS consultancy, to expose the various requests from companies interested in participating in the first bidding round.

Regarding the unitization clause, Cline reports that the Gaffney Cline's view had been considerably influenced by the experience in unitization in the North Sea in the early-mid 90s. This consultant recalls that in 1989-90 the Gaffney Cline were commissioned by 13

[86] Interview granted by Bill Cline, consultant of Gaffney & Cline, on 13/10/2020

[87] Interview granted by Marilda Rosado de Sá Ribeiro, former employee of Petrobras and former Superintendent of ANP, on 28/09/2020

large IOCs (all of the majors plus some large independents) to develop standards, principles and procedures to expedite and standardize what at that time was a very inefficient, acrimonious and lengthy process. Due to this experience of working over the course of 12-13 months in the North Sea with unitization, he says that the construction of the unitization clause of the first round concession contract was influenced by the experience of the Gaffney Cline in the North Sea.

Through this brief history, it is possible to observe in the rulemaking process of the Brazilian concession contract the influence of: i) regulations and IPA from other HCs, through the contribution of Braspetro technicians; ii) regulations and international practices brought by consultants from Gaffney Cline, hired by ANP; and IHS, hired by IBP, in addition to those obtained by the international experience of representatives of interested industries; and iii) the academy, through the participation of UFBA and UNICAMP in the process of analyzing the areas to be retained by Petrobras.

About the transfer of rights agreement, the unitization clause was prepared based on the Pre-salt Law and the clause of the concession contract for the Tenth Bidding Round.

Regarding the production sharing contract, although several clauses in this contract have been influenced by the AIPN's Joint Operating Agreement model contract, as previously mentioned, the unitization clause referred to the current legislation, in a significantly reduced wording.

2.8 – Influence of TLO on the interpretation and enforcement of Brazilian regulation for unitization

Interpretation

About the TLO for the upstream sector's influence on the interpretation of the Petroleum Law unitization provisions, the clearest example is in relation to the sole paragraph of Article 27. This provision dictated that when the parties did not reach an agreement, ANP would determine, based on the arbitration report, how the rights and obligations would be equitably appropriate. The term 'arbitration report' caused ambiguity and may be interpreted as an arbitration award or as an administrative decision. Many different interpretations have ensued, as Bucheb (2007) reported in his work, based on industry practices.

It is possible to affirm the influence of TLO in the interpretation of the Brazilian unitization regulation for the first UAs that involved open areas located in the Pre-salt, notably those of the Tupi and Sapinhoá fields. Through the transcription of some meetings on these UAs negotiation, it is possible to point out such influences through the following examples: In the Meeting Minutes of SDP no. 161/2014 (ANP, 2014) it is reported the mention that the ANP makes to the Unit Operating Agreement (UOA). The ANP informs the parties negotiating Lula's AU that the criteria for redetermination should be dealt with in an UOA, not in the UA. The Meeting Minutes of SDP No. 32/2015 (ANP, 2015), reports that the industry practices related to the equalization of past costs and production (balance correlative rights) are mentioned by BG, one of the parties to negotiate Lula's UA. In the Meeting Minutes of SDP No. 151/2015 (ANP, 2015), the discussion of the parties that negotiated the UA of Sapinhoá is reported on the criterion for defining the ITPs. The parties differed between the adoption of VREC or VOE.

Another example that demonstrates the influence of transnational rules in the interpretation of Brazilian regulation on unitization is the adoption in the UAs submitted to the ANP of the clause dealing with TP. This information is not required by the ANP Unitization Resolution, but it appears in the model contracts related to unitization. All UAs submitted to the ANP after the publication of this Resolution bring this information, which highlights the influence of model contracts in the interpretation of the regulation on unitization.

It is worthy to say that, concerning private negotiation, when the Petroleum Law regulation was in force, the private agreements followed the contractual model of the AIPN UA of 2006, as reported by Araújo (2009). After the Pre-salt Law came into effect, David (2020) reports the adoption in the private unitization covenants of the AIPN's Accounting Procedures model; some clauses of the AIPN's UUOA model; and the Expenses and Volumes Equalization Agreement, developed by Petrobras and PPSA for UA involving open áreas placed in Pre-salt polygon. However, the version of the signed UAs submitted to the ANP's approval is very brief. In the public version of the UAs, only the information required by the ANP is provided (Braga, 2014).

Enforcement

When the Petroleum Law regulation was in force, only four UA were signed: Albacora and Albacora Leste (2007); Mangangá and Nautilus (2008); Camarupim and Camarupim Norte (2009), and Lorena and Pardal (2009). Araujo (2009) reports that the negotiation processes took place without the need for enforcement by the ANP. This author comments the ANP's role in these processes was contributory, requiring minor adjustments for the approval of the UAs.

After the launch of Pre-salt Law rules for unitization and the Unitization ANP Resolution came into effect, some processes demanded the 'enforcement' of the ANP. Among them, the ones that stand out the most are the Lula and Sapinhoá unitization process. Concerning two points: data sharing and the deadline for signing the UA. The arguments used by the ANP for adherence to regulation referred to the rules prescribed in Brazilian regulation.

2.9 The Governance Model Adopted by the Brazilian State for the Rule-Making Process of the Regulatory System for Unitization

After verifying the influence of TLO in the rule-making process of Brazilian regulation for unitization, it is questioned which is the best governance model to be adopted by the Brazilian State to deal with this influence and make the best use of it. Thus, this section evaluates the Brazilian State's type of governance adopted nowadays for the unitization regulatory system's rule-making process. The analysis will take place according to the methodology of Abbott and Snidal (2009), considering the types of governance proposed by these authors and the four features pointed out by them. Then it will be analyzed how the State's role as an orchestrator, proposed by Abbott and Snidal, can contribute to the better use of transnational rules on the Brazilian national order.

2.9.1 Summary of the governance types proposed by Abbott and Snidal

In order to facilitate the understanding of this analysis, the following lines will briefly recall the types offered by Abbott and Snidal (2009).

National Old Governance: The State is at the center of this governance model, regulating from the top down. State uses coercion to enforce rules when necessary. The ‘command and control’ approach is often adopted in regulated activities. This type adopts a hierarchical structure, where state organizations, as executive departments and administrative agencies, centralize regulatory authority. The expertise comes from state bureaucrats and professional regulators. There is the assumption that regulators have or can develop all the expertise necessary to implement policies.

International Old Governance: In this type, the IGOs are the main actors. The member states that make up these organizations are in the center. As states are reluctant to grant authority to IGOs, they do not have the same state authority over mandatory regulation and enforcement. IGOs centralize administrative and operational functions, but member states retain the rule adoption and implementation functions, and political and financial control over important issues, protecting their national interests. Thus, the regulatory authority is shared among IGOs and member-states. These organizations are important centers of bureaucratic expertise. IGOs acts mainly through recommendations or other non-binding soft law. Mandatory rules are rarely adopted since IGOs often are not authorized to establish these types of rules. Even treaties and different legally binding

rules depend on state ratification to enter into force. When IGOs are allowed to adopt a regulation, state-members can decide to opt-in or out. Since they rarely can use coercion, IGO efforts are mostly managerial and indirect in order to convince states to adopt regulations designed to order the conduct of private actors in their jurisdictions.

New Governance: The State has a significant position, acting as an orchestrator. It promotes and empowers other public and private actors - a network of public, private-sector, and civil society actors and institutions, encouraging them to regulate activities, including self-regulation. The State retains the ability to interfere in private regulators' actions to correct them. If necessary, to bring them closer to the public interest (e.g., request that schemes follow basic procedural and substantive norms or keep firms other groups from excessive influence within private schemes). The State, through its agencies, shares regulatory authority with private actors. Then, self-regulation is encouraged and the participation of other civil society actors in the rule-making process. The civil society actors' involvement is stimulated through private ordering and relationships with state agencies. The expertise is dispersed, coming from state bureaucrats and private actors. It assumes that knowledge is dispersed and seeks to bring together many local knowledge stakeholders, often unavailable to state bureaucrats. This model's regulatory process adopts more flexible norms and procedures. Rather than detailed rules, regulation may be drafted in general terms and require flexible standards, targets, guidelines, or benchmarks (e.g. 'performance-based' and 'management-based' regulation). Management practices are privileged at the expense of specific inputs or outputs or call for disclosure or dialogue.

Transnational New Governance: The State does not occupy the central position. The rule-making process occurs predominantly through Regulatory Standard-Setting schemes created by private actors, from the bottom up, with little direct state participation. The possibility of state interference to correct bottom-up regulation is limited. A state can orchestrate the international regulatory system in two ways: i) "directive orchestration," (in which the State uses its authority to direct RSS schemes in the way it deems most convenient); ii) "facilitative orchestration," or supportive actions where the State and IGOs are not directly involved in predominantly private schemes but can stimulate and improve the development of the desired forms of RSS. The expertise comes from the actors that make up the RSS scheme. The more complementary the sources of expertise

(regulatory, technical, economic, and social), the more effective the system will be. However, state regulators or IGOs are also sources of expertise.

2.9.2 Position of the State in the regulatory rule-making process

In order to evaluate the type of governance adopted by the Brazilian Government for the rule-making process of the unitization regulatory system, the same regulatory framework presented in the previous section will be analyzed.

When analyzing the State's position in the rule-making process for the regulatory system of unitization, it is possible to affirm that the State occupies the central position, as in the Old Governance model. The participation of private actors occurs secondarily, through contributions presented in specific events. State actors analyzed the contributions, deciding which ones to incorporate and which ones to disregard.

The rule-making process

Regarding the Petroleum Law rule-making process, Ministry of Mines and Energy – MME - took over the coordination of this process. However, it did count on the advice of Petrobras and the consultancy Expetro. According to Prates (2020), Expetro was responsible for writing the Petroleum Law's final version.

For the Pre-salt Law rule-making process, Federal Decree 11,699, of 17 June 2008, instituted a commission to propose the regulatory framework's change. Under the MME coordination, this commission was made up of the Civil House, the Ministries of Development, Industry, and Foreign Trade; of Finance; of Planning, Budget, and Management; the BNDES; the ANP, and the Petrobras. During this Law rule-making process, private actors - IBP and representatives of companies, universities, and specialized law firms, could express their opinions through the 1st Pre-Salt Seminar held in Brasilia from 18 to 20 August 2010.

ANP Ordinance No. 174, of 2 June 2008, constituted a specific working group to elaborate the ANP unitization resolution, made up of ANP employees and members of the Federal Attorney General's Office allocated to ANP. ANP unitization resolution was written exclusively by the members of the working group. However, during the rule-making process, industry and academia experts made presentations on the unitization

topic. The ANP also held a consultation and public hearing to receive contributions from private actors.

CNPE published Order No 452 of 2015, establishing a specific working group to prepare unitization guidelines. This working group was composed of MME, in charge of coordination, and by ANP and PPSA. This order authorized the working group to invite specialists or representatives from other public or private institutions to participate in the meetings and advise specific topics. Because of this provision, EPE was integrated into the working group, and the company ExxonMobil, IBP, and the specialized law firm Tauil & Chequer were invited to make presentations.

The changes in the ANP Unitization Resolution were carried out exclusively by the ANP and reflected the provisions contained in the CNPE Unitization Resolution. This amendment also incorporated the guidelines proposed by the working group created by Order No. 452 of 2015 that were not included in the CNPE Unitization Resolution, as reported in Technical Note no. 60/2017 / SDP. The ANP held a consultation and a public hearing to receive contributions from private actors.

Regarding the concession contract first drafts, they were written by the consultants of Expetro, and Gaffney Cline hired by MME and ANP, respectively, as reported in the previous subsection. Therefore, even though these state actors were at the forefront of the process, there was the direct participation of non-state actors in these contracts' rule-making process. Furthermore, there were a legal-fiscal seminar and a public hearing to receive contributions from other private actors.

ANP Ordinance No. 318 of 2012 created an interdisciplinary working group, composed of ANP employees and members of the Federal Attorney General's Office allocated to ANP to prepare the first draft of the production sharing contract. However, before creating this group, MME coordinated the previous discussion about this contract, in meetings in which ANP and Petrobras also participated. ANP also sponsored a legal-fiscal seminar and a public hearing to receive contributions from private actors.

2.9.3 Level of centralization of the regulatory authority

It is possible to affirm that the level of centralization of the regulatory authority in the rule-making process related to unitization, especially for the pre-salt reservoirs, is closer to the ideal level model of Old Governance.

In the rule-making process related to unitization, state agencies hierarchically centralize regulatory authority. As reported in the previous item, the MME assumed the coordination of Petroleum and Pre-salt Laws' rule-making process. MME also coordinated the rule-making process for establishing specific guidelines for the open areas located in the pre-salt, with the participation of subordinate bodies, such as ANP, PPSA, and EPE. For hierarchically inferior rules to federal laws, such as resolutions and contracts, the ANP assumed the coordination. However, the MME closely followed the first production sharing contract's preparation, holding periodic meetings with the ANP, exercising its hierarchical power.

2.9.4 Type of Expertise on which the Rule-making Process is Based

According to the above, it is possible to say that unitization rules did not rely only on the state technicians' bureaucratic expertise involved in the rule-making process. The participation of non-state technicians is evident in the drafting of the Petroleum Law and the first concession contracts. The involvement of Expetro and Gaffney Cline consultants brought the diffuse expertise of private actors.

Indirectly, it is also possible to point out the participation of private actors in consultations and public hearings that precede the rules' publication and collect suggestions for improvement. IBP actively participated in public hearings that discussed the rules of the first concession contracts[88], the ANP resolutions, the first production sharing contract. IBP also presented its suggestions for the Pre-salt Law in the 1st Pre-salt Seminar and directly to the working group in charge of writing the CNPE Resolution on unitization. Also, industry experts were invited to directly present their contributions to the group in charge of writing the Unitization ANP Resolution the CNPE Resolution.

Thus, it is possible to verify that the unitization regulatory system's rule-making process did not rely only on bureaucratic expertise but also on the private actors' expertise. As in

[88] According to an interview granted by José Alberto Bucheb, a former employee of Petrobras, on 09/29/2020. Buch said that on this occasion the IBP proposed a substitute draft for the concession contract.

the New Governance model, expertise is dispersed, coming from state bureaucrats and private actors. However, it is worth noting that the number of private actors participating in these processes was quite limited. Besides, except for the Petroleum Law and the concession contract, the participation of private actors in the process was not direct. It was carried out through presentations and suggestions. Thus, unlike the ideal model, the rule-making process did not bring a large number of stakeholders who have local knowledge, often unavailable to state bureaucrats.

2.9.5 Form of the Established Rules

Legally binding and mandatory rules basically form the Brazilian unitization regulatory system. Due to the peculiarities of the Pre-salt polygon, already exposed at the beginning of this section, the regulation takes the form of command-and-control. The entire process is precisely regulated in detail. All actions that must be performed are provided for in the regulation. Even the items that must be included in the unitization agreement are foreseen. And in case of non-compliance with the rules, there is a provision for administrative sanctions.

However, there is a small space in this system for soft law. In all the rules detailed here, there is a direct or indirect provision mentioning the industry practices. The ANP and CNPE Resolutions require that the best petroleum industry practices must be observed directly in the unitization process. In Laws and contracts, the requirement is that the operations provided for in the contract, which includes unitization, must be carried out following the best petroleum industry practices.

2.9.6 Governance of the Brazilian Regulatory System for Unitization

From the analysis of the four aspects pointed out in the Abbott and Snidal methodology, it is possible to say that the type of governance adopted by the Brazilian State for the rule-making process for the unitization regulatory system is closer to the ideal model of Old Governance, with some aspects of New Governance.

However, the Old Governance model follows the positivist logic, maintaining the state in the central and unique position of the rule-making process. In this model, there is the belief that the State can gather among its members all the expertise necessary to regulate a sector. Thus, it becomes incompatible with the previous sections' reality, in which

transnational rules influence the Brazilian regulatory system of unitization. Therefore, the State must change the current form of governance to have a more active position in the face of the influence of such rules and to be able to maximize the benefit that these rules provide to its national order.

Among the options offered by Abbott and Snidal (2009) methodology, the models of new governance or new transnational governance seem to be better suited to coordinate state and non-state actors working in the rule-making process of Brazilian regulation. The Old International Governance model is inadequate because it also follows the positivist logic and the absence of a highly representative IGO with the object dedicated exclusively to the upstream oil sector.

A common point between the models of new governance and new transnational governance is the orchestrator's proposed role to be played by the State. According to Abbott and Snidal (2009), this role includes several techniques of directive and facilitative orchestration, which encourage and facilitate the cooperation of private actors in the national rules rule-making process. These techniques include incentives to self-regulation and performance improvement, establishing regulatory goals, selecting best practices, and actors' training.

This new role may be one of the options for the State to change its form of governance. To affirm that orchestration is the best way, it would be necessary to carry out specific research on governance, which is not the subject of this thesis. Thus, as an example of the way forward, suggestions for how the Brazilian State could act as an orchestrator will be proposed.

The following subsection will present some options for orchestration actions to be implemented by the Brazilian state, considering the unitization shortcomings found in Brazil, and the transnational rules that influence the Brazilian regulatory system.

2.10 Options for orchestration actions to be implemented by the Brazilian State

This subsection aims to analyze how the Brazilian State can use governance to manage the influence of transnational rules in the Brazilian regulatory system for unitization in order to bring these rules closer to the public interest.

For this analysis, it is important to remember the governance concept proposed by Ost and Kerchove (2002), which defines it as a process of coordination of State and non-state actors that aims to achieve collectively set objectives in fragmented and uncertain

environments. And also, the concept of Joerges (2004) defines it as “policy arrangements” that emerge outside the administrative system of a single nation-state (government), but which nevertheless have a significant impact on a globally or regionally defined set of recipients.

Following these governance concepts, the analysis will be carried out under two approaches. The first will analyze how the state actors involved in the rule-making process of Brazilian regulation for unitization and the private actors that develop transnational rules that touch Brazilian regulation can act in a coordinated way. This approach will analyze how the orchestration carried out by the Brazilian State can help to format an adequate regulatory system for unitization. The second approach will examine how the Brazilian State can act outside the administrative system to contribute to the upstream sector's TLO concerning the transnational rules for unitization through a combined orchestration with other HCs.

2.10.1 Unitization Shortcomings in the Brazilian Regulatory System

To analyze the two approaches of proposed orchestration, it is essential to present the unitization regulation challenges. Worthington (2020), after his comparative analysis of several unitization regulations, points out a series of deficiencies found in general, already described in the first subsection of this chapter. About Unitization Brazilian Regulatory System, the shortcomings that are verified are indicated below:

i. Disparate Tract Participations: when there is a big difference between TPs. This problem occurs in Brazil, especially concerning Petrobras, which, due to its monopoly history, tends to have greater participation in E&P projects. As exposed by Amorelli Júnior (2013), Petrobras is predominant in the Brazilian E&P sector, which gives it an additional advantage in the UA negotiations. Therefore, Petrobras's tendency to impose its point of view generates conflicts in the agreements' negotiations. This situation can be observed in the Lula field UA negotiations, in which Petrobras' TP was 67%, and the second-largest TP was BG's with 23%.
ii. Non-adherence to agreements: This problem, which is mainly related to data sharing, can be seen in the UA negotiation between the Polvo and Tubarão Martelo fields. The disagreement between the concessionaires concerning data

sharing, even if there is a legal provision with this command, made it impossible to sign the UA and, consequently, putting on production the shared deposit.

iii. Unaligned commercial priorities: The divergence about the priority level is also noticed in the Brazilian unitization processes. An example that can be cited was Lorena and Pardal fields UA's negotiation between Petrobras and Potióleo. As Araújo (2009) described, it was a unitization process that involved companies of quite different sizes. Petrobras, a leading company in the Brazilian market with international operations, and Potióleo, a company with local level operations. Production in a mature onshore field was necessary for Potióleo, but it was not a priority for Petrobras. Thus, as Bonolo and Almeida (2012) report, the negotiations lasted for seven years. The most extended negotiation period for an UA negotiation until 2012, when these authors completed their study.

iv. Non-uniformity of available information: information asymmetry, primarily related to technical data, can distort the fairness, equitability, and Pareto-optimization of the unitization process. As stated (Amorelli Júnior, 2013), Petrobras is predominant in the E&P sector. According to the ANP Monthly Production Bulletin of August 2020 (ANP, 2020), Petrobras operates 94.5% of the fields that produce oil and 95.6% of the fields that produce gas. This situation provides Petrobras with a knowledge of Brazilian geology that no other company can have, which gives it an advantage in UAs negotiating. In the Meeting Minutes of SDP no. 161/2014, which reports the Lula field UA negotiation, Petrobras informs that it had not yet shared the data with PPSA. Therefore this company could not analyze the technical data of the shared deposit.

v. Undue regulatory interference: when legislation is over-prescriptive and imposes an unnecessary cost, the result of the unitization process can be harmed. According to Worthington, "*a unitization legislator should leave detailed subsurface prescription to be formulated by the coventurers in a UUOA,"* avoiding over-prescription. However, the ANP Resolution for unitization details the procedures that must be adopted to define the TP. It also determines that the Original Volume of Equivalent Oil criterion should be adopted preferentially. During the public hearing to discuss this resolution's revision, IBP (2017) expressly requested excluding the prescription from the preferential criteria, indicating that the details were not adequate.

vi. Multiphase reservoirs: when a reservoir has oil and gas, it is hard to convert gas volumes to barrels of oil equivalent to determinate TPs. All production fields in the Pre-salt polygon produce oil and gas, which includes the Sapinhoá field, according to the ANP Monthly Production Bulletin of August 2020 (ANP, 2020). During the UA negotiation, there was disagreement between the parties in choosing the criterion for defining the ITP. According to the Meeting Minutes of SDP no. 0151/2015 (ANP, 2015), the consortium formed by Petrobras, BG, and Repsol preferred to use Estimated Ultimate Recovery basis, and PPSA suggested the adoption of Original Volume of Equivalent Oil basis. PPSA claimed that the Estimated Ultimate Recovery basis would bring up several points that would make it difficult to sign the agreement.

vii. Post-production unitization: when the production has already started in one field (brown-green fields) or both fields (brown-brown fields). In this case, it is challenging to balance correlative rights and fairness with maximizing economic returns, mainly through enhanced-recovery scenarios. The Lula field UA illustrates this problem. As reported in the Meeting Minutes of SDP No. 32/2015 (ANP, 2015), one of the obstacles in this field UA negotiation was the definition of the methodology to be adopted to reimburse the Brazilian Government. As the holder of the open area rights where the shared deposit was extended, the Brazilian Government must receive his share in the volume produced since 2010 until the UA signature.

According to Worthington (2020), effective regulatory governance can reduce unitization deficiencies. Thus, pointing out weaknesses found in Brazilian regulation, the next subsection will analyze how the State's orchestration can resolve these deficiencies. The analysis will be made in two ways. Within the national legal order scope, aiming to make the Brazilian regulatory system for unitization more robust. As well as within the scope of the transnational legal order, in order to contribute to the better adaptation of the transnational rules related to unitization.

2.10.2 Unitization transnational rules relevant to Brazilian regulation

Before going into the analysis of the State's orchestration, it is essential to discuss the unitization transnational rules that could contribute to the better adaptation of the Brazilian regulatory system. The Brazilian State’s orchestration for the rule-making

process of these rules would also contribute, in general, to the improvement of the TLO for the upstream sector.

Regarding the transnational rules that influenced the regulatory system of Brazilian unitization rule-making process, presented in the previous subsection, it is possible to highlight three categories: the regulation of other producing countries - laws, regulations, and E&P contracts; model contracts drawn up by professional organizations and companies; industry practices, notably those related to subsurface appraisal.

Foreign Regulation

Regarding the regulation of other producing countries, these were brought into the Brazilian regulation rule-making process, mainly indirectly. In the first phase of the regulatory framework, in which the Petroleum Law and the concession contract were drawn up, foreign regulatory references were brought in through Expetro and Gaffney Cline's consultants. In the review of the regulatory framework, in which the Pre-Salt Law and the PSA were drawn up, the foreign regulation references were mainly brought by ANP, BNDES, and EPE technicians. A few missions took place to learn about regulation on the spot. The visits to Angola and Russia Governments stand out. For the construction of the ANP and CNPE Resolutions for unitization, the reference to foreign regulations was brought by ANP technicians and representatives of IBP and interested petroleum companies.

A more effective way of knowing the other producing countries' regulations would be to build conditions to access them directly. In other words, to create spaces in which the producing countries' regulators could meet to debate the rules of unitization and exchange successful regulatory experiences. This action could contribute to seeking regulatory solutions to the deficiencies listed above. An example of this practice is the International Regulators Forum - IRF, a space for discussion that brings together regulators from different countries to debate global offshore safety rules.

Model Contracts

Concerning model contracts, only those produced by the AIPN were used as a reference for the ANP Unitization Resolution rule-making process. The same occurred regarding

the unitization rules interpretation in the negotiation of some UA, such as Sapinhoá. However, these were mentioned by ANP technicians. There are no records of in-depth studies on other model contracts in constructing the regulatory system for unitization. After the ANP Unitization Resolution publication, representatives of PPSA started to participate in the AIPN discussions to understand its model contracts better to facilitate the Pre-Salt UAs negotiations. PPSA and Petrobras also developed a specific model contract, called the Expenses and Volume Equalization Agreement, to resolve issues related to the balance correlative rights.

If discussed directly with the professional organizations that draft them, model contracts could help reduce UA negotiations' conflicts, especially concerning deficiencies related to data sharing and 'balance of correlative rights.' Appropriate contractual models, specific to these issues, could reduce the negotiation problems.

Industry practices

Regarding the unitization Industry practices, the Original Volume of Equivalent Oil was indicated as a technical basis to be adopted preferentially to define the ITP. This basis incorporation on the ANP Unitization Resolution was made by the ANP regulators, without having a more in-depth discussion or analysis of other technical bases with the professional organizations specialized in this theme.

During Lula's UA negotiation, the industry practices related to the past expenses and production equalization (balance correlative rights) were mentioned by one of the parties negotiating the UA. However, there are no records of in-depth studies about the balance of correlative rights practices in constructing the unitization regulatory system.

By knowing and selecting the best Industry practices regarding the technical basis for defining the ITP or TP, the Brazilian State assumes conditions to prevent the parties with less participation or with less available information from being harmed. Knowledge about these practices can also contribute to the fact that the reserves of multiphase deposits are not mistakenly calculated. In general, a broad understanding of the technical basis available for the definition of ITP or TP would give the regulator more capacity to audit the values foreseen in the UA.

2.10. 3 The role of orchestrator

The next subsection will analyze how the Brazilian State can act as an orchestrator of these transnational rules relevant to the unitization regulatory system. Both directive and facilitative orchestration techniques will be examined. First, it is worthy of remembering the concept of state orchestration proposed by Abbott and Snidal (2009):

> *"State "orchestration" includes a wide range of directive and facilitative techniques for supporting and steering this network, such as initiating voluntary and cooperative programs; convening and facilitating private collaborations; persuading and providing incentives for firms to self-regulate; building the capacities of private actors; negotiating regulatory targets with firms; providing incentives to exceed mandated performance levels, and ratifying or scaling up successful approaches."*

According to these authors, the orchestration carried out by the State can increase the legitimacy of transnational rules and guide them into the public interest direction. This orchestration can occur following directive or facilitative techniques, carried out individually by the State or by a group of States, gathered in an IGO or informal networks. Next, some orchestration proposals for the regulatory system of national and transnational unitization will be suggested.

Directive orchestration

Brazilian State

The Brazilian State, represented by MME and ANP, when carrying out the directive orchestration, would follow a governance model closer to that of New Governance. The State would maintain a significant position and encourage and empower other non-state actors to participate in the regulatory process, including self-regulation.

Following the Abbott and Snidal's methodology, the Brazilian State could use the following techniques to carry out the directive orchestration: i) granting benefits to companies that adopt specific transnational rules; ii) incorporating the best transnational rules in the national regulation; iii) requiring that Brazilian NOCs adopt specific transnational rules on their international operations; iv) giving points in the bidding processes.

Concerning the granting of benefits, discounts on government participation or other obligations such as local content could be given to companies that use the transnational rules selected by the State during the UA negotiation. The use of technical bases to define TPs previously chosen by the State, known by the State and easily audited, would undoubtedly lead to a more equitable result and closer to the public interest. The use of contractual models also previously selected by the State could contribute to speedy negotiation and, in the case of open areas, allowing the State to receive its share of production without delay.

The incorporation of transnational rules in the national regulation is already a technique adopted by the Brazilian State. In the unitization Brazilian regulation, there is an explicit provision of the technical basis Original Volume of Equivalent Oil, as the preferred basis for defining TP. It can also be said that UK regulation rules on cross-border rules have been incorporated into the ANP unitization resolution. Besides this action, another alternative to the Brazilian State is to create guidelines guiding and encouraging transnational rules. The government of India has done this concerning Industry practices. However, a lot of attention must be taken not to cause the problem of over-prescription regulation, as pointed out by Worthington (2020).

The last two techniques suggested by Abbott & Snidal (2009) are more challenging to be performed by the Brazilian State. Concerning the requirement that Brazilian NOCs use specific transnational rules, the Brazilian State could not impose conditions to Petrobras to carry out its transactions since Petrobras is an open market traded company, governed by private law. Concerning PPSA, this being a public company, 100% state-owned, the State could dictate its performance rules. However, this would represent an increase in transaction costs that could compromise UA negotiations involving open areas.

Regarding the points allocation in the bidding rounds processes, as Abbott & Snidal (2009) points out, this technique is recommended to promote sustainable practices. Furthermore, as the unitization process is random, it only occurs concerning some contracts. To award points to companies that follow the transnational rules related to the unitization process would benefit only a group of companies, contrary to the isonomy principle in the bidding process.

It is worth mentioning that for the Brazilian State to grant benefits or replicate rules in its ordering, it must know very well the transnational rules related to unitization. Abbott and Snidal stress that States often lack the technical capacity and resources to promote

directive orchestration. These authors recommend that the directive orchestration be carried out in a coordinated manner with other States or IGOs.

IGOs or Producing States Network

Although only OPEC is an IGO with the object aimed exclusively at the Petroleum Industry, its representativeness is limited. For not being a member, Brazil could not cooperate in a possible directive orchestration carried out by this IGO. Through their specialized bodies in the oil industry, the UN, the World Bank, and the OECD could orchestrate transnational rules related to unitization. However, as these IGOs deal with industry issues more generally, they are unlikely to deeply devote their efforts to address such a specific and infrequent topic in the industry. Besides, Brazil could only act through the UN and the World Bank since it has been a member of these IGOs since the 1940s. In the OECD, Brazil participates based on a collaboration agreement, as it is not yet a member.

Therefore, the best option for the directive orchestration to be performed by multiple producing states would be through informal networks, dedicated exclusively to the theme of unitization, along the lines of the IRF that is dedicated to the global offshore safety theme. In this way, producing countries that deal with unitization processes could come together to debate the existing transnational rules, informing themselves and updating on the most recent ones, exchanging experiences and choosing the most effective regulations, developing guidelines to guide the unitization processes in each country, select the best transnational rules linked to unitization periodically and create a support group for the new issues that arise from the practice of negotiating agreements.

However, creating a network among the producing countries that deal with unitization can be a challenge for the Brazilian State. In the structure of the ANP, MME, bodies involved in the process of unitization, there are no sectors specialized in promoting spaces for debates between producing countries. Thus, it would be necessary to allocate people and resources to achieve this objective, which can be complicated in a context of increasing restrictions on public spending.

Facilitative orchestration

Facilitative orchestration is best suited to orchestrate the transnational rules linked to unitization, developed by transnational actors. As the Brazilian State would not be able

to determine the direction of such rules, since sovereign countries and transnational professional organizations draft these rules, the orchestration would be limited. When exercising this form of orchestration, the Brazilian State would leave the center and act in the regulatory process in other actors' same position. Therefore, the governance type to be adopted would be closer to new transnational governance.

Brazilian State

The techniques that Abbott and Snidal point out for the State to carry out the facilitative orchestration are as follows: i) providing material support for the RSS schemes; ii) bringing together the various non-state actors that participate in the rule-making process of transnational rules to encourage them to create transnational rules; iii) sharing information on regulatory issues and help spread knowledge.

Considering that non-state actors that participate in the drafting of unitization transnational rules have sufficient financial conditions to carry out their activities, the first technique would not be necessary. The Brazilian State could exercise the two other facilitative orchestration techniques through the promotion of seminars and workshops. In these spaces for discussion, the Brazilian State, other producing states, professional organizations, academia, and other interested players could meet to discuss solutions to unitization problems, disseminate best practices, and highlight the most appropriate regulations and training professionals who wish to act in the UA negotiations.

An example of such spaces for discussion would be the Ocean Energy Safety Institute (OESI). This institute *"provides a forum for dialogue, shared learning and cooperative research among academia, government, industry, and other non-governmental organizations, in offshore energy-related technologies and activities that ensure safe and environmentally responsible offshore operation"* (OESI, 2020).

Another example of spaces for discussion would be the Inter-American Hydrocarbons Regulators Dialogue, promoted by the University of Houston Law Center, which brought together two editions the regulatory hydrocarbons from Brazil, Mexico, the US, Colombia, and Trinidad and Tobago[89].

[89] For more information, see: https://www.law.uh.edu/eenrcenter/Inter-American-Hydrocarbons-Regulators-Dialogue.asp Accessed on 14 Jan 2021

IGOs or Producing States Network

For the reasons mentioned above, IGOs would not be the most qualified organizations to exercise the orchestration of unitization transnational rules. Thus, producing states networks along the lines of the IRF would be more appropriate to carry out the facilitative orchestration. And the gathering of several producing countries in these networks would give more legitimacy to the orchestration results.

In this way, Producing States Networks could develop publications on unitization transnational rules, serving as codes of conduct to guide individual states. They could also promote learning forums, workshops, and seminars, bringing together the various actors involved in the rule-making process of unitization transnational rules to discuss solutions, point out the best practices and the most successful regulations. Thus they would produce knowledge based on their multiplicity actors diffuse expertise. They could also develop criteria to define acceptable principles, structures, and procedures for developing new rules. In the words of Abbott and Snidal, it would be to create a code of codes.

However, for the facilitative orchestration, there is also the same complication already reported above. For the Brazilian State to promote these networks' creation, it would be necessary to create a structure dedicated to accomplishing this purpose, which does not currently exist.

It is important to note that, for the effectiveness of the orchestration proposals presented above, it is essential that the network of producer countries involved in the rule-making process adopt the same terminology for unitization. Thus, the standardized terminology would facilitate the discussion in the spaces where the different actors will meet to discuss improvements in unitization rules.

2.11 Conclusion of the Second Chapter

This chapter aimed to prove the existence of a transnational legal order for unitization, which would be inserted in the upstream sector's transnational legal order, following the methodology of Halliday and Shaffer (2015). As a case study, the Brazilian unitization regulatory system was analyzed, showing pieces of evidence of how the transnational rules touched Brazilian regulation. It has been shown that the influence of the transnational order on the national order is achieved without effective governance by the State.

After completing the analysis in this last section, it is possible to affirm that the State occupies the central position in the rule-making process of Brazilian unitization regulation, as in the Old Governance model. However, at the same time, it was shown that there was the direct participation of non-state actors in the drafting of Petroleum Law and concession contract. Furthermore, since the first bidding round was promoted by ANP, a legal-fiscal seminar and a public hearing were promoted to receive contributions from other private actors related to the E&P contracts. Thus, the influence of transnational rules on Brazilian regulation is done directly and also indirectly, without effective coordination by the State.

According to Worthignton's (2020) understanding, regulation on unitization may be more appropriate for adopting effective regulatory governance. Based on Abbott and Snidal (2009) methodology, an option to achieve this goal is the Brazilian State acting as an orchestrator, adopting directive and facilitative techniques. Thus, the Brazilian state would be able to have broader access to transnational standards. This chapter demonstrates that these rules touch national regulation implicitly through consultancies, companies, and associations. The Brazilian state rarely directly accesses the actors that issue the transnational rules. In this sense, the new governance and new transnational governance models were presented as a proposal for the Brazilian State. It would play the new role of orchestrator and so could promote an adequate regulation for unitization, both at the national and at the transnational level.

Again, it is emphasized that this chapter's main objective was to show the influence of transnational rules on Brazilian regulation for unitization. Given the finding of incomplete State management on this influence, a proposal was made to improve governance in the regulatory process to deal more adequately with transnational rules. The orchestration proposal by the State is an option to improve governance. It cannot be said that orchestration would be the best option since an in-depth analysis of governance has not been carried out. This topic is suggested for a future research.

CHAPTER III – CASE STUDY OF THE BRAZILIAN REGULATORY SYSTEM FOR OFFSHORE DECOMMISSIONING

3.1 Introduction

In the words of Cameron (2014): *"As finite, depletable resources, oil and gas will at some point begin to decline in productivity, even if enhanced techniques and high prices can often postpone this trend."* At some point, it will be necessary to end production in the field and carry out decommissioning operations, a complex activity as it involves technical, environmental, social, and financial issues. Moreover, this operation becomes even more problematic when it must be carried out offshore due to the high values of offshore operations, environmental sensitivity, technological challenges, and other interests such as safe navigation and fishing that must be considered when planning this operation.

As it involves all of these issues, offshore decommissioning is not just a petroleum industry problem. Therefore, the rules that regulate this operation are established by a plurality of actors: regulators of the Petroleum Industry, regulators of the environmental sector, the Navy, and IGOs. The IGOs published the first rules related to offshore decommissioning, even before this operation became frequent. Thus, it is possible to say that the regulatory system for offshore decommissioning emerged in the international legal order through international conventions aiming to protect the freedom of the seas and seagoing commerce to the global community (Anderson et al., 2020).

In addition to these state actors, standard-setting organizations also play an important role in the regulatory system of offshore decommissioning. Due to the diversity and complexity of technical activities required to carry out this operation, organizations such as ISO, API , NORSOK , IEC , ISA , ASTM propose several industry practices. Thus, it is possible to analyze the regulatory system for offshore decommissioning from the Halliday and Shaffer (2015) methodology, proposing a TLO composed of national, international, and transnational rules.

Considering all the challenges related to the offshore decommissioning operation, the presence of the three types of rules - national, international, and transnational - in the regulatory system, setting up a complete example of TLO, this chapter will focus on the analysis on offshore decommissioning operations. This choice is also justified for the

relevance of offshore petroleum operations, which accounted for 30% of all world production in 2015.

The Brazilian regulatory system for offshore decommissioning is used as a reference to analyze the influence that transnational rules have on the national legal order. The analysis of this chapter is restricted to the regulation established by the Petroleum Industry, given the objective of this thesis to analyze the influence of TLO over the upstream sector regulatory system.

The Brazilian regulatory system for offshore decommissioning is made up of rules that address technical and financial issues. An ANP resolution for dealing with technical matters was instituted shortly after the publication of the Petroleum Law and has been updated since then. However, the rules that detail the financial issue of decommissioning, which will be known as the ANP Guarantee Decommissioning Resolution are yet to be published. The delay in publication can be attributed to the differences that this issue causes between regulators and E&P companies.

From the analysis carried out in this chapter, it is possible to prove that transnational rules influence Brazilian regulation for offshore decommissioning. This is because both the rule-making process of Brazilian regulation and the interpretation and enforcement process of this regulation is influenced by international and transnational rules. and this chapter presents examples that show this interaction between the rules. However, although the Brazilian State is more aware of the transnational rules related to this operation, it does not adopt the appropriate governance model to manage these rules.

Transnational rules can contribute to a more updated, adequate, and swift regulation, which can unlock a series of investments related to decommissioning and encourage the development of activities related to this operation in Brazil (FGV, 2021). In addition, transnational rules can contribute to carrying out offshore decommissioning operations in compliance with the most up-to-date environmental, social, and safety requirements. However, the Brazilian State still has incipient participation in the rule-making process of transnational rules. Therefore, it is important to think about a new form of governance that allows the Brazilian state to interact with transnational rules more consciously, maximizing its usefulness.

These issues are addressed throughout the five sections that make up this chapter.

The second section characterizes the offshore decommissioning operation, identifying the main challenges that this operation imposes on agents, public and private, who deal with this operation. The financial issue presents itself as the main challenge and is dealt with in more detail in this section. Offshore decommissioning involves carrying out extremely expensive activities, and as production declines, so does the field's financial income. Ensuring that there are sufficient financial resources to cover all decommissioning activities when production is closed is a challenge for both HGs and companies that produce the field in a consortium. This is because, in the event of default by any company, the other companies that are part of the consortium will be called upon to comply with the entire obligation. Still, in the absence of them, the debt will fall on HG taxpayers.

The third section characterizes the regulatory system for offshore decommissioning as a TLO, based on the methodology of Halliday and Shaffer (2015), describing the elements, the attributes, and the characteristics. This section also sets out international rules and transnational rules relevant to this system. Differently to what was found in relation to the regulatory system for unitization, in the TLO of the upstream sector for offshore decommissioning, international rules assume a prominent position.

The Brazilian regulatory system for offshore decommissioning is presented in the fourth section, following the legislative framework for petroleum development proposed by Onorato (1999), which includes petroleum law, petroleum regulations, and E&P contracts. This section shows the international rules that have been incorporated into the Brazilian national legal order, in addition to the rules instituted by the Brazilian State. This section also offers examples of how transnational rules influence the rule-making process of Brazilian regulation for offshore decommissioning.

The fourth section shows that international regulation is the main category that touches Brazilian regulation. International conventions, even those that Brazil has not ratified, like the Geneva Convention and OSPAR, also have an important influence on the rule-making process of national rules on offshore decommissioning. Unlike what was observed with unitization, Brazilian regulators use industry practices more consciously, citing them expressly in resolutions and official communications. In general, transnational rules are reached directly by state actors. However, indirect ways of obtaining these rules also occurs through the use of consultants from Expetro, Gaffney & Cline, and IHS Markit.

The sixth section analyzes the governance model adopted by the Brazilian State, based on the models proposed by Abbott and Snidal (2009). According to this analysis, it is possible to conclude that the type of governance adopted by the Brazilian State is hybrid, verifying the characteristics of the Old National Governance, Old International Governance, and New Governance models. However, the Brazilian State does not play the role of an orchestrator. Thus, in this fifth section, suggestions for actions are proposed for the state to carry out the directive and facilitative orchestration in order to encourage the development of transnational rules and disseminate its knowledge.

3.2 Presenting the Decommissioning Operation

3.2.1 Definition of Decommissioning

Decommissioning can be understood as a stage in the oil field's life when operations becomes uneconomic, and the asset owners decide to end production. However, its planning starts in the initial phase of the field life when elaborating the Development Plan (DP). The DP must foresee how the equipment installed in the field must be uninstalled, how the site must be restored, and the estimated costs for these operations. Thus, decommissioning is a step at the end of operations, but that is planned throughout the field's productive life.

Decommissioning operations include cessation of production (CoP), plugging (abandoning or sealing) wells, decontamination of topsides and pipelines, isolation of pipelines, dismantling, and total or partial removal of these facilities and the disposal in a safe and environmentally appropriate manner. In the case of partial removal, the decommissioning process must monitor facilities that have not been removed (Hammerson and Antonas, 2016).

According to Hammerson and Antonas (2016), the decommissioning project objectives are to guarantee the safety of people, protect the environment, and uphold company values and reputation. According to these authors, asset owners have a social responsibility to return the restored area and obey the applicable regulation.

3.2.2 Technical Aspects of Offshore Installations

Before detailing the phases that make up the decommissioning process, it is necessary to better understand the offshore structures used to exploit the offshore fields. For this thesis, these structures will be divided into four categories: platforms, subsea systems, pipelines, and wells.

Platforms

According to Anderson et al. (2020), offshore platforms can have two parts: topside and jacket. The topside is the visible part of the platform, positioned at a height capable of withstanding waves of 25 meters or more. It can be considered a small island, including the deck, drilling equipment, production, processing, use, and substructure support. Generators, crew accommodation facilities, and helipads are also part of the topside. The jacket is the submerged part of the platform. It consist of a truss structure made of tubular steel supported by pillars embedded in the seabed that supports the topside.

The American Petroleum Institute (API, 2021) points out seven types of platforms that are used offshore: Fixed Platform (FP), Compliant Tower (CT), Tension Leg Platform (TLP), Mini-Tension Leg Platform (Mini-TLP), SPAR Platform (SPAR), Floating Production System (FPS) and Floating Production, Storage & Offloading System (FPSO). These platforms are detailed in the table below.

Table 5 - Types of Offshore Platforms

Type of Platform	**Characteristics**
Fixed Platform (FP)	It has a topside and a jacket and is used for installation in water depths up to 300 meters.
Compliant Tower (CT)	A narrow and flexible tower supports the topside. It is suitable for use in water depths between 300 and 600 meters since it withstands large lateral forces by sustaining significant lateral deflections.

Tension Leg Platform (TLP)	The topside is supported by tension rods embedded to the seafloor by pile-secured templates. It is used for operations in water depths approaching 1500 meters with limited vertical motion.
Mini-Tension Leg Platform (Mini-TLP)	A smaller version of the TLP, intended to produce smaller reservoirs. It can be used as a utility, satellite, or early production platform for larger deepwater discoveries.
SPAR Platform (SPAR)	A large diameter single vertical cylinder supports the topside. It is used for operations in water depths up to 900 meters, although technology allows for this type of platform to be used with water depths up to 2,200 meters.
Floating Production System (FPS)	The topside on this platform is semi-submersible and is supported by a wire rope and chain that position it in the desired location. It is also possible to set it using rotating thrusters. It is suitable for water depths of more than 2000 meters
Floating Production, Storage & Offloading System (FPSO)	The topside is built on a ship anchored on the seabed. The FPSO is usually accompanied by a smaller shuttle tanker, which transports the oil stored onboard the vessel to an onshore facility. It is suitable for remote deepwater areas over 2000 meters, where there is an infrastructure pipeline.

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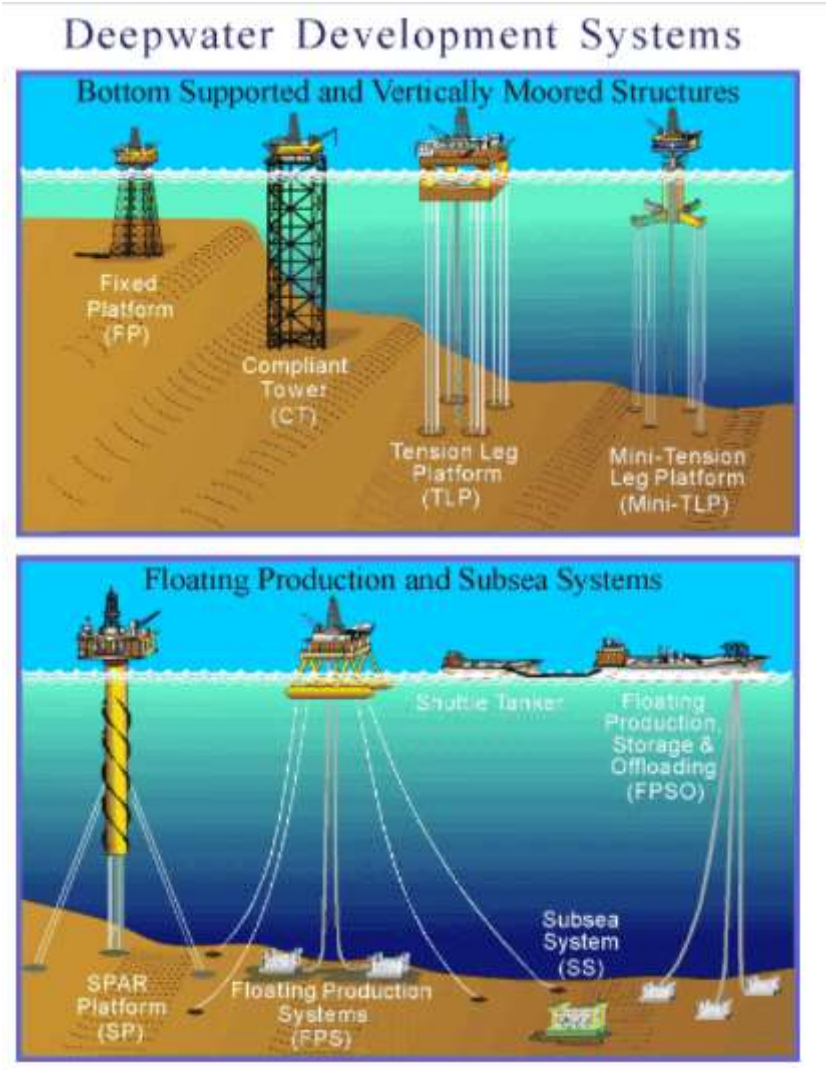
Figure 9 illustrates the seven types of platforms described above.

Figure 9 - Offshore Platform Types



Source: BSEE (2021)

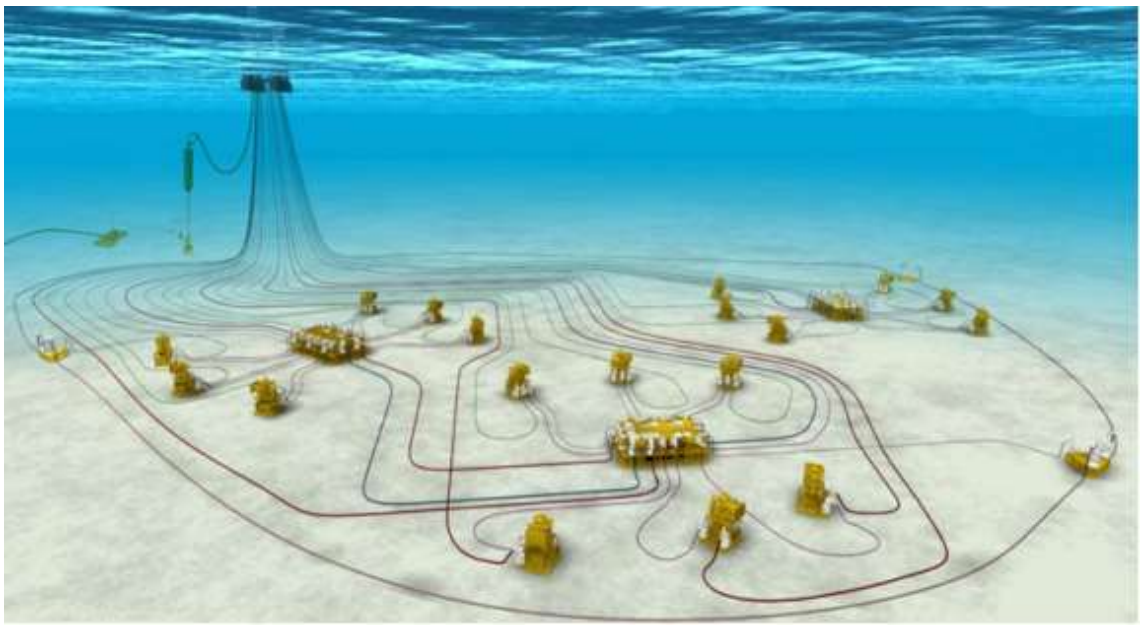
Brazil, whose regulatory system is the subject of this chapter, has fixed platforms, FPS, FPSO, TLP, and even jack-up platform. With this last type of platform, the topside is mobile, supported by three or more legs fixed on the seabed. It is used for depths of up to 150 meters (FGV, 2021).

Subsea Systems

The Subsea System (SS) is the set of equipment which is submerged or located on the seabed, such as production lines, injection lines, manifolds, templates, risers, christmas

trees, and anchor lines. These systems are used in water depths greater than 1,500 meters (Ruivo, 2001; API, 2021). Figure 10 shows an illustration of an SS.

Figure 10 - Representation of an underwater system



Source: FGV (2021)

Wells

Wells are the drilled paths that make the connection between the oil reservoirs and the production system. These are drilled to produce oil and gas or inject other substances such as water and, CO2 (Ruivo, 2001).

Pipelines

Pipelines transport production fluids between platforms or processing units at sea and distribution sites onshore. Also, the pipelines can drain the water produced in the wells, which after being treated, can be discarded or re-injected into production wells (FGV, 2021).

In Brazil, the pipelines used in offshore operations vary from 4 to 22 inches, and their life cycle lasts an average of 30 years. (Ruivo, 2001).

3.2.3 Decommissioning Phases

The decommissioning of an offshore field is a very complex process that permeates the entire life of the field since its planning begins when drafting the development plan. For this thesis's purposes, this process will be divided into the following phases, as proposed by Hammerson and Antonas (2016): planning, plug, and abandonment of wells; cleaning; pipelines; removal; disposal and monitoring. Each of these phases will be detailed below.

Planning

The planning of an offshore field decommissioning must start at the moment when this field development is planned. When the companies are designing the structures needed to carry out production, they must think about how these structures will be removed. Therefore, planning for decommissioning must already be provided, at least preliminarily, in the development plan.

In addition to how the structures will be removed, the planning of the offshore decommissioning must also provide for how the financial resources will be guaranteed to carry out this operation. Decommissioning operations represent huge costs for field asset owners, and these costs come when production ceases and when there will be no more financial resources from this field. In the words of Hammerson and Antonas (2016), "there is no prize at the end of a decommissioning project."

Failure to comply with the obligation to carry out with decommissioning may lead the HG to assume such responsibility, causing this operation's high costs to fall on taxpayers. For Cameron (2014), this is the biggest concern of HG. Therefore, it is up to HG to ensure that asset owners will have sufficient funds when the decommissioning operation is necessary.

Thus, beginning with the DP preparation, information regarding the estimated costs necessary to carry out decommissioning operations is already required, which requires that asset owners plan the operational part of this operation in advance. Guarantees are also needed to ensure compliance with this obligation.

Decommissioning planning is carried out in advance even among companies with rights over the field, as there is a risk that some of them will default. In this case, to ensure that partners do not become responsible for the costs of the defaulting party's

decommissioning operations, it is common for a consortium to require all parties to provide guarantees for future decommissioning costs. This issue is generally provided for in the Joint Operating Agreement (JOA), early in the field's life, when the parties define the rules for operating the area (Hammerson and Antonas, 2016).

Plugging and Abandonment of Wells

Considering that the wells are the means by which oil and gas are extracted from the reservoir, the first operation to be carried out is the plugging and abandonment of these wells to stop production, disconnecting the reservoir's production system. Thus, the reservoirs' fluid flow will be blocked with these wells' permanent deactivation, leading to the end of the field's productive life (FGV, 2021).

The petroleum and aquifer reservoir isolation will prevent the migration of fluids between formations either through the well or through the annular space between the well and the liner and the migration of fluids to the bottom of the sea (Ruivo, 2001).

Anderson et al. (2020) warn that improperly plugged wells can cause severe damage to the environment since it can lead to the escape of contaminating fluids from the subsoil, such as gas, hydrogen sulfide, arsenic, and methane.

According to de Hammerson and Antonas (2016), the plugging and abandonment of wells is a routine operation performed globally through the following activities: placement of reservoirs barriers; displacement of hydrocarbons; well tubing, safety valves and casing removal where required; installation of intermediate barrier and environmental plugs; and conductor recovery. Many industrial practices guide this operation

Cleaning

All installations set to be decommissioned must undergo a decontamination process in order to reach a relatively acceptable level of hydrocarbons and toxic substances present in these installations. The objective is to reduce the danger associated with equipment decommissioning.

These activities are carried out by specialist cleaning teams who are responsible for removing oil and gas, asbestos, chemicals, and other toxic waste.

The cleaning of the topsides that will be taken to onshore bases accepts at lower level of cleanliness, as long as it meets the regulation and contractor requirements. However, a higher level of cleaning is required when the decommissioning project provides for the breaking of any containment of the original hydrocarbon envelope or onsite demolition.

The cleaning process for equipment that will not be removed from the sea, such as some pipelines, must be carried out so that no remaining residues harm the environment or have the potential to cause problems, following regulatory agencies' requirements (Hammerson and Antonas, 2016).

Pipelines

After going through the cleaning process, the pipelines must be disconnected from the production system. According to Hammerson and Antonas (2016), they must be isolated by "air gapping".

In offshore systems, it is common for pipelines to remain in situ. In this case, it is recommended that they be plugged and buried (Ruivo, 2001).

Removal

Despite the fact that the first international regulation related to decommissioning - the 1958 Geneva Convention - required the total removal of facilities, the international regulations that followed it gave more flexibility, which allowed for other alternatives to complete removal (Martin, 2003).

According to each field's specificities, several decommissioning alternatives may be possible, which can lead to three final results: total removal, partial removal, or permanence in situ (FGV, 2021).

For decision making, five criteria must be considered:

- Technical: analyzes the characteristics of the facilities and the available technologies to evaluate the possible alternatives;

- Environmental: assesses the environmental impact of each possible alternative in the different media through which the installations will transit;

- Social: analyzes how possible alternatives impact communities and other users who use the area to be decommissioned, including the impact on jobs, fishing and tourism;

- Safety: assesses the risk of causing damage to all workers involved in the decommissioning process for each of the possible alternatives and also the impact on safe navigation;

- Economical: estimates the cost of each possible decommissioning alternative.

The analysis of all these criteria together contributes to the decision-making process to choose the most suitable alternative for the decommissioning scenario in question (FGV, 2021).

In the case of removing jackets and topsides, Hammerson and Antonas (2016) group the feasible methods in three core techniques:

- Reverse of installation: in the case of modular facilities, where it is possible to transport the modules onshore using a heavy-lift vessel (HLV), guaranteeing the structural integrity of the structures.

- Single lift: in the case of small structures, it is possible to transport the entire facility at once utilizing a single-lift vessel (SLV).

- Demolition in situ: in this case, a team of specialists resides on the platform to disable it for a longer period. Industrial demolition machines and hydraulic shears are used.

These authors emphasize that for the removal of jackets, in addition to the possibility of demolition, which requires divers and remotely operated vehicle (ROV) systems, there is also the alternative of cutting the jacket into pieces to be transported in parts. This method is called cut and lift.

Anderson et al. (2020) point out some ways of reusing the platform regarding the permanence in situ, keeping it in the place where it was installed. The most common form is that which transforms platforms into artificial reefs (From Rigs to Reefs). Countries like the US, Australia, Mexico, Brunei, and the Philippines already have examples of platforms in this new role.

Another reuse highlighted by these authors is repurposing the platform for carbon sequestration in depleted offshore reservoirs. This use is permitted by the 1996 Protocol to the London Dumping Convention, provided that it is subject to a licensing regime and that the integrity of the location that will store the CO2 is guaranteed. Equinor is already

developing a CO2 sequestration project at Sleipner West Field in the North Sea part of Norway. However, this is a field in production, so there is a possibility to carry out similar projects on existing platforms in abandoned fields.

The US Energy Policy Act of 2005 also provides examples of how abandoned platforms can be reused, such as aquaculture, research, education, recreation, support for other offshore operations, and telecommunications.

Disposal

The disposal of facilities brought to an onshore base is one of the final stages of the decommissioning process. Therefore, the disposal process must meet environmental requirements, operational safety, waste regulation, observe the industry practices, and the concept of savings (Hammerson and Antonas, 2016).

It is essential to pay attention to the site's choice to receive the decommissioned facilities given these structures' large size. It is necessary to check the processing capacity, material handling, lifting resistance of the pier, the draft, and waste processing. Due to the lack of experience in the decommissioning processes, ports, docks, and shipyards are considered critical elements in this stage (FGV, 2021).

Another problem refers to the disposal of waste. In Brazil, for example, there is the presence of the sun coral (coral-sol) on the platforms. This coral is an invasive species, which spreads quickly and easily, impairing other species' development. Another waste that causes a problem is naturally occurring radioactive material (NORM), which accumulates mainly in production risers, storage tanks, and production plants. These materials need proper disposal, as they can last up to 16,000 years. As an alternative for disposal, they can be stored in deactivated mines, salt caves, or injected into rock formations (FGV, 2021).

Whenever possible, companies must try to recycle decommissioned installations. Hammerson and Antonas (2016) argue that reuse in repair or remanufacturing saves costs and provides waste management.

Monitoring

Monitoring will always be necessary when any installation is left in situ after the decommissioning process is completed. Thus, it will be perpetually necessary to monitor the site to ensure that no problems are caused by the installations left on the seabed. Besides, it must keep signs on visible in situ equipment to protect safe navigation and not harm fishing activities (Anderson et al., 2020).

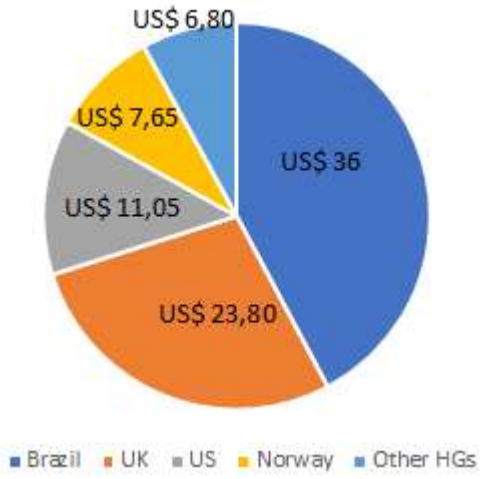
3.2.4 The Financial Aspect of Decommissioning Offshore Fields – A Significant Challenge

High Costs and Risk of Default

According to Cameron (2014), the costs involved in offshore decommissioning "are likely to prove daunting to many foreign and domestic investors, and the risk of default on decommissioning obligations is to be taken seriously by governments and co-venturers alike."

In Brazil, there is an approximate US $4.91 billion cost estimated for the period of 2021 to 2025 (FGV, 2021). In the UK, the Oil and Gas Authority (OGA, 2021) estimates the cost of £ 39 billion by 2022. Figure 11 shows FGV (2021) estimate for the costs of decommissioning activities in the main producing countries with offshore activities after 2025:

Figure 11 - Forecast of Global Investment in Decommissioning after 2025 (in billions of US $)



Source: Adaptation of FGV (2021)

In producing countries with more experience in offshore production, default cases concerning decommissioning operations have already been reported. For example, Cameron (2014) cites two default cases in the UK, which took place in the Ardmore fields in 2005 and Emerald in 1996. The decommissioning costs of these two fields added up to nearly £5 million. Regarding the Ardmore field, the UK government arranged for the drilling company hired by the insolvent company, Tuscan Energy North Sea Ltd. (TESL), to bear all costs. Regarding the Emerald field, the UK government had to pay all costs, spending approximately £ 1 million.

Anderson et al. (2020) report that after the 2014 crisis, the number of orphan wells in the US was in the thousands and American taxpayers paid approximately US $35 billion due to companies' default concerning decommissioning costs. The defaulting companies had been exempted from providing guarantees that would assure the decommissioning obligations. These authors also note the case of default by the Redwater Energy Corporation in Canada. Fortunately, the Canadian government held insurance that can be used for decommissioning operations. However, this was only possible after the Supreme Court of Canada decided to prefer decommissioning operations over debts to private creditors, based on the polluter pays principle and the public's interest in a safe environment over the private interest of creditors.

HGs will endeavor to prevent the costs from falling on the government and, consequently, on its taxpayers, in case one or more holders of the rights to the offshore field that is to be decommissioned do not comply with their decommissioning obligations. The objective is to protect HGs and their taxpayers against unexpected and high costs resulting from companies' default when production ceases and the field needs to be deactivated.

Notwithstanding, finding a balance between protection against default and incentives to extend the productive life of the offshore field is currently the biggest challenge for countries that produce offshore oil.

Types of Financial Guarantees

Thus, default cases reinforce the need to demand guarantees from companies that hold E&P rights to an offshore field early in the field's productive life. Hammerson and Antonas (2016) point out the following types of guarantees that HGs usually request: cash, a bond from a bank or insurance company, parent or affiliate guarantee, letter of

credit from a bank. There are also other types of guarantees, such as the pledge of oil and gas production and auto insurance, adopted in Brazil, and trust funds, adopted in countries such as the US, Tanzania, Belize.

Cash or provisioning funds equate to savings, whereby companies that hold E&P rights over a field provide financial resources in a bank account throughout the field's productive life, with the HG as a beneficiary. These resources can only be used to implement an approved decommissioning plan.

According to Cameron (2014), this fund provides security for both HG and the company or consortium of companies that hold E&P rights over a field. This author points out that the amounts contributed to the fund are considered cost recoverable since they can be classified as operating expenses for the purpose of any industrial taxes. Further the amount that remains in the fund should be considered as income tax for tax purposes. If the field is under a PSA, the fund's left must be divided into profit oil.

Anderson et al. (2020) warn of the need for the bank to be a safe institution, as the fund's solidity depends on the bank's stability. These authors point out that national banks are often chosen for nationalist reasons, but they are not always safe options. It must also be ensured that the allocation of resources occurs exclusively for decommissioning operations. The choice of the beneficiary is another issue that deserves attention, according to these authors. They report the example of Angola, in which the fund must be paid to the NOC. However, NOCs are often subject to the current government's decisions, which may lead to resources being directed to other causes. Besides, these authors claim that corruption is endemic in most HGs.

The letter of credit is a security issued by a bank or financial institution in the amount of the estimated costs for the decommissioning operations. The bonds are issued by a bank or insurance company, which guarantees to the HG that the company holding the E&P rights over an offshore field will be able to afford the decommissioning costs. In the event of default, letters of credit and bonds can be executed by the HG at the respective financial institutions to receive the estimated amount to bear the costs of decommissioning (ANP, 2020 - docs public hearing).

A parent or affiliate guarantee, also called a corporate guarantee, is issued by another company belonging to the same group as the company that holds the E&P rights over the offshore field, considering the guarantor's greater financial capacity. This type of

guarantee has a bail nature. Thus, in the guaranteed default, the guarantor company is responsible for paying the decommissioning operations costs or carrying out these operations (ANP, 2020 - docs public hearing).

Brazil also adopts two other types of guarantees for companies. One of them is the oil pledge, whereby the company holding the E&P rights over the offshore field offers oil or gas production from another field whose E&P rights it also holds as a guarantee of the decommissioning costs. The other is self-insurance, whereby the company that owns E&P rights over the offshore field submits an extrajudicial executive title to the regulatory body to ensure compliance with the decommissioning obligations.

According to Hammerson and Antonas (2016), the financial institutions that issue insurance must have a ranking that proves their financial capacity to protect HGs. It is recommended that even companies that give other types of guarantees also have their economic power certified.

Funds

Another alternative to protecting against company default is the creation of special funds to cover decommissioning costs. Anderson et al. (2020) report that after the problems observed in the North Sea and the Gulf of Mexico, countries with more recent oil production created such funds in their national regulation. For example, we can mention the Tanzania Fund, which is financed by oil companies operating in the country. These are expected to contribute to the fund two years after the start of commercial production. Another example is the Texas Oilfield Cleanup Fund, created in 1991 to clean up contamination and properly abandon wells. This fund is financed by mandatory fees charged to companies in the oil industry. Before banning oil operations in 2018 to protect its coral reef, Belize also demanded the payment of 1% of the total value of oil production to feed two funds. One fund was intended to compensate for the loss resulting from oil operations, and the other was dedicated to financing conservation and environmental education activities.

The creation of a compulsory contribution fund to be fed by all E&P companies operating in Brazil is proposed by FGV (2021) as an alternative to the traditional regulatory command and control mechanism. Thus, this fund could cover possible bankruptcy cases

and facilitate the transfer of rights to new small and medium-sized companies interested in continuing operations in marginal fields.

Decommissioning Security Agreement (DAS)

Still, concerning the types of guarantees, it is worth making a brief comment on the Decommissioning Security Agreement (DAS), a model contract developed by Oil & Gas UK (OGUK) in 2009. DSA is a private agreement between members of a Joint Operating Agreement (JOA); therefore, it is not subject to national regulation. From the DSA, the companies participating in a JOA present guarantees for the costs of decommissioning in order to prevent the default of one of the parts of the consortium, since the most current versions of the JOAs establish joint and several liabilities between the consortium's members (Hammerson and Antonas, 2016).

The DSA is also adopted in the case of transfer of rights. The company entering the consortium needs to sign a DSA and guarantee the costs of decommissioning. UK regulation also allows the regulator to be part of a DSA. This possibility facilitates the transfer of rights when a smaller company acquires a larger company's participation, mainly concerning mature fields. Thus, the incoming company will not have to present two guarantees for the decommissioning costs: one for the regulator, another for the consortium. The guarantee offered under the DAS will be valid between the parts of the JOA and before the regulator (Hammerson and Antonas, 2016).

Balancing: Costs X Investments

The high costs of financial guarantees are a factor to be considered, according to Hammerson and Antonas (2016). Banks and financial institutions will charge fees and require proof of equity to grant guarantees or will even require collateral insurance depending on the company's ranking that will be guaranteed. These authors also note that the letter of credit can cost up to 3.5% of the insured amount. The funds also immobilize a part of the resources that could be invested in the operations.

Thus, guarantees and contributions to the funds represent an additional cost and can substantially impact investment capacity, especially for smaller companies interested in operating mature fields. Companies tend to defend the submission of guarantees close to

the end of production, while for the HG, they tend to demand their submission when the O&G project begins (Cameron, 2014). Continuously, the industry pleads for financial guarantees not to overburden companies (FGV, 2021).

Hammerson and Antonas (2016) state that the decommissioning activities are related to the Maximizing Economic Recovery (MER) policy, as it must seek to maximize the revenues from oil exploitation with the minimization of costs. Finding the balance between the guarantee requirement to mitigate the default risk of companies and the maintenance of the flow of investments in a period in which the field's production will be in decline is a significant challenge for HGs, especially those with offshore operations.

Calculation of Decommissioning Costs

To achieve this balance, it is important to find solutions that minimize guarantor's costs. According to Cameron (2014), the cost estimate for the decommissioning operations must be carried out well in advance and must provide a margin of error. Thus, it is possible to develop strategies to raise sufficient funds when the flow of financial resources from offshore field production is declining. However, factors such as oil prices, technological developments for enhanced oil recovery (EOR), and environmental policy can impact the cost estimate over the field's life. Anderson et al. (2020) also point out that the industry's lack of offshore decommissioning experience can also make it difficult to estimate costs.

The UK and Colombia present a model of progressive contribution of financial guarantees characterized by requiring lower guarantee values at the beginning of production and higher values close to the end of the contract. However, for this model to be effective, the calculation in decommissioning activities must be as close to reality as possible (Saad et al., 2020).

Another calculation method, pointed out by Anderson et al. (2020), is the Unit of Production (UoP), used for annual payments. Adopting this method, one should start from the most recent estimated decommissioning cost, subtract it from the amount already provided and multiply the result by the proportion of production in the current year, considering the remaining recoverable reserves. Using this calculation method, the entire amount related to the decommissioning costs is paid until the final production year.

Companies holding E&P rights over offshore fields will likely reduce decommissioning costs to reduce the costs of guarantees. These companies can use tax reliefs for the

calculation, which is not recommended since, at any time, the HG can suspend these tax reliefs. Hammerson and Antonas (2016) maintain the importance of a detailed methodology to calculate the costs of decommissioning and the valuation of reserves. For these authors, clarity in the calculation reduces the potential for conflicts around the operator's estimate and minimizes the operator's discretion.

It is also important that HGs have their regulators trained to analyze the estimated costs to verify their accuracy or that they require the analysis of a third party, an independent expert, to correctly assess the costs and help avoid misunderstandings, as suggested by Anderson et al. (2020).

The UK regulation provides for hiring an independent expert to perform the calculations of the decommissioning costs in the event of a dispute and when the regulator is part of the DAS. At least once a year, or up to three times, the independent expert must be hired to calculate changes in the value of reserves and the cost estimate, considering technological developments, regulatory changes, etc.

Transfer of Rights

The problem of financing offshore decommissioning becomes even more critical when a large company holds the offshore field's rights and, when production becomes marginally profitable, these holders decide to assign the rights to a smaller company with less financial capacity and, therefore, greater risk of default. In this case, it is necessary to protect the entire guarantee system for decommissioning set so far. It may be required for the transferor company to continue maintaining principal or subsidiary responsibility for the decommissioning obligations. Also, the assignment contract may be allowed to retransfer the asset to the transferor after approval by the regulator (Hammerson and Antonas, 2016).

The greatest challenge is to find a balanced formula between the guarantee requirement and the incentive for new investments in the field. Especially when the field reaches its maturity and requires new capital contributions to increase its recovery rate and the extension of its life cycle (Cameron, 2014).

Mature field operators suggest a triple balance between the interests of the company that sells the field rights, the company that buys, and the regulator that wants to maintain an acceptable security level concerning decommissioning costs so that the requirement for

guarantees does not overburden the business to the point of making it infeasible. Thus, especially for the company interested in buying the field, it is necessary to clearly understand the decommissioning liability that it will acquire and the possible alternatives for decommissioning. The regulator should allow the new entrant to review costs as well.

The financing of decommissioning operations and the various ways HGs can protect themselves from possible defaults are still under discussion, especially in HGs with offshore operations, where decommissioning costs are much higher.

3.2.5 Other Offshore Decommissioning Challenges

In addition to financial challenges, the decommissioning of offshore petroleum fields presents others challenges related to technological, environmental, social, and regulatory issues. The following lines will detail these challenges.

Environmental

Regardless of the chosen removal process, total, partial, or permanence in situ, the offshore platform's decommissioning will impact the environment.

As explained above, to be removed, the facilities must undergo a process of depressurization, drainage, and cleaning. However, even after all these processes, there will still be a residual amount of hydrocarbons, heavy metals, and polychlorinated biphenyls (PCBs) that can contaminate the platform's surroundings. When explosives are used to break structures, mammals and endangered species, such as sea turtles in the Gulf of Mexico, are significantly impacted. The structures' simple displacement will disturb the drill-cutting piles left on the seafloor after drilling the wells. Harmful drilling fluids generally contaminate these drill cuttings, and their movement may contaminate underwater habitats and ecosystems (Anderson et al., 2020).

When the facilities are left in situ, they will undergo a corrosion process that will generate contaminants that can spread through the surrounding ecosystem and also accumulate inside fish and shells. Another problem is the possibility of rust and damage to installations after storms and hurricanes, which can cause parts of the installation to come loose. These loose and damaged parts can damage ships, impair navigation, or reach the coast, causing damage to the hillside properties. In addition, the simple act of depositing

the platform's pieces on the seabed can crush organisms and suffocate others due to the sediments raised by the installations' impact on the seabed. Even facilities that revert to other uses, such as artificial reefs, can harm fishers whose nets can be trapped in these facilities. In addition, other problems may arise since the consequences of leaving facilities on the seabed are not yet widely known (Anderson et al., 2020).

As knowledge evolves concerning the environmental impacts generated by the decommissioning process, the environmental policy must become more rigid. Dealing with this uncertainty is a challenge that companies must face when planning decommissioning operations.

Social

Leaving the facilities used in oil and gas production in situ can interfere in fishing and tourism activities. In some situations, the installations left on the seabed can impair these activities if they represent damage to the marine environment and visual pollution. In others, it can contribute to the improvement of these activities. Costa reports (2021) that for the Cação, a Brazilian offshore field, the regulatory bodies had already approved the decommissioning plan for the total removal of facilities. However, fishermen in the region have spoken out against complete removal, claiming that the facility had already become an artificial reef, which contributes to fishing. Fishermen also claimed that recreational diving in this artificial coral could be a new activity to develop.

This example demonstrates the challenge that regulators have in reconciling the interests of communities representatives close to the facilities that are set to be decommissioned with the interests of companies holding E&P rights over the field, as well as considering the public interest.

Technical

Although technological advances in the oil industry are growing, there are still challenges to be faced that directly impact the decommissioning process. One of them refers to techniques for increasing recovery factors that would increase field survival and, consequently, postpone the start of decommissioning operations. In Brazil, for example, the recovery factor is 21%, while the global average is 35%. The increase in this recovery

factor would extend the useful life of the field, giving continuity to government stakes payment (FGV, 2021).

Another challenge is developing the necessary infrastructure to adapt ports, docks, and shipyards to decommissioning and the lack of a specialized labor force.

The uncertainty regarding offshore technological development is another challenge. Anderson et al. (2020) highlight the constant evolution of the offshore industry. Thus, the technology used today may not be the one that will be available when it is necessary to carry out decommissioning operations. By these author's assessments, there will likely be underwater cities of petroleum equipment handled by robots and intelligent drones in the future.

Regulatory

Despite the growing worldwide concern with offshore decommissioning, public pressure, and environmental movements, the regulatory framework on this topic is still far from complete, homogeneous, and satisfactory, even in countries with more experience in decommissioning operations (FGV, 2021)

There is still a tangle of international rules on the subject, which brings some conflicting guidelines. Reconciling national, international regulations and transnational rules can be a regulatory challenge for companies designing the decommissioning project.

Another regulatory challenge is to guarantee the protection of the environment, operational safety, safeguard social issues and maintain the attractiveness of investments through the marginal production.

3.3 The Offshore Decommissioning Regulatory System as part of TLO for the Upstream Sector

The offshore decommissioning regulatory system is structured by national and international legal rules and industry practices, which are considered in this thesis as transnational rules. Thus this system presents the three elements of the TLO - transnational, legal, order - pointed out by Halliday and Shaffer (2015). The international community was the first to draw up rules on this issue, having published some international conventions before the producing states organized themselves to regulate

this operation. However, currently, offshore decommissioning is largely regulated by producing countries. Fiatikoski (2021) reports that the IHS Markit PEPS legal and contractual database points out that there are 136 regulations on decommissioning. This regulatory system also highlights the presence of transnational rules - contractual models, industry practices, codes of conduct - developed by private actors, such as professional associations BIMCO , LOGIC , API, AIPN, OGUK, and companies such as DNV-GL.

The attributes of the TLO are also easily identified in the offshore decommissioning regulatory system. The IGOs that launch the international conventions and professional associations that elaborate the transnational rules evidence the presence of an organization or legal network whose performance transcends or exceeds the borders of the countries in the rule-making process. The involvement of legal institutions is noted, on a national level, by the presence of the regulatory body for the petroleum industry, the navy, the regulatory body for environmental issues that launch rules about this issue and ensure the requirement of these rules. At the international level, the United Nations' participation stands out by elaborating conventions and the IMO's relevant involvement in regulating this issue. The rules of this system are materialized in the form of laws, resolutions, contracts, international conventions, contractual models, code of conduct, and standards, all of which are considered by Halliday and Shaffer as recognizable legal forms.

The five essential characteristics that structure the TLO listed by Halliday and Shaffer (2015) can also be verified in the regulatory system for offshore decommissioning. According to Higgins (1993), the interactive process of creating rules between national, international, and transnational orders can be verified through "a considerable permeability between the treaty provisions and state practice.” Hammerson and Antonas (2016) report that before UNCLOS, the rules on offshore decommissioning were quite different. They also commented on the impact that OSPAR 1998 had on the North-East Atlantic Ocean countries' regulation in adopting stricter standards than those of UNCLOS. According to these authors, the rules regarding decommissioning present in the JOA contractual model are also influenced by the HG national regulation where E&P operations will take place. Legal forms are observed in the rules that make up the regulatory system on offshore decommissioning, adopting the form of hard law in national regulations and international conventions, and the form of soft law in the IGOs guidelines and in the transnational rules. A diversity of actors creates this system: HGs,

IGOs (e.g., UN, OSPAR Commission), professional associations (e.g., BIMCO, API, ISO, AIPN, OGUK), and companies like DNV-GL, demonstrating legal pluralism. It is possible to note the realistic legal perspective of the offshore decommissioning regulatory system through the power of IGOs, such as the UN and OSPAR, and producing countries such as the UK, which have influenced the way some HGs regulate this issue. Hammerson and Antonas (2016) state that "the main principles for the establishment, removal and dumping of offshore installations have been agreed at an international level and incorporated to varying degrees in national frameworks regulating the oil and gas industry." Producing countries repeatedly replicate the rules established at the international level, demonstrating the weight of TLO's authority.

Thus, by verifying the elements, attributes, and characteristics that make up the TLO, as proposed by Halliday and Shaffer, it can be stated that the offshore regulatory system for decommissioning is part of the Upstream TLO sector.

3.3.1 International and Transnational Rules Related to Offshore Decommissioning

This subsection will detail the international and transnational rules related to the regulatory system of offshore decommissioning that make up the TLO for the upstream sector. Before describing the Brazilian regulatory system, it is important to detail the two types of rules that influenced the construction of the Brazilian regulatory system: international rules, as the first rules of this system, and transnational rules, as they are widely adopted in this operation.

3.3.1.1 International Rules

In the context of the offshore decommissioning regulatory system, the international legal order assumes a prominent role since international conventions were the first rules to integrate this system. Higgins (1993) states that "(t)he legal regulation of the offshore abandonment of structures and installation on the continental shelf is in the first place determined by international law. "

Higgins (1993) explains the importance of the international legal order for the offshore decommissioning regulatory system based on two arguments:

> *"First, states will want, both as a matter of general policy and to protect themselves against any litigation, to ensure that their abandonment and reclamation policy is consistent with international law. Second, their rights on the continental shelf are, in any event not rights of full sovereignty. They are sovereign rights for the purpose of exploring and exploiting shelf resources."*

Anderson et al. comment that the first international convention on this topic - the 1958 Geneva Convention on the Continental Shelf - came into effect (in 1964) even before giant fixed platforms were installed in the North Sea. According to Martin (2003), international legal order related to decommissioning has developed over the past sixty years and is comprised of three major international conventions - the 1958 Geneva Convention on the Continental Shelf; the 1972 London Dumping Convention; the 1982 UN Law of the Sea Convention (UNCLOS) - and by one set of non-binding guidelines issued by IMO. In the following lines, each of these international standards will be detailed.

The 1958 Geneva Convention on the Continental Shelf (Geneva Convention)

The Geneva Convention resulted from the United Nations Conferences on the Law of the Sea held at Geneva in 1958. It was the first international Convention that dealt with decommissioning offshore structures, aiming to ensure safety in navigation. This norm requires that the construction of any offshore installation is announced, permanently flagged and that, in the end, the structure be entirely removed (Anderson et al., 2020). However, this norm was published without any practice regarding the decommissioning of offshore petroleum fields. This is because, it was not until the 1970s, the first fixed platforms were installed in the North Sea, and operations in the Gulf of Mexico gained strength (Hammerson and Antonas, 2016).

According to Martin (2003), this Convention does not refer to the removal of pipelines and deals briefly with living marine resources without explicitly requiring the protection of the offshore environment. This author maintains that this text has been overcome by a more flexible approach adopted by UNCLOS.

The 1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (London Dumping Convention)

While the Geneva Convention focuses on navigation safety, the London Dumping Convention aims to protect the marine environment from human activities, control all marine pollution sources, and prevent pollution of the sea by dumping wastes and other matter (IMO, 2021).

In the opinion of Martin (2003), this is the second main Convention concerning the disposal of offshore installations. It must be adopted in all marine areas of the 87 signatory countries, except for inland waters of a coastal state. Anderson et al. (2020) highlight this Convention's importance because it deals with the destination of offshore installations removed parts, which is not mentioned in the Geneva Convention or the IMO Guidelines and Standards.

This Convention defines dumping as "the deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures, as well as the deliberate disposal of these vessels or platforms themselves" (IMO, 2021). Under this definition, platforms that are totally or partially left in the sea are considered dumping, including those converted into artificial reefs. Martin (2003) reports that this understanding was confirmed by a new protocol adopted in 1996, which went into effect in 2006.

This convention establishes a blacklist in Annex I and a gray list in Annex II. Dumping is prohibited for materials listed on the blacklist. For the materials on the gray list, dumping is allowed as long as there is a special permit. A general permit is required for the dumping of other substances, as provided for in Annex III. General and special permits must be granted by an appropriate authority appointed by the signatory country according to Annex III criteria (IMO, 2021).

If an HG, signatory to this Convention, decides to authorize a platform permanence at sea, totally or partially, it must make the case assessment. This Convention does not deal with pipelines; that is, it does not define whether these structures' permanence on the seabed is considered dumping or not (Martin, 2003).

Anderson et al. (2020) report that the start of decommissioning activities in the Brent field in the North Sea motivated some HGs to demand changes in the London Dumping Convention, aiming to prohibit all "offshore dumping." Thus, the Convention was amended by the 1996 Protocol to make its rules more rigorous. The Convention started treating any structure, including pipelines, left on the seabed as dumping. The 1996

protocol adopted the 'polluter pays principle.' Thus, even if there is still no conclusive evidence between dumping and its potentially harmful effects, the operator must adopt preventive measures when putting wastes into the marine environment. The operator must also prove that the environmental option chosen is the most appropriate, and there is no better option.

The 1982 UN Convention on the Law of the Sea Convention (UNCLOS)

The UNCLOS establishes the legal regime for the world's oceans, regulating all oceans' uses and resources. According to the IMO (2021), this convention "embodies in one instrument traditional rules for the uses of the oceans and at the same time introduces new legal concepts and regimes and addresses new concerns."

Regarding decommissioning, the UNCLOS is more flexible than the Geneva Convention by allowing partial removal of offshore structures. However, it requires attention concerning fishing, protecting the marine environment, and other states' rights and duties.

For installations left on the seabed, it requires that it be adequately signaled with information on depth, position, and dimensions (Anderson et al., 2020). Like the Geneva Convention, the UNCLOS does not explicitly require the removal of pipelines, despite establishing general marine pollution principles (Martin, 2003).

The dichotomy between the rules that deal with removing offshore installations established by the Geneva Cconvention and UNCLOS has not yet been resolved. Martin (2003) reports that a majority adopts the textual approach, maintaining that there is only the option of total removal for the signatory countries of the Geneva Convention, as it is the strictest rule. The minority adopts the teleological approach, which defends, in the case of conflicting devices, the application of the general rule of treaty interpretation found in the Vienna Convention on the Law of Treaties. Thus, good faith must be used to interpret treaties according to their ordinary contextual meaning and considering their object and purpose. This current would allow partial removal of petroleum facilities for the signatory countries to the two conventions.

The UNCLOS also determines that the removal should consider "any generally accepted international standards established in this regard by the competent international organization." Anderson et al. sustain (2020) that the competent international organization is the International Maritime Organization concerning decommissioning.

IMO was created in 1948 by a UN conference in Geneva as a specialized agency. Its purpose is to coordinate the regulation of international maritime transport, ensure maritime safety, efficiency in shipbuilding, and prevent and control marine pollution from ships.

IMO Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone – Resolution A. 672(16) - (IMO Guidelines)

In 1989, the IMO published guidelines and standards to guide the process of total and partial removal, and in situ maintenance of offshore structures. The organization made no mention of the issue of financing operations.

According to the Guidelines, the structures that must be removed entirely are: i) located on primary navigation routes; ii) located in less than 75 meters of water depth and with less than 4 thousand tons; iii) installed after 01/01/1998, in less than 100 meters and below 4 thousand tons. In the latter case, the structures installed offshore must be designed and built already with the provision for complete removal. Thus, operations in deep waters must be made possible by using floating structures and with tensioned legs. For other cases, the removal can be partial, as long as 55 meters of water are above the remaining part, and only structures that receive new use can be left in situ (Anderson et al., 2020).

In the case of partial removal, the IMO Guidelines establish some criteria to assess this possibility, which deals with the "effects on navigation, costs, technical feasibility, risks of injury to marine contractors, and possible use for other purposes if the structure remains in place" (Anderson et al., 2020). HGs must evaluate case by case, weighing the criteria to approve or not partial removal.

The IMO Guidelines also state that decommissioning activities cannot significantly disturb living resources in the marine environment, nor can they threaten endangered species. This brings limitations to the use of explosives, for example. Regarding the structures authorized to remain in situ, the guidelines require a specific monitoring plan that allows the observation of deterioration of materials, such as drill cuttings, and that protects fishing and endangered species (Anderson et al., 2020).

According to Martin (2003), the IMO Guidelines have the legal status of recommendations and cannot be considered international rules, as they do not bind HGs.

According to this author, they establish only general principles. Therefore, these Guidelines could be viewed as a transnational rule.

Otherwise, Higgins (2003) understands that the IMO represents a reference for state practice. According to Higgins, with the IMO guidelines and standards adopted by the HGs aiming to conduct decommissioning operations, this state practice will become customary international law. If the IMO Guidelines and Standards achieve this status through widespread practice among HGs, they will apply to all HGs regardless of the ratification of the treaties mentioned above. However, Anderson et al. (2020) point out that it cannot yet be said that the IMO Guidelines and Standards have achieved the status of customary international law.

Regional Conventions

In 1974 the Regional Seas Program was established within the UN Environmental Program (UNEP) as a regional mechanism for conserving the marine and coastal environment. Under this program, eighteen Regional Seas Conventions and Action Plans have already been published. These conventions and plans establish inter-governmental frameworks to address the degradation of the oceans and seas at a regional level. These conventions and plans focus on preventing pollution at seas, such as oil spills and the movement of hazardous waste and land-based sources of pollution, for example, plastics, wastewater, and excess nutrients (UNEP, 2021).

According to Martin (2003), "there are a variety of regional conventions around the world that superimpose themselves on the above international conventions." This author cites as examples of these conventions: the 1972 Oslo Convention; the 1991 OSCOM Guidelines, the 1992 OSPAR Convention, which apply to the North Sea; the Barcelona Convention for the Mediterranean; the Kuwait Convention, for the Persian Gulf; the Jeddah Convention for the Red Sea and the Gulf of Aden; the Black Sea Convention for the Black Sea and the Abidjan Convention for West Africa.

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention')

The 1992 OSPAR Convention, signed by the North Sea countries, is worth mentioning among the regional conventions since it is used as a reference by some HGs in the decommissioning rule-making process. UNEP has not established this Convention, but the OSPAR Commission cooperates with the Regional Seas Program and attends regular meetings. The OSPAR Convention derives from the Oslo and Paris Commission. It aims to promote the prevention and elimination of pollution from land-based sources, by dumping or incineration, from offshore sources; the assessment of the quality of the marine environment; and the protection and conservation of the ecosystems and biological diversity of the maritime area.

According to Anderson et al. (2020), the OSPAR "reflects the lessons learned from the Brent Spar episode about the need for independent reviews and consultation with a wider range of parties." As the IMO Guidelines and Standards, the OSPAR Convention requires, initially, the total removal of structures located offshore. However, as an exception to complete removal, this Convention provides for the possibility of derogation, provided that the conditions listed in this standard are met. This Convention also provides a "Consultation Procedure," which requires a 32-week consultation period before a member state can grant a derogation permit. During this period, any HG signatory to this Convention may object to partial removal. If this objection is not resolved, a meeting of the OSPAR convention members must be convened to decide the issue, and the decision must be made by the country that requested the derogation. If the commission decides to approve the derogation, the conditions set out in Annex 4 of the Convention must be established. Among these conditions, according to Anderson et al. (2020), it should be provided "an independent verification of the information that was provided to secure the permit, the allocation of responsibility for monitoring the installation's condition over time, and identification of the owner (s) of the parts that remain in place so that any future claims for damages can be brought against them." The full participation of NGOs in the OSPAR Commission's work is encouraged in this Convention.

3.3.1.2 Transnational Rules

As already mentioned, private actors also participate in the regulatory system of offshore decommissioning. Professional associations such as the Baltic and International Maritime Council (BIMCO), the American Petroleum Institute (API), the Association of International Petroleum Negotiators (AIPN), Oil & Gas UK (OGUK), and companies such as DNV-GL launch model contracts, industry practices and codes of conduct. National regulators, such as the Oil and Gas Authority of the UK, develop risk allocation models replicated in several other HGs. The following lines will detail each of these categories of transnational rules.

Model Contracts

Considering the complexity and high values involved in the decommissioning operation, model contracts can reduce negotiation costs and increase efficiency, as defended by Martin and Park (2010).

The most recent contractual models of the Joint Operating Agreement (JOA) contain specific clauses on decommissioning. Anderson et al. (2020) report that the 2009 UK Oil and Gas Model JOA (UKOG JOA) and the 2012 AIPN Model International Joint Operating Agreement (2012 AIPN JOA), two models widely adopted by industry, address decommissioning plans and liabilities. The AIPN model deals with decommissioning issues in a much more detailed way, requiring the forecasting of the costs of activities in the Work Program & Budget, the approval of the start of operations by the operational committee; the obligation of the parties to contribute to the costs and the provision of the decommissioning plan in the development plan. Exhibit E of the AIPN model deals with the conduct of decommissioning and brings requirements for creating a Decommissioning Trust Fund.

As reported in the previous section, JOAs adopted in the UK generally provide for submitting the model contract Decommissioning Security Agreement (DAS), developed by Oil & Gas UK (OGUK) in 2009. This contractual arrangement simplifies and standardizes the process of negotiating guarantees

According to Hammerson and Antonas (2016), "*most oil companies are likely to prefer to contract with prime contractors who can subcontract with specialist contractors as necessary or appropriate.*" This contract is called an Engineering, Preparation, Removal,

and Demolition (EPRD) contract and is commonly adopted in fixed platform decommissioning projects (FGV, 2021). BIMCO, an association of companies dedicated to global keep shipping regulation, developed the first EPRD contractual model, called DISMANTLECON. Vianna (2019) points out three main objectives of the model of this contract: i) to establish a degree of standardization in the sector; ii) to reduce costs and time in negotiations; and iii) to establish a fair and balanced contract.

Anderson et al. (2020) also report the publication of "a model contract for use by offshore operators and decommissioning contractors" in 2018, by the UK offshore industry, in an effort to standardize decommissioning contracts and thus reduce costs. The contractual model was developed by LOGIC (Leading Oil & Gas Industry Competitiveness), a subsidiary of Oil & Gas UK, created to reduce costs through standardization during the 90s, marked by very low oil prices.

Industry Practices

Anderson et al. report that the first national rules on decommissioning used to only require plugging wells and the adoption of industry practices to carry out this operation. Now that there is greater detail for the decommissioning regulatory system, industry practices include proper field closure techniques and should be applied in all activities that make up the decommissioning operation.

For the performance of the phases that make up the decommissioning operation - planning, plugging, and abandonment of wells; cleaning; pipelines; removal; disposal and monitoring - several activities must be carried out. For most of these activities, especially those of a technical nature and those involving environmental and operational safety issues, there is a wide variety of industry practices prepared by standard-setting organizations available to guide the execution of these activities.

Regarding the planning phase, Nicolosi et al. (2018) cite the adoption of 'decommissioning comparative assessment' as a good practice to compare the possibilities of decommissioning from a multicriteria methodology that considers the technical, economic, environmental, social, and safety aspects.

According to Morais (2020)[90], among the standard-setting organizations that develop industry practices for decommissioning activities, stand out: the American Petroleum Institute (API), International Organization for Standardization (ISO), NORSOK, developed by the Norwegian petroleum industry, International Electrotechnical Commission (IEC), the International Society of Automation (ISA) and the American Society for Testing and Materials (ASTM).

In a survey carried out using the 'Engineering Workbench' tool from IHS Markit on the standards on 'removal of offshore petroleum structures", considering only the organizations mentioned above, 482 results were pointed out.

Among the research results, Jacques (2021)[91] emphasizes the importance of ISO practices on offshore structures - ISO 19901-9: 2019 and ISO 19902: 2020 - for the decommissioning operation. Section 14 of ISO 19901-9 establishes specific standards for decommissioning and removal. This section has the following items: general; decommissioning process; pre-decommissioning data gathering; planning and engineering; well decommissioning; facilities decommissioning; pipeline decommissioning; conductor removal; structure removal; and site clearance. Concerning ISO 19902: 2020, items 8 and 12.4 contain rules applicable to removal situations.

Jacques (2021) also highlights the Norsok Standard Z-013 on risk and emergency preparedness assessment. Item A.5.3 of this standard suggests the application of ALARP evaluation principles. According to this standard, "ALARP expresses that the risk shall be reduced to a level that is as low as reasonably practicable." ALARP is a concept that emerged in the UK in the 1950s and is dedicated to risk management at all stages of the plant life cycle, which includes decommissioning. Several standards incorporate this concept, but the Norsok Z-013 presents it in a well-structured way.

Another example of industry practices applicable to the decommissioning operation is the standard API RP 2SIM that deals with Structural Integrity Management of Fixed Offshore Structures. Item 5.6 provides specific guidelines for decommissioning in the structural integrity management process, and item 14 guides decommissioning platforms.

It is important to note that access to the standards developed by the mentioned standardizing organizations is charged with high fees. Likewise, the access to the

[90] Interview granted by Caroline Morais, regulator of the ANP, on 06/26/2020
[91]

'Engineering Workbench' tool from IHS Markit, which meets several standards, and makes easier the access of these standards. The high costs are generally an obstacle for HGs who want to keep up to date on industry practices.

Codes of conduct

As previously explained in the first chapter, codes of conduct are compilations of industry practices, created through a multi-stakeholder collaborative process to guide petroleum companies and regulators in the performance and monitoring of operations.

An example of a code of conduct is the Guidelines for Risk-Based Comparative Assessment of Options for Decommissioning of Subsea Installations in Brazil, published in 2017 by DNV-GL. Schaffel et al. (2020) report that these guidelines were developed through a Joint Industry Project, including the Brazilian NOC, Petrobras, and eight oil companies. Also participating in the discussions, through meetings, are the Brazilian regulatory bodies of the petroleum industry and the environment - ANP and IBAMA - and the Brazilian navy. The purpose of these guidelines is to guide a comparative assessment of different decommissioning options for subsea installations in Brazil. According to Schaffel et al. (2020), "They should be viewed as a collection of good practices that if followed will lead to a good quality comparative assessment."

The Oil & Gas UK has at least fifteen guidelines publications for different activities that make up the decommissioning operation. These codes of conduct bring together the industry's best practices for the specific activities subject to these publications.

Although published by an IGO under the international legal order, the IMO Guidelines constitute a collection of industry practices. According to Martin (2003), the IMO Guidelines were published to establish the 'generally accepted international standards' in compliance with the requirement of art. 60 of UNCLOS. Besides, as Higgins (1993) argued, as the adoption of IMO guidelines and standards becomes a widespread practice among HGs, they will have the status of industry practices; that is, they will be transnational standards that all HGs may require.

Risk Allocation Contracts

As already exposed in the first chapter, risk allocation models are mechanisms established in the provisions of model contracts or in the HCs' regulation, used to define the share of liability among companies involved in E&P operations in the event of an accident. Due to the number of activities it encompasses, the offshore decommissioning operation consists of various potential risks: operational, human, and environmental. According to 'Decommissioning Contract Risk Allocation Report 2015' by Oil & Gas UK (OGUK, 2015), both operators and contractors identify six risks concerning the offshore decommissioning operation. Are they:

> • *"Poor weather;*
> • *Restricted access to the structure (assumes contract provides unrestricted access);*
> • *Uncertainty of drill cutting pile content and/or volume prior to removal;*
> • *Unknown obstructions – obstructing access to pile cut location*
> • *Changes to removal requirements beyond original scope of work*
> • *Availability of the lifting vessel that has been contracted within the agreed period."*

Thus, defining the risk allocation model in the contracts that govern the decommissioning operation is necessary. For example, in BIMCO's EPRD model contract, responsibility for these risks is expressed through the risk allocation model 'knock-for-knock.' According to Vianna (2019), each party must assume responsibility for losses, damages, or losses to its personnel and property in certain situations, regardless of the cause.

The LOGIC model contract also elects the 'knock-for-knock' risk allocation model for decommissioning operations. However, in the opinion of Dracoulis and Deane (2019), it does not adequately address the risks and discrete issues associated with the interaction of the knock-for-knock indemnity regime with insurance policies.

The Guidance Notes on 'Decommissioning of Offshore Oil and Gas Installations and Pipeline', published by the 'Department for Business, Energy and Industrial Strategy', the competent authority for regulating decommissioning in the UK, informs that the Offshore Installations (Safety Case) Regulations 2015 (OSCR2015) requires a safety case to be submitted at least three months before the start of the dismantling process.

Australia's offshore energy regulator, NOPSEMA, also requires a Safety Case to be in effect to perform decommissioning. The requirements on the content of the safety case are laid down in the Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 (OPGGS (S).

This subsection presented the legal orders and transnational rules on the offshore decommissioning operation that make up the regulatory system for the upstream sector. The following subsection will present the Brazilian regulatory system for offshore decommissioning, with the objective of identifying the influence of the TLO of the upstream sector in the rule-making process of Brazilian regulation.

Foreign Regulation

As exposed in the first chapter, foreign regulation will be treated in this thesis as transnational rules. Despite being created by sovereign countries, they cannot be considered international rules, because they are elaborated out of the national legal order of a given producing country, without the participation of the national state, that is, without the consent of this country. Thus, foreign regulations are rules that cannot be classified as national or international.

3.4 The Upstream TLO's Influence over the Brazilian Regulatory System for Offshore Decommissioning

3.4.1 The Brazilian Regulatory System for Offshore Decommissioning

Before detailing the Brazilian regulatory system for offshore decommissioning, it is important to justify choosing this system as a case study for this thesis. In Brazil, 34% of the production systems are offshore, in deepwater and ultra-deepwater. Furthermore, among the offshore production units, 33% have been in operation for more than 25 years, and 20% are aged between 15 and 20 years. For this reason, investments of around 34 billion dollars are estimated in decommissioning operations in Brazil, placing it among the world leaders in investment volumes (FGV, 2021).

Furthermore, in Brazil, the decommissioning operation is regulated in the three categories used by Onorato (1999) to describe the legislative framework for petroleum development:

the Petroleum Law, petroleum regulations, and E&P contracts. Besides, Brazil is a signatory to most international conventions.

The recent revision of the ANP resolution that deals with the technical and operational aspects of decommissioning and the drafting, of the resolution on the financial aspects related to decommissioning was another factor that contributed to the choice of using the Brazilian regulatory system for offshore decommissioning as a case study.

Thus, this section will present the rules that make up the Brazilian regulatory system for offshore decommissioning, and it will identify the presence of transnational rules in this system. Furthermore, this section will point out how the TLO of the upstream sector influenced these rules during its rule-making process.

3.4.2 International Conventions Ratified by Brazil

International conventions, signed and ratified by Brazil, are incorporated into the national legal order. Among the international conventions detailed in the previous section, only the Geneva Convention was not signed by the Brazilian government. Fiatikoski (2021) reports that although the Brazilian congress expressly authorized Brazil's accession to the Geneva Convention through Legislative Decree no. 45 of 1968 (Brazil, 1968), Brazil has neither signed nor ratified this Convention, as provided for in the UN proceedings.

A London Dumping Convention was internalized by Brazil through Decree no 87.566/1982 and its amendments through Decree No. 6.511/2008 (Kowarski et al., 2019).

More (2013) reports that Brazil signed UNCLOS in 1982, ratified it in 1988, and internalized it in the national order by Decree no. 1530 of 1994.

Kowarski et al. (2019) sustain that the IMO Guidelines apply to Brazil, "*since it is a member of that organization, internalizing the Convention on the International Maritime Consultative Organization, signed in Geneva, on 6 March 1948, through Decree no 52.493, dated 23 September 1963."* Moreover, these authors say that Brazil actively participates in the IMO, having integrated its councils twice.

Concerning regional conventions, there are none that deal with decommissioning issues affecting Brazil (Hammerson and Antonas, 2016).

As can be observed, the decrees that ratified the London Dumping Convention and UNCLOS established rules for decommissioning even before the publication of

Petroleum Law. Thus, it is possible to affirm that these conventions were the first norms of the Brazilian regulatory system for offshore decommissioning.

3.4.3 Petroleum Law and Pre-Salt Law

In the regulatory system for the upstream sector, petroleum law tends to be the norm with the highest hierarchy within the national legal order's regulatory framework. However, since offshore decommissioning operations involve environmental protection issues, environmental laws regulate these issues. Therefore, petroleum law will generally be the main norm concerning technical, operational, and financial matters.

According to Anderson et al. (2020), national laws are the most important layer on decommissioning regulation because they bring mandatory requirements. For these authors, these laws typically contain rules about:

> *"• Whether total removal is required and when partial removal may be approved.*
>
> *• Whether operators must present a decommissioning plan to the government for approval, the contents of the plan, and the procedures for approval.*
>
> *• Whether the government may choose to take title to some structures and use them for its own purposes.*
>
> *• What kind of financial guarantees are required by the government.*
>
> *• Whether site restoration or the payment of any compensation for environmental damage is required.*
>
> *• Whether contractors are jointly and severally liable to the government for proper decommissioning.*
>
> *• Whether the seller retains any residual liability when it transfers its interest in a contract or whether all decommissioning obligations become the sole liability of the buyer.*
>
> *• Fiscal and accounting mechanisms, such as provisions for amortization, expensing, cost recovery, tax credits, royalty relief, or creation of special decommissioning funds for such activities. »*

Among the fourteen countries whose regulation on decommissioning was analyzed by Hammerson and Antonas (2016), eight provide for general rules on decommissioning in their petroleum laws, including Brazil.

Petroleum Law

Petroleum Law makes only one reference to decommissioning. When establishing the hypotheses of extinction of the concession contract, this Law establishes that the concessionaire has the sole responsibility for removing equipment and goods that will not be reverted to the Brazilian government. Any damage resulting from this activity must be repaired and compensated by the dealer. The concessionaire must also practice the acts of environmental recovery determined by competent institutions.

The Influence of the TLO

As reported in the second chapter, the rule-making process of the Petroleum Law was coordinated by the Ministry of Mines and Energy (MME), which hired the consultancy Expetro to write the final text of this Law. Prates (2020) reports that Expetro used as a reference to draft the Petroleum Law, the regulation of some countries such as the UK, Norway, Libya, Angola, and Colombia, where Expetro technicians from Braspetro (Petrobras' international subsidiary) had worked. However, there are no precise references to the rules that specifically influenced the wording of the decommissioning clauses.

Pre-salt Law

The Pre-salt Law makes more references to the decommissioning process. This Law establishes that the decommissioning of facilities may be considered cost oil and, subject to conditions specified in the contract. This Law also determines that the operator is responsible for conducting and executing, directly and indirectly, the decommissioning activities of the facilities.

The Pre-salt Law establishes that PPSA will not assume the risks, nor will it bear the costs and investments of the decommissioning activities of the facilities. Furthermore, and when setting the hypotheses of contract extinction, this Law determines the contractor's obligation to remove the equipment and goods, the property of which will not be reverted to the Brazilian government. It also establishes the contractor's responsibility to repair and indemnify the damages resulting from their activities and to perform the environmental recovery acts determined the competent authorities.

The Influence of the TLO

The influence of foreign regulations in the rule-making process of the Pre-salt Law has also been exposed in the second chapter, which reports how the studies carried out by ANP, EPE and BNDES impacted the drafting of this Law.

The studies carried out by the ANP analyzed the regulation of Saudi Arabia, the US, Russia, and Venezuela. The ANP also made technical visits to Angola and Russia to examine the adoption of the PSCs.

The EPE focused its analysis on the E&P regulatory systems of ten HCs: Algeria, Angola, Azerbaijan, Kazakhstan, Colombia, Indonesia, Iran, Libya, Venezuela, and Norway.

In a study developed in 2008, the BNDES analyzed the regulatory experience of the countries of the Middle East and North Africa (MENA), Norway, the USA (Alaska), and Canada (Alberta). The following year, the BNDES carried out a second study in which they analyzed the regulatory options of some countries (USA, United Arab Emirates, Norway, Angola, Indonesia, Mexico, Saudi Arabia, Venezuela, Russia, and Nigeria) concerning some themes that integrate the regulation of the upstream sector. However, in this study, decommissioning was not dealt with in-depth, under the justification that, at the time, this issue did not assume great relevance in the short and medium term, and significant changes in its regulation were still expected.

Therefore, it is not possible to clearly identify the specific references used to draft the rules on decommissioning present in the Pre-salt Law.

3.4.4 ANP Decommissioning Resolutions

Regulations in the upstream sector are norms entirely dedicated to regulating an issue and generally detail the general rules in petroleum law. Bearing in mind that decommissioning activities occur only at the end of the field's life cycle, this is a topic that HG does not urgently address. Hammerson and Antonas (2016) report that this was the case in the US, which effectively established robust regulation only after the DeepWater Horizon accident in 2010.

Brazil started to regulate decommissioning in general only after the creation of the ANP. The first resolution related to this aspect was published in 2002 to guide the abandonment of wells drilled in the exploration and production phase. However, it was only in 2006

that the ANP published a specific rule for the decommissioning to be carried out at the end of the field's productive life, establishing rules, including on the requirement of guarantees. These rules have been updated periodically.

Currently, ANP Resolution no. 817 of 2020, which deals with decommissioning operation's technical aspects, is in effect. In this thesis, it will be called the ANP Decommissioning Resolution. Furthermore, the ANP is carrying out the rule-making process of a resolution to deal with decommissioning financial aspects. Thus, a new resolution will soon be published, which will be called the ANP Decommissioning Guarantees Resolution in this thesis. These two norms will be presented in the following sections.

ANP Decommissioning Resolution

The ANP, the IBAMA, and the Brazilian Navy drafted the ANP Decommissioning Resolution jointly in order to include in a single rule the provisions on decommissioning, ensuring legal certainty, regulatory simplification, and speed in the process. Thus, these three competent institutions for carrying out the analysis of decommissioning programs harmonized the procedural aspects (FGV, 2021).

The ANP has the competence to evaluate the suitability of the proposed project, the reservoir situation regarding the recovery rate, and the facilities inventory. IBAMA is responsible for ensuring that the project presented causes minor environmental impact and that mitigation measures for this impact are included in the project. The Brazilian Navy is responsible for inspecting the naval aspects for the floating units' safe removal and good mapping and signaling of equipment that will remain in situ. Thus, it can analyze if the remaining facilities may interfere with other uses of the marine space (FGV, 2021).

This Resolution introduces the term decommissioning into the Brazilian legal system, adopted internationally. Thus, it replaces the terms 'removal' and 'abandonment' adopted in the Petroleum and Pre-salt Laws and the Brazilian E&P contracts.

The ANP Decommissioning Resolution establishes the procedures for the planning and evaluation of decommissioning projects, which requires the submission of three documents:

The first is the 'Study of Justifications for the Decommissioning of Production Facilities', which should indicate the area to be relinquished and the characteristics of the reservoir, the wells, the facilities, and the motivation for the decision for decommissioning.

The second document is the 'Decommissioning of Facilities Program', containing the information, projects, and studies necessary for planning and executing the decommissioning. The Resolution establishes specific rules for activities in the exploration phase and the production phase. For this last phase, rules are defined for offshore installations, onshore facilities, and installations used in anticipated production systems.

The third document is the 'Facilities Decommissioning Report', which should report all activities performed during decommissioning.

This Resolution also approves the Technical Regulation for Decommissioning of Exploration and Production Facilities, which defines requirements and guidelines for decommissioning in areas under the E&P contract, including specific rules related to transfer of rights. Among the provisions contained in this Technical Regulation, the following stand out: the requirement of a risk analysis ninety days before the start of activities; the presentation of a plan for the adequate treatment of radioactive materials (NORM); for offshore installations, conducting a multicriteria analysis that analyzes the technical, environmental, social, security and economic aspects; and presentation of a monitoring plan. It also establishes conditions to maintain the integrity of the facilities while carrying out removal activities.

It is important to mention that the ANP Decommissioning Resolution requires that the company responsible for decommissioning has a social responsibility and sustainability management system that follows the industry practices and seeks to achieve the 17 United Nations Sustainable Development Goals. According to FGV (2021), this forecast reinforces the importance of contemplating sustainable development in the company's strategic planning and contributes to a legacy for society after petroleum exploitation.

The ANP Decommissioning Resolution also deals with the area relinquishment, the sale, and reversion of assets to the Brazilian government, the program for extending the useful life of mature fields, and the obligation of the contracted companies to keep all information about the facilities up to date (ANP, 2020).

The Influence of the TLO

According to the Joint Technical Note ANP / IBAMA / MARINHA n. 01/2019, written by these three institutions, discussions on the preparation of the ANP Decommissioning Resolution started in 2016, and involved national and international regulators, and representatives of academia, operators, and service companies (ANP et al., 2019).

In the presentation made by the ANP (2020) during the public hearing that discussed the draft resolution, the ANP reported that it used international standards such as the IMO Guidelines, the OSPAR Resolution, and UK regulation as references. It also noted that several meetings were held with IBP and some E&P companies individually. According to this presentation, fourteen manifestations from different actors were sent to the public audience. Between them, there were the Brazilian environmental regulator, the Brazilian Institute of Petroleum, Natural Gas and Biofuels (IBP), oil companies, law firms, consulting firms, and individuals.

Braga and Frota (2020) report that during the ANP Decommissioning Resolution rule-making process, some ANP regulators financed by the Prosperity Fund UK visited the British regulatory body, UK Oil & Gas Authority, to learn about the HC's strategies on decommissioning.

It is also possible to observe the direct influence of transnational rules on the ANP Decommissioning Resolution by incorporating these rules into the Resolution's own text. For example, the sole paragraph of Article 5 requires the contractor to have a social responsibility and sustainability management system during the decommissioning operation, comply with the industry practices and follow the 17 UN Sustainable Development Goals guidelines. This resolution also requires the observation of the ABNT NBR 10004/2004 standard in waste management.

ANP Decommissioning Guarantees Resolution

The ANP Decommissioning Guarantees Resolution draft is in the process of being prepared, aiming to regulate the obligation foreseen in the Brazilian E&P contracts, which requires the presentation of financial guarantees to ensure the execution of the decommissioning. Saad et al. (2020) note that this Resolution aims to improve the monitoring of contractual obligations related to decommissioning by the ANP, to mitigate the risks of the lack of financial resources to carry out this operation, and to reduce the

uncertainties regarding the financial capacity of the companies in charge decommissioning.

This Resolution provides five types of financial guarantees which the ANP may accept and set specific rules for submitting each one. The envisaged modalities are a letter of credit, guarantee insurance, pledge of oil and natural gas, corporate guarantee, and provisioning fund. Furthermore, the Resolution establishes the procedures required for the presentation and execution of these guarantees, providing deadlines, the possibility of submitting more than one type of guarantee, restrictions on the incidence of liens on the object of the guarantee, specific rules in cases where there is a consortium and unitization, and the procedures for executing the guarantees in case of default.

According to Saad et al. (2020), for the guarantee to be accepted, the ANP must analyze the convenience, observe the public interest, the proportionality, the company's reasons, and the risks of the guarantees presented in the analysis of its admissibility. If the company meets all requirements, the guarantee should be refused only on a motivating basis for reasons contrary to the public interest.

Of the modalities provided in this Resolution, the pledge of oil and natural gas deserves a little more attention, as it is a Brazilian innovation. The Resolution defines it as a type of financial guarantee whose objective is the production of a petroleum field located in the national territory. The company that owns the rights in this field presents the field production to the ANP to guarantee the decommissioning obligations of another field whose rights are also held by the same company.

Furthermore, there is the possibility of companies ensure decommissioning obligation by itself, provided that it presents financial capacity, demonstrated according to the criteria established in the Resolution.

This Resolution also regulates how the amount to be guaranteed must be updated annually. According to Saad et al. (2020), this value should be obtained from the cost of decommissioning informed in the most updated version of the following documents: Development Plan, Annual Work Program, Annual Bulletin of Resources and Reserves, or Facilities Deactivation Plan, provided that the ANP has approved these documents. When there are discrepancies concerning the amount, the ANP may arbitrate it considering the industry practices.

Regarding the presentation of the first financial guarantee, the expected value must be confirmed through certification, estimate in similar cases, or quotation of the cost of each activity that is part of the decommissioning operation. Saad et al. (2020) confirm that the ANP can request this procedure in the annual reviews of the values of the guarantees.

The ANP Decommissioning Guarantees Resolution proposes a dynamic model for providing financial guarantees, called the 'Progressive Contribution Model'. This Model must be adopted for the annual calculation of the amounts to be guaranteed. According to Saad et al. (2020), for calculating this model, the accumulated production and proven and probable reserves are considered, in addition to the estimated costs of decommissioning the field. The capital update is recalculated to the net present value from the performance of the field development activities. The amounts contributed are lower at the beginning of production and are higher near the end of the contract or when the reserves are exhausted. Thus, the costs are reduced at the beginning of the contract, and this value will increase as the activities are carried out and production grows. Saad et al. (2020) report that this model was built based on the UK and Colombia regulations. This model aims not to impact the investments to be made at the beginning of the field's productive life, balancing the protection against default with the investment incentive.

This Resolution also set rules on the presentation of guarantees during the transfer of rights process, aiming to protect the entire guaranteed system for decommissioning established from the beginning of the production. The incoming company may request a revision of the amount to be guaranteed, but it must present the guarantee within the transfer of rights process scope. The guarantee of the assignor company will be retained until the effective date of commencement of the addendum assignment term.

The Influence of the TLO

Although the ANP Decommissioning Guarantees Resolution is still in the process of being drafted, through the analysis of the information released so far (April 2021), it is already possible to point out examples of the influence of transnational rules in its rule-making process.

In a presentation made during a public hearing, the ANP (2020) informed that it had considered the subsidies submitted by the institutions which it had met while drafting the Resolution. The ANP held more than twenty-five meetings with the following

institutions: IBP, Brazilian Association of Independent Oil and Gas Producers (ABPIP), E&P Companies, Central Bank of Brazil, Brazilian Development Bank (BNDES), Brazilian Bar Association (OAB), National Federation of General Insurance (FENSEG) and the British Consulate. In one of these meetings, the consultancy IHS Markit, hired by the IBP, presented to the ANP in March of 2020 a comparative analysis on the regulation regarding guarantees for decommissioning costs adopted by the US, UK, and Norway.

According to Saad et al. (2020), the construction of the progressive contribution model provided for in the Resolution was based on the UK and Colombia models.

The proposed Resolution also expressly mentions industry practices, requiring that they be observed if the ANP should arbitrate the amount to be guaranteed when there is a disagreement.

3.4.5 Brazilian E&P Contracts: Risk Contract, Concession Agreement, Production Sharing Agreement, Transfer of Rights

Anderson et al. (2020) argue that E&P contracts are not the best instrument for regulating decommissioning. The obligations entered into at the time of signing the IPA will not reflect changes in government policy, in calculating reserves, or in the escalation of costs. Besides, participation may be assigned, new technologies will emerge, and other uses for depleted fields will be possible.

According to these authors, the first E&P contracts did not contain provisions on decommissioning activities, as they provided for the reversion of assets to HGs. Thus, the companies that operated the field transferred the obligation to carry out decommissioning to the HGs. The most recent E&P contracts generally address the issue in more detail than national laws. Examples of HG that bring rules on decommissioning in E&P contracts, within the scope of Hammerson and Antonas' (2016) research, are Indonesia, Malaysia, Norway, Denmark, and Brazil.

Before detailing the specificities of the decommissioning rules in the three types of E&P contracts adopted in Brazil, it is important to note that only the seventeenth round concession contract adopted the term decommissioning in some clauses. All other Brazilian E&P contracts reported in this subsection adopted the term abandonment, removal, and deactivation of facilities to refer to the decommissioning operation.

The following lines will detail the information obtained by analyzing the contractual models available on the ANP website dedicated to the Bidding Rounds (ANP, 2021).

Risk Contract

According to Adaulto Pereira[92] (2021), the Risk Agreement is silent regarding decommissioning. This is because Petrobras would assume complete control of production activities if there was a commercial discovery. So, this contract only provides for the reversal of the assets to Petrobras.

Concession Agreement

Unlike the contractual rules on unitization, the rules on decommissioning have undergone more changes over the concession contracts drafting evolution. From the round zero contract to the fifth round contract, modifications were made to each contract. According to Adaulto Pereira (2021), the concept of asset reversal was incorporated into the Round Zero Concession Contract, as the technicians who prepared this first draft had worked at Petrobras with the Risk Contracts.

The Round Zero Concession Contract required the Development Plan to include an abandonment plan and the provision of funds necessary to ensure this operation through guarantee mechanisms, reserve funds, or financing. According to this contract, any abandonment operations of area, wells, structures, fields, transfer lines, parts, or units of surface and subsurface installations should be carried out following the industry practices. Concerning socio-environmental issues during the decommissioning operation, the contract provided that the concessionaire would be obliged to preserve the environment, pay attention to the safety of people and animals, respect the historical and cultural heritage, to repair or indemnify the damages arising from its activities, and to practice the acts of environmental recovery determined by the competent institutions. In the event of damage and losses to the environment and third parties during the decommissioning operation, this contract determines the concessionaire's obligation to repair them and indemnify the Brazilian government. The guarantees for the decommissioning operation

[92] Interview granted by Adaulto Pereira, former employee of Petrobras, on 13/04/2021

were generally provided for in the insurance clause, even admitting self-insurance. However, there are not many details regarding the specific case of decommissioning.

The Facilities Deactivation Program began to be required from the First Round Contract. This contract requires the delivery of this Program, six months in advance, in cases of early closure during the production phase. The Second Round Contract extended this requirement to the conclusion of the production phase. The Third Round Contract detailed the ways of financing the decommissioning, specifying the guarantees that the ANP could accept. The Fourth Round Contract started to require the Facilities Deactivation Program for early closure of the exploration phase.

The contracts from the sixth round to the thirteenth round followed similar wording to the contract from the fifth round, with minor changes.

The Fourteenth Round Contract changed the submission deadline for the Facilities Deactivation Program to 365 days and dealt with the process of approving this program and returning the field in more detail. The fifteenth-round contract followed the same wording, with minor rearrangements.

The submission deadline for the Facilities Deactivation Program was extended to two years in the sixteenth round contract. The seventeenth round contract replicated almost all of the decommissioning rules of the sixteenth round contract. However, this concession contract was the first to adopt the term decommissioning in some of its clauses.

Therefore, it is possible to identify three phases of clauses on decommissioning in Brazilian concession contracts. The first, from Round Zero to the Fifth Round, in which the changes were constant; the second, from the Sixth Round to the Thirteenth Round, in which only changes in wording were made; and the third, from the Fourteenth Round to the Sixteenth Round, in which new changes were made, due to the studies resulting from the discussions to update the ANP Decommissioning Resolution.

Product Sharing Contract (PSC)

The PSCs follow the evolution demonstrated in the description of the concession contracts decommissioning rules. However, they contain specific clauses on the recovery of expenses spent on decommissioning activities, such as cost oil. The points of difference

relate to the deadline for submitting the facility deactivation program and the final facility deactivation report requirement. The PSC for the first round required 180 days to present the facility deactivation program. The PSCs for the second round up to the fifth round provided for 365 days for the presentation of this program. The sixth round contract extended this term to two years. The final report of the deactivation of the facilities is foreseen from the contract of the fourth round.

Transfer of Rights Contract

The transfer of rights contract rules on decommissioning has some similarity to the tenth round concession contract rules. However, it requires the submission of the facility deactivation program one year in advance of the estimated completion of production. This contract also provides specific rules for decommissioning if the production limit established in the contract is reached and production continues.

The Influence of the TLO

The second chapter reported, in general, how the first concession contracts were drafted, highlighting the role of consultants Expetro and Gaffney Cline in carrying out this task. In the concession contract first versions, the international experience of Expetro and Gaffney Cline technicians printed foreign regulations references from HGs where these technicians had worked.

Regarding the rules on decommissioning of the first-round contract, Cline (2020) informs that its drafting was based on the similar requirements present in the regulation of the UK and Norway for the operations carried out in the North Sea.

According to Guilherme Papaterra (2021)[93], the evolution of the clauses on decommissioning of the Zero Round Contract until the fifth round contract was motivated by intense debates that occurred between the ANP and the E&P companies and within ANP's technical departments. Nilce Costa (2021), ANP regulator who worked in the Production department in the first years of the ANP, adds that for the amendment of these first clauses on decommissioning, the UK regulation and American rules for decommissioning in the Gulf of Mexico were used as a reference. In addition, Costa

[93] Interview granted by Guilherme E. Z. Papaterra, regulator of the ANP, on 26/04/2021

recalls that the ANP had a very close relationship with the former Minerals Management Service (MMS) in its early years.

The rules on the decommissioning present in the transfer of rights and in production sharing contracts followed the evolution of the concession contract rules, being influenced by the suggestions arising from consultations and public hearings.

3.4.6 – The Influence of the TLO on the Interpretation and Enforcement of Brazilian Regulation for Offshore Regulation

Interpretation

The influence of transnational rules on the interpretation of the Brazilian regulatory system for offshore decommissioning can be seen in some offshore decommissioning operations already carried out in Brazil. Some examples reported by FGV (2021) will be exposed in this section.

In the decommissioning operation for the platform of the City of Rio de Janeiro, which was part of the facilities of the Espadarte Field, the DNV-GL code of conduct was used to carry out a comparative assessment of the decommissioning alternatives of the rigid stretch of the gas pipeline export of this platform. Thus, this code of conduct was used to interpret item 3.2 of the Decommissioning Technical Regulation contained in the ANP Decommissioning Resolution. Thus, this code of conduct was used to interpret item 3.2 of the Decommissioning Technical Regulation contained in the ANP Decommissioning Resolution, which requires a comparative assessment of the decommissioning alternatives.

Regarding recycling offshore installations, FGV reports that Estaleiro Atlântico Sul SA is adapting its procedures to carry out this decommissioning stage using Regulation (EU) N ° 1257/2013 of the Council of the European Parliament of 20 November 2013, as a reference, in addition to Brazilian standards. In this way, Estaleiro Atlântico Sul SA interprets the Resolution's requirement for waste management to be carried out in an environmentally appropriate manner.

Enforcement

Although the offshore decommissioning processes are recent in Brazil, it is already possible to observe examples of the influence of transnational rules in enforcing Brazilian regulation in ongoing operations.

Through the analysis of Official Letter no. 237/2021 / SSM / ANP-RJ-e, it is observed that the regulator requires the operator to follow the industry practices when carrying out the pipeline removal step in the Ubarana Field. This Letter cites as examples of industry practices Section 14 of ISO 19901-9: 2019 and item 12.4.3.5 of ISO 19902: 2020.

The Board of the ANP, in recent decisions, has demanded that the E&P companies, signatories of E&P contracts, provide decommissioning guarantees using a progressive contribution model. As the resolution providing for this model has not yet been published, its adoption is based on the influence of the UK and Colombian regulation. The Board Resolutions no. 538/2020; 587/2020, and 602/2020 are examples of these decisions.

3.4.7 Transnational Rules Relevant to the Brazilian Regulatory System for Offshore Decommissioning

According to the examples mentioned in this section, it is possible to affirm that the Brazilian regulatory system for offshore decommissioning is influenced by the following categories of transnational rules: the regulation of other producing countries - laws, regulations, and E&P contracts; Industry practices related to offshore decommissioning, and codes of conduct, especially the ones created by IGOs. Therefore, the following section will describe these transnational rules in the context of their adoption in the Brazilian regulatory system for offshore decommissioning.

Foreign Regulation

Foreign regulation is the main category of transnational rule that influences the Brazilian regulatory system for offshore decommissioning. The Petroleum Law and the first concession contracts adopted foreign regulations from the consultants Expetro and Gaffney Cline, contracted by MME and ANP, respectively, to draft the final version of these norms. Public actors- ANP, BNDES, and EPE -promoted the Pre-salt Law and the first PSC. Technical visits were also made to regulatory bodies in Angola and Russia. Regarding the ANP's resolutions on decommissioning, the UK, Norway, the US, and

Colombia regulations were used as a reference, and were accessed by the ANP directly through research and indirectly through the IHS Markit consultancy hired by the IBP. The ANP also visited the British regulatory body, UK Oil & Gas Authority, to learn about this country's procedure for decommissioning.

It is also possible to point out the influence of foreign regulation in the decisions of the ANP Board of Directors, which based its demands on guarantee of decommissioning in the regulation of the UK and Colombia, as verified in the Board Resolutions no. 538/2020; 587/2020 and 602/2020. And in the interpretation made by Estaleiro Atlântico Sul SA about the requirement of the ANP Decommissioning Resolution on waste management. This company adopted Regulation (EU) N ° 1257/2013 of the Council of the European Parliament of 20 November 2013 as a reference to carry out with the disposal waste.

Industry Practices

Unlike the regulation of unitization, the decommissioning regulatory system has the direct incorporation of some industry practices, such as the reference to the ABNT NBR 10004/2004 practice in the ANP Decommissioning Resolution and to the standards of ISO 19901- 9: 2019 and ISO 19902: 2020 in Official Letter no. 237/2021 / SSM / ANP-RJ-e.

In addition, all categories of the legislative framework of decommissioning regulation expressly require that industry practices be observed in general.

Codes of conduct

It is possible to note the influence of codes of conduct on decommissioning regulation, especially in the ANP Decommissioning Resolution rule-making process. As stated by Costa (2020), this Resolution was drafted considering the IMO Guidelines. This Resolution still makes express reference to the UN 17 Sustainable Development Goals.

It is also possible to note the evident influence of the DNV-GL codes of conduct in the interpretation on the requirement of comparative assessment of the decommissioning alternatives, carried out by Petrobras in the decommissioning operation of the platform

of the City of Rio de Janeiro, which was part of the facilities of the Espadarte Field (FGV, 2021).

3.5 The Governance Model for the Brazilian Regulatory System for Offshore Decommissioning

The previous section presented the Brazilian regulatory system for offshore decommissioning. It confirmed how transnational rules touch this system in the rule-making, interpretation, and enforcement process.

This section will describe the governance model adopted by the Brazilian State concerning the regulation of offshore decommissioning, according to the methodology of Abbott and Snidal (2009). It will examine whether this model is adequate for dealing with the influence that transnational rules have on this system. Finally, adaptations to improve the governance model will also be proposed with the suggestion that the Brazilian state act as an orchestrator of the Brazilian regulatory system for offshore decommissioning.

3.5.1 The Governance Model Adopted by the Brazilian State for the Regulatory System for the Offshore Decommissioning Rule-making Process

This subsection analyzes the governance model adopted by the Brazilian State for the regulatory system for the offshore decommissioning rule-making processes, based on the four criteria indicated by Abbott and Snidal (2009), namely: i) the position of the state in the regulatory rule-making process; ii) the level of centralization of the regulatory authority; iii) the type of expertise on which the rule-making process is based; iv) the form of the established rules.

3.5.1.1 The Position of the State in the Regulatory Rule-making Process

The analysis of the State's position in the rule-making process of the Brazilian regulatory system for offshore decommissioning will be carried out considering the same rules presented in the previous section.

As already mentioned, the first rules on offshore decommissioning to compose the Brazilian regulatory system came from the London Dumping Convention and UNCLOS

international conventions. Thus, until the advent of the Petroleum Law, IGOs were the main actors in the rule-making process of the Brazilian regulatory system for offshore decommissioning. However, incorporating these rules into the Brazilian national legal order depended on the ratification of the Brazilian State, placing it in the central position to grant validity to these rules.

The drafting of the Petroleum Law was coordinated by the Ministry of Mines and Energy, aided by Petrobras and Expetro. The final text, as reported by Prates (2020), was prepared by the consultancy Expetro.

The Pre-salt Law was also drafted under the coordination of the MME, with the participation of the Civil House, the Ministries of Development, Industry, and Foreign Trade; of Finance; of Planning, Budget, and Management; the BNDES; the ANP, and the Petrobras. These actors were appointed to compose the working group instituted by Federal Decree 11,699, of 17 June 2008. In addition, as reported in the second chapter, private actors such as the IBP and representatives of companies, universities, and specialized law firms made contributions during the rule-making process of this Law.

Regarding the rule-making process of ANP Decommissioning Resolution, three state agents - ANP, IBAMA, and the Navy - conducted this process, including the participation of private agents through discussions at specific meetings and events. The ANP Decommissioning Guarantees Resolution also counted on the involvement of several non-state agents during the rule-making process. However, this process was coordinated exclusively by the ANP.

As explained in the second chapter, the drafting of the first concession contracts was carried out by consultants Expetro and Gaffney Cline, despite the process being coordinated by the MME and the ANP. Other non-state actors also participated in constructing these contracts through discussions in meetings, legal-fiscal seminars, and public hearings.

The first production sharing contract was also drawn up under the coordination of the ANP but had the active participation of Petrobras. In addition, non-state actors could present their suggestions for drafting this contract through the legal-fiscal seminar and public hearings.

In general, it can be said that the first rules of the regulatory system for offshore decommissioning were the international conventions, developed by the IGOs, which were

at the center of the rule-making process. In a second moment, when the Brazilian State published specific rules for offshore decommissioning, the State was at the forefront, assuming the governance model close to the National Old Governance. However, all rules mentioned in the lines above refer to industry practices. These, as evidenced in the previous section, complement national regulation. However, the Brazilian State does not actively participate in the rule-making process of these rules.

3.5.1.2 The Level of Centralization of the Regulatory Authority

In aiming to analyze the level of centralization of the regulatory authority, it is important to divide the Brazilian regulatory system into two phases. In the first phase, before the publication of the Petroleum Law, the rules on offshore decommissioning were issued exclusively by the IGOs. As such, these institutions centralized the regulatory authority, as in the International Old Governance model. In the second phase, which started with the drafting of the Petroleum Law, the Brazilian State began to centralize regulatory authority through the MME and the ANP. The constant participation of non-state actors characterizes this second phase, however, always under the coordination of a state actor, in a hybrid governance model with similarities to the National Old Governance and the New Governance models.

Thus, it is possible to say that in the first phase, the regulatory authority centralization in the rule-making process related to offshore decommissioning was closer to the model of Old International Governance. However, in the second phase, due to the participation of consultancies in the drafting of the Petroleum Law and the first Brazilian E&P contracts and the intense involvement of private agents in the construction of resolutions, the level of centralization of the regulatory authority was among the models of Old Governance and New Governance.

Concerning the transnational rules that touch the Brazilian regulatory system mentioned in the previous section, such as the ISO standards, the DNV-GL code of conduct, the Brazilian state does not participate in the discussions to elaborate these norms.

3.5.1.3 The Type of expertise on which the rule-making process is based

In the regulatory system for offshore decommissioning, the expertise is dispersed, coming from IGOs, state bureaucrats, and private actors, similar to the New Governance model.

International conventions were drawn up based on the expertise of the IGO bureaucrats who promoted them and the state bureaucrats who represented the member states. The rule-making process of Petroleum Law and the first concession contracts relied on the expertise of the technicians of the consultants Expetro and Gaffney Cline. Despite being drafted while relying on the expertise of state actors, Pre-salt Law also relied on the expertise of private actors who presented technical subsidies at meetings, seminars, and public hearings. ANP resolutions were also drawn up after several meetings with private actors. Thus, these resolutions' rule-making process relied on state bureaucrats' expertise and experts from private institutions.

3.5.1.4 The Form of The Established Rules

The regulatory system for offshore decommissioning consists of legally binding and mandatory rules, such as the rules provided for in laws, resolutions, and contracts, and also flexible norms and procedures, such as the IMO Guidelines, ISO standards, DNV-GL codes of conduct.

Unlike regulation for unitization, offshore decommissioning requires more flexible rules that follow the evolution of the techniques available for this operation, such as ISO, NORSOK, and API standards. Nor can it precede the soft law that emanates from IGOs, such as the IMO Guidelines, given that offshore decommissioning involves issues of international interest, such as fishing and navigation.

Thus, in this respect, the governance of the Brazilian state concerning the regulatory system for offshore decommissioning is close to the New Governance model.

3.5.1.5 The Governance of the Brazilian Regulatory System for Offshore Decommissioning

When analyzing the Brazilian regulatory system for offshore decommissioning, considering the four aspects that define the governance models proposed by Abbott and Snidal (2009), it is not possible to point out a single model to determine the type of governance adopted by the Brazilian state.

In the phase that preceded the launch of the Petroleum Law, the governance of the regulatory system on the offshore decommissioning rule-making process was carried out exclusively by the IGOs, who were responsible for drafting the international conventions on this topic. As the offshore decommissioning operations were expected to occur in the long term, the Brazilian State was not concerned with publishing specific rules on this topic. Thus, the governance model adopted at this stage was very close to the ideal model of Old International Governance.

After the publication of the Petroleum Law, the Brazilian state began to issue binding rules on offshore decommissioning, while complying with both the international conventions to which it was a signatory and the IMO Guidelines. As reported above, even the OSPAR convention, to which Brazil is not a signatory, influenced the rule-making process of the Brazilian regulatory system. In addition, according to the examples presented, the influence that transnational rules had on the rule-making process of this system is evident, especially those arising from foreign regulations. It can even be said that the transnational rules complement the regulation, as verified in the Official Letter no. 237/2021 / SSM / ANP-RJ-e, in which the ANP requested the observation of the standards of ISO 19901-9: 2019 and item 12.4.3.5 of ISO 19902: 2020 in the removal of pipelines in Campo de Ubarana.

Thus, it is possible to say that the governance model adopted by the Brazilian state for the rule-making process of the offshore decommissioning regulatory system has similarities with the ideal models of International Old Governance, National Old Governance, and New Governance. However, despite the similarities with the New Governance model, the Brazilian state does not exercise the role of orchestrator, as proposed by Abbott and Snidal (2009). According to these authors, the State can encourage and facilitate the cooperation of private actors in the national rule-making process through several directive and facilitative orchestration techniques. Thus, the State would encourage self-regulation and performance improvement, establish regulatory goals, select best practices, and train actors.

As already mentioned in the second chapter, it cannot be said that orchestration is the best option for improving the State's role concerning the integration of private actors in the regulatory system for offshore decommissioning and better use of transnational rules in this system. It would be necessary to carry out specific research on governance to confirm that orchestration is the best option, but that is not the subject of this thesis.

Thus, the following section will propose, as a suggestion, how the performance of the Brazilian state as an orchestrator could contribute to perfecting Brazilian regulation for offshore decommissioning.

3.5.2 Options for Orchestration Actions to be Implemented by the Brazilian State

Considering governance as a process that coordinates state and non-state actors that seek to achieve a common goal (Ost and Kerchove, 2002) through a political arrangement external to a state's administrative system, that impacts, regionally and globally, the actors involved (Joerges, 2004), this subsection will analyze how a model similar to that of New Governance can contribute to minimizing the challenges present in the Brazilian regulatory system for offshore decommissioning. Based on the analysis of the main transnational rules adopted by the Brazilian regulatory system for offshore decommissioning, directive and facilitative orchestration actions will be proposed from the perspective of Abbott and Snidal (2009).

3.5.2.1 Offshore Decommissioning Challenges in the Brazilian Regulatory System

Before presenting orchestration options for the Brazilian State, it is necessary to recall the challenges encountered in regulating offshore decommissioning, analyzing how they present themselves in Brazil.

Financial

In Brazil, one of the biggest challenges about offshore decommissioning is the search for balance between the requirement of guarantees that ensure the performance of operation, which burdens the operations, and the incentive policies for extending the offshore fields' productive life. Continuity of operations is not always feasible at the end of the field's productive life, considering that marginal production becomes uninteresting for large companies. In addition, the value to guarantee and perform decommissioning is often below the capacity of a small and medium company interested in continuing operations.

According to FGV (2021), in order to encourage the extension of a mature fields' productive life, Brazilian companies that operate these fields should: reduce the value of the decommissioning guarantees; review the value of the decommissioning agreed

between the ANP; and the previous operator, and leave the facilities on the seabed as an environmentally sustainable and economically cheaper alternative. These suggestions contrast with the objective of ensuring that the high costs of decommissioning do not fall on the Brazilian state, as defended by the ANP (2020) at the hearing that discussed the resolution on decommissioning guarantees, as well as with the provision expressed in the ANP Decommissioning Resolution that the decommissioning operations are carried out in line with the 17 Sustainable Development Goals proposed by the UN.

Technical

In Brazil, one of the leading technical challenges is to increase the recovery factor of mature offshore fields to extend their useful life since the Brazilian percentage of 21% is well below the global average of 23%.

Another challenge concerns the adequacy of Brazilian shipyards to receive facilities removed from the sea. Costa (2021) reports that Brazil does not yet have a shipyard prepared to carry out this part of the decommissioning operation. FGV (2021) warns that it is necessary that the shipyards also present solutions to receive installations with coral-sol and NORM.

Environmental

As already explained in this chapter, whichever option is chosen to carry out offshore decommissioning, completely removing the facilities or leaving them partially or totally in situ, the environment will be impacted.

In Brazil, the sun coral in offshore installations is considered a challenge because it is an invasive species that competes for nutrients and harms the development of the native species with which they compete. In addition, sun coral spreads easily and quickly, so it can compromise the balance of the Brazilian ecosystem. Brazilian regulatory bodies and research centers study the best way to deal with sun coral (FGV, 2021). Costa (2021) informs that the IMO has guidelines on biofouling, which means the accumulation of various aquatic organisms on ships 'hulls. According to Costa, IMO will involve Brazilian experts in biofouling research to discuss sun coral.

Concerning NORMs, radioactive material that accumulates in structures during the productive life of the field, mainly in production risers, as well as in storage tanks and

production plants, the challenge is presented by the fact that Brazil does not yet have rules on the proper destination and storage of this material. Bearing in mind that these materials have an estimated life span of 16,000 years, finding a solution to enable their safe disposal is necessary.

Social

In Brazil, as the experience with offshore decommissioning operations is still recent, the social challenges have yet to be defined. However, as previously reported, the decommissioning of Cação Offshore Field showed how this operation could impact the community close to this field. Like Costa reports (2021), fishermen who carry out fishing activities in the surroundings of Cação Offshore Field took a stand against the already approved decommissioning plan, which provided for the total removal of facilities. They claimed that the facility had already become an artificial reef, which contribute to fishing. Fishermen also claimed recreational diving in this artificial coral could be a new activity to develop.

The Brazilian State must be aware of reconciling the interests of representatives of communities close to the facilities to be decommissioned with the interests of companies holding E&P rights over the field and also the public interest.

Regulatory

Regarding the regulatory challenges, Costa (2021) reports the regulatory gap regarding some aspects such as the management of sun coral in the installations, the destination of the radioactive material, the requirements for adapting the shipyards to the demands of decommissioning.

Another problem is the updating of national rules on offshore decommissioning. According to Costa (2020), the need to change the ANP Decommissioning Resolution, published in 2020, has already been acknowledged with regards to improving some procedures and the wording. However, as the procedure for the publication of a resolution by the ANP requires several actions, the amendment to this Resolution will not be so soon.

Another major challenge is the publication of the resolution proposed by the ANP on guarantees for decommissioning, converging the interests of the Brazilian State that wants to protect itself against default concerning this operation and the interests of companies that do not want the exploitation of offshore fields to be significantly burdened.

3.5.2.2 The Role of Orchestrator

According to Abbott and Snidal (2009), through directive and facilitative orchestration techniques, the State could support and guide networks formed by public and private actors, encouraging and facilitating collaboration between them in order to face these challenges. In addition, the State could promote self-regulation, actions for professional training of private actors, and disseminate successful experiences. The State could also negotiate regulatory targets and encourage companies to seek to overcome mandatory performance levels.

The following lines will present proposals for the Brazilian State or IGOs to act as orchestrators of the regulatory system for offshore decommissioning, considering the challenges reported and the influence of transnational rules on Brazilian regulation. Thus, the Brazilian State or IGOs will be able to coordinate public and private actors in actions that seek appropriate regulatory solutions that promote the development of transnational rules and their adoption in a more effective way.

Directive Orchestration

The Brazilian State

Facilitative orchestration could be promoted by the Brazilian State represented by the ANP in a model similar to the New Governance. Thus, the ANP would remain in a relevant position to coordinate and encourage other public actors, E&P companies, the scientific community, NGOs, and other non-state actors in the rule-making process of the regulatory system for offshore decommissioning.

According to Abbott and Snidal's methodology, the following techniques could be carried out by Brazilian State in order to promote the directive orchestration: i) granting benefits

to companies that adopt specific transnational rules; ii) incorporating the best transnational rules in the national regulation; iii) requiring that Brazilian NOCs adopt specific transnational rules on their international operations; iv) giving points in the bidding processes.

Regarding the granting of benefits, Hammerson and Antonas (2016) cite the example of the UK, which adopts a specific tax incentive policy for decommissioning activities. Following this example, the Brazilian state could promote directive orchestration by offering tax incentives to companies that carry out offshore decommissioning operations. However, these incentives should be conditioned to adopt transnational rules related to safety and environmental protection. FGV (2021) suggests that the Brazilian State grants incentives for decommissioning operations, such as reducing taxes or allowing the use of research and development funds to finance these operations.

As demonstrated in the previous section, the Brazilian State has already incorporated transnational rules into its regulation. The ANP Decommissioning Resolution expressly cites the 17 UN Sustainable Development Goals as guidelines and determines that the ABNT NBR 10004/2004 standard is observed in waste management. Furthermore, reference is made to the industry's best practices in all categories of the legislative framework.

As already stated in the second chapter, the imposition of transnational rules on Petrobras, the Brazilian NOC, would not be possible since Petrobras is an open market traded company governed by private law. Furthermore, concerning PPSA, another Brazilian NOC, this company will not assume the risks and will not be responsible for the costs and investments related to the decommissioning activities according to Pre-salt Law.

Regarding the granting of points in bidding processes, this action would help select companies to carry out the E&P activities that already operate following transnational rules previously selected by the Brazilian State. According to Abbot and Snidal (2009), this practice is currently widely adopted to promote sustainable practices through “green public procurement”.

However, it is important to highlight that to grant benefits conditioned to the adoption of transnational rules and, still, to replicate such rules in its regulatory framework, the Brazilian State must present a vast knowledge about the transnational rules applicable to offshore decommissioning operations.

IGOs or Producing States Network

As previously reported, the UN and its specialized agency - IMO - have a prominent role in the regulatory system for offshore decommissioning. Through conventions and guidelines, these IGOs are able to promote directive orchestration by requiring member countries that ratify these standards to observe transnational rules. UNCLOS and the IMO Guidelines, for example, require that the generally accepted international standards be observed.

The options for directive orchestration by IGOs proposed by Abbott and Snidal (2009), such as the conception of benefits in the procurement process or imposing conditions for granting loans, cannot be considered since the IGOs cited do not hire E&P companies and are not focused on the granting of loans.

Another option for directive orchestration to be performed by multiple producing states would be through informal networks, such as the International Regulator's Forum (IRF), dedicated to the global offshore safety issue. Supposing a forum like IRF that would deal exclusively with offshore decommissioning, producing states, including Brazil, could analyze the transnational rules that would apply to this operation and contribute to a more adequate regulation. In addition, in these forums, countries could exchange regulatory experiences, create guidelines, and periodically monitor the emergence of new transnational rules. FGV (2021), for example, suggests that the Brazilian State should approach the English regulator for the exchange of regulatory experiences on offshore decommissioning.

Facilitative Orchestration

The Brazilian State

According to Abbott and Snidal, facilitative orchestration can be performed using the following techniques: i) providing material support for the RSS schemes; ii) bringing together the various non-state actors that participate in the rule-making process of transnational rules to encourage them to create new rules; iii) sharing information on regulatory issues and helping spread knowledge.

As previously reported, foreign regulation is the main category of transnational rules that influence offshore decommissioning in the Brazilian regulatory system. Following this category of rules are industry practices and codes of conduct produced by industry

associations and E&P companies. For the actors that promote these transnational rules, financial support would not be necessary. However, when observing the participation of non-state actors in the rule-making process of the Brazilian regulatory system for offshore decommissioning, there is a lack of presence of civil society representatives, such as fishermen's associations or NGOs dedicated to tourism environmental causes. Thus, material support to these less-favored actors could help to increase the plurality of actors in the rule-making process of transnational rules related to offshore decommissioning.

To promote the second technique of facilitative orchestration, the Brazilian State can organize forums and workshops to bring together non-state actors who participate in the rule-making process for offshore decommissioning (e.g., ISO, API, DNV-GL, BIMCO). Thus, it would be possible to discuss the current transnational rules, point out the best practices, and present demands to encourage new rules created in line with the public interest. It is important to emphasize that some actions in this regard have already been taken. The ANP promoted some workshops to discuss the regulation of decommissioning in general, where private actors can expose transnational rules. Furthermore, the ANP participates in forums that indirectly debate the regulation of decommissioning.

In this way, FGV (2021) suggests that the Brazilian State help to promote collaboration between the main players in the industry through partnerships that allow sharing of knowledge, equipment, and successful solutions. In the view of this institution, the broad technical partnership in an environment of collaboration and integration of public and private actors throughout the decommissioning process, including the monitoring after this activity, would help overcome the challenges encountered in developing this operation.

Concerning the third technique, sharing information on regulatory issues and helping spread knowledge, FGV (2021) also suggests that the Brazilian State promote technical events to exchange experiences and discussions on the planning and execution of offshore decommissioning projects. The sharing of knowledge and solutions by those involved in offshore decommissioning would promote increasingly efficient and safe projects and favor the adoption of new technologies, research, and innovation. Thus, according to FGV, these events would assist the adaptation of Brazilian regulation to internationally recognized technical standards for offshore decommissioning and could serve to train service companies' employees, focusing on operational and environmental safety.

IGOs or Producing States Network

In the understanding of Abbott and Snidal (2009), the facilitative orchestration can be performed by IGOs or Producing States Network through techniques such as: i) publication of transnational rules to be used as a reference by RSS schemes; ii) meeting of states and private agents in the development of an RSS scheme; iii) promoting learning forums to discuss the best references among actors engaged in a given sector, iv) granting of support material; v) production of knowledge.

The IMO already performs facilitative orchestration concerning the offshore decommissioning regulatory system rule-making process. This IGO launches guidelines and publications suggesting practices to be adopted in this operation, promotes conferences and meetings, and offers technical cooperation for implementing its practices. In addition, the IMO is a knowledge production and training center for offshore decommissioning, especially for regulators.

The IRF is another example of a producing states network, which also conducts facilitative orchestration by bringing together petroleum regulators to discuss offshore safety, including offshore decommissioning. In addition, this forum discusses the best references to be adopted by regulators.

However, there is still room for other regulatory schemes that create spheres of debate between regulators and private agents, which discuss existing practices, elect the best, and present proposals for improvement. So far, it is not possible to identify RSS schemes that bring together representatives from industry, academia, civil society, and regulators.

RSS schemes with this plurality could develop codes of conduct to compile the industry's best practices regarding the planning and execution of the offshore decommissioning operation, as suggested by FGV (2021). Furthermore, these RSS schemes, in FGV's opinion, could identify successful experiences, which, if replicated, could facilitate the planning and approval of future projects, also contributing to increasing predictability for service providers.

FGV also signals the need for contract models for decommissioning operations. However, contrary to unitization, there are not many options available specifically for offshore decommissioning operations. Thus, RSS schemes could dedicate themselves to elaborating this transnational rule contributing to greater efficiency in contractual negotiations.

Either the IMO or the Brazilian State could encourage the creation of these RSS schemes. Nevertheless, it would be necessary for the Brazilian State to dedicate specific resources to promote such orchestration actions.

3.6 Chapter Conclusion

This chapter proposed a TLO for the offshore decommissioning regulatory system, identifying the international and transnational rules that integrate this system alongside the national rules. By analyzing the Brazilian regulatory system for offshore decommissioning, it was possible to demonstrate how the TLO interacts with the Brazilian national order. Examples were presented of how the international and transnational rules contained in the TLO influenced the Brazilian regulation's rule-making process and how this order influences the interpretation and enforcement of this regulation.

When analyzing how the TLO affects the Brazilian regulatory system, it is possible to affirm that the Brazilian State remains in the central position of the rule-making process of this system. However, it consciously incorporates international and transnational rules in its legal order. The Brazilian state still participates in an incipient way in the process of drafting transnational rules. Thus, it is possible to affirm that the governance model adopted by the Brazilian state is a hybrid model, which presents characteristics of the Old National Governance, Old International Governance, and New Governance models. It is important to emphasize, however, that the Brazilian state does not carry out orchestration actions.

Thus, this chapter also proposes, as suggestions, orchestration actions that the Brazilian State could carry out in order to improve governance concerning the interaction between the transnational, international, and national orders. As already highlighted in the second chapter, from the research carried out in this thesis, it is not possible to affirm that orchestration would be the best option to improve governance since an in-depth analysis of governance has not been carried out. The objective of this chapter was to demonstrate how the TLO influences the Brazilian regulatory system for offshore decommissioning. Thus, further studies on governance are suggested for future research.

CONCLUSION

In the words of Weaver (2017), "*good regulation is the industry's best friend*." In other words, appropriate regulation is essential to ensure a balance between protecting the public interest and attracting investment. When dealing with transnational sectors, such as the petroleum industry, regulation assumes a higher level of complexity, composed of rules elaborated by a plurality of actors, including state and non-state actors.

Considering that there is still a controversy concerning the legal treatment given to rules elaborated by non-state actors, this thesis aimed to analyze how these rules, called transnational rules in this thesis, interact with the national legal order. Halliday and Shaffer's (2015) methodology was adopted to conduct this analysis. It suggests that national, international, and transnational rules compose a single order, named by these authors as the Transnational Legal Order (TLO).

Thus, this thesis presented the upstream sector of the petroleum industry regulatory system as a TLO, detailing the different rules that make up this order. From this theoretical construction, two regulatory systems that are part of the TLO of the upstream sector of the petroleum industry were analyzed as case studies. They are: the Brazilian regulatory system for unitization and the Brazilian regulatory system for offshore decommissioning.

From the analysis of these two case studies, it was possible to demonstrate the presence of transnational rules in both systems. It was also possible to point out how the different rules interact within the two analyzed systems. Examples showed how international and transnational rules influenced the rule-making process, interpretation, and enforcement of national rules that make up the two regulatory systems analyzed.

However, the confirmation of the presence of transnational rules in the analyzed regulatory systems brought up another question: would the Brazilian state adopt an adequate governance model to best deal with transnational rules? This thesis used the methodology of Abbott and Snidal (2009) to answer this question, aiming to assess the type of governance adopted by the Brazilian state in regulatory systems for unitization and offshore decommissioning.

It was concluded that, in general, the governance model adopted by the Brazilian state is not the most adequate to deal with the presence of transnational rules in this system. For

the Brazilian regulatory system for unitization, the actions taken by the state to engage public and private actors in regulatory activity are still very incipient. Generally, this participation takes place through consultative meetings and at times of consultation and public hearing. Regarding the Brazilian regulatory system for decommissioning, although the state has more knowledge about the transnational rules that make up this system and participates in discussion forums and workshops on these rules, the state is not involved in the rule-making process of transnational rules. State actions to increase the participation of private actors in the rule-making process for regulating this system are also minimal.

Table 6 summarizes the comparison between the results obtained from the analysis of the two case studies carried out in this thesis.

Initially, Table 6 shows how the TLO is structured for each regulatory system analyzed from a general perspective of the upstream sector of the petroleum industry. Thus, the categories of rules commonly adopted by producing states in their regulations for unitization and offshore decommissioning are mentioned. Then, the types of transnational rules present in each of these regulatory systems are specified.

In a more restricted analysis for the Brazilian regulatory system, Table 6 shows which rules, external to the national legal order, influence unitization and offshore decommissioning regulation. From the analysis of the unitization case, it can be concluded that the Brazilian regulatory system was influenced by foreign regulations, model contracts, and petroleum industry practices. Concerning offshore decommissioning, the analysis carried out in this thesis showed that in Brazil, the construction of this regulatory system was influenced by international rules, foreign regulation, petroleum industry practices, and codes of conduct.

Thus, it can be seen from the analysis of the two case studies that transnational rules affect the Brazilian regulatory system. However, the type of transnational rules differs for each of the Brazilian regulatory systems analyzed.

Table 6 also presents, comparatively, the analysis of the governance model adopted by the Brazilian state for unitization and offshore decommissioning regulatory systems, considering the criteria defined in the methodology of Abbott and Snidal (2009).

For unitization, the governance model adopted by the Brazilian state is close to the ideal model of Old National Governance. This conclusion was reached by analyzing the criteria

shown in Table 6. As seen in the Table, in the Brazilian regulatory system for unitization, the state occupies the rule-making process's central position and centralizes the regulatory authority. The rules take the form of legally binding and mandatory rules. Furthermore, the Brazilian state does not carry out orchestration actions. However, for the elaboration of this system, in addition to the bureaucratic expertise of regulators, the state draws on the expertise of private actors, such as oil companies, consulting companies, and professional associations. Thus, there is a slight similarity with the New Governance model.

Regarding offshore decommissioning, the governance model adopted by the Brazilian state is currently among the ideal models of Old National Governance and New Governance. This conclusion is based on the analysis of the criteria presented in Table 6, which indicates that the Brazilian state occupies the central position in the rule-making process of this system, despite the relevance that the rules elaborated by non-state actors are represented in this system. Thus, the state continues to centralize regulatory authority but with less force than in the case of unitization. The expertise used to build this system comes from various actors, including state bureaucrats, IGO experts, companies, and professional and standard-setting associations. Additionally, because it is a system more permeable to transnational rules as well as to legally binding and mandatory rules, flexible norms and procedures are part of this system. It is possible to say that the Brazilian state, albeit in an incipient way, assumes the role of orchestrator when it promotes workshops to debate the regulation of decommissioning with private actors and when it participates in forums that discuss this topic.

However, when the first rules of this system emerged, the governance model was very close to the ideal model of the Old International Governance. In the initial moment of creating this regulatory system, the IGOs occupied the central position of the rule-making process, also centralized the regulatory authority. In this period, the expertise on the rule-making process was based on the IGOs bureaucrats, and the rules were predominantly international conventions and recommendations, therefore soft law, until they were internalized in the national legal order.

Thus, by analyzing the two Brazilian regulatory systems, it can be seen that, despite the differences between them, the governance exercised by the state over the rule-making process remains based on state power, with similarities to the ideal model of Old National Governance.

Table 6 – Comparison between the Case Studies Analyzed

COMPARISON CRITERIA	CASE STUDIES	
	UNITIZATION	OFFSHORE DECOMMISSIONING
OVERVIEW OF THE REGULATORY SYSTEM FOR THE UPSTREAM		
TLO Structure	National rules are predominant in this regulatory system and are already consolidated. Transnational rules are limited but are adopted worldwide in the unitization process. There are some international rules, but these apply to specific cases of unitization (cross-border or offshore unitization in maritime waters)	International rules were the first rules of the regulatory system for offshore decommissioning. Transnational rules are numerous and issued by a plurality of actors. National rules are more recent. Producer countries are beginning to structure the regulatory framework for this operation.
Transnational Rules Adopted in the TLO of the Upstream Sector	Model Contracts; Petroleum Industry Practices; Foreign Regulations	Model Contracts; Petroleum Industry Practices; Codes of conduct; Risk Allocation Contracts Foreign Regulations
ANALYSIS OF THE BRAZILIAN REGULATORY SYSTEM		
Rules that Influence the Brazilian Regulatory System	Foreign Regulation; Model Contracts; Petroleum Industry Practices	International Rules Foreign Regulation; Petroleum Industry Practices; Codes of Conduct;
Position of the State in the Regulatory Rule-making Process	The Brazilian state occupies the central position, as in the Old Governance model	At first, IGOs were at the center of the rule-making process, as in the Old International Governance model. Then, the Brazilian state was at the forefront but under the influence of transnational rules, keeping similarities with Old and New Governance models
Level of Centralization of the Regulatory Authority	Closer to the ideal level model of Old Governance	In the first moment, it was among the Old International Governance model. In the second moment, it was among the models of Old Governance and New Governance
Type of Expertise on which the Rule-	Bureaucratic expertise but also accounts with limited private actors' expertise	Expertise dispersed, coming from IGOs and state bureaucrats, and

making Process is Based		private actors, similar to the New Governance model.
Form of the established rules	Legally binding and mandatory rule, basically	Legally binding and mandatory rules, and also flexible norms and procedures
Governance Model Adopted in the Brazilian Regulatory System	Closer to the ideal model of Old Governance, with some aspects of New Governance	It's hybrid. It has similarities with the ideal models of International Old Governance, National Old Governance, and New Governance.
Brazilian State's Role of Orchestrator	Rarely plays the role of orchestrator	Perform some facilitating orchestration actions

Although this thesis does not propose an in-depth study on governance, from the information collected, it is possible to conclude that the Brazilian state does not exercise adequate governance concerning the presence of transnational rules that make up its national legal order. Therefore, this thesis proposed some actions for the Brazilian state to exercise the role of orchestrator through engaging in expanding its knowledge of transnational rules and promoting the rule-making process of these rules.

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