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The Parameters for Drafting Insurance and Indemnity Contractual Clauses as the Subset of Risk Allocation Provisions Outlined in the Main Types of Upstream Petroleum Contracts: A Case Study of IPC

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ABSTRACT

Various types of hazard exist in the upstream oil and gas industry. Therefore, the contracting parties of any petroleum contract always try to reduce the inevitable economic burdens of occurring adverse events arising out of risks in the course of petroleum operation by applying legal approaches such as contractual risk allocation provisions, which can be realized by drafting efficient insurance and indemnity clauses as the subset of risk allocation provisions. Hence, this study addressed the main research question of "What are the necessary parameters for drafting the insurance and indemnity clauses in the main types of upstream petroleum contracts?". To this end, the mentioned clauses stipulated in the main types of upstream petroleum contracts, including concessions, production sharing, and service contracts of 15 different countries worldwide, in addition to the comparative analysis with the new model of Iranian Petroleum Contract (IPC), are examined. Eventually, the hypothesis of this study verified that there should be several parameters such as liability towards risks, limitation of liability, and exclusions/exemptions for drafting the insurance and indemnity clauses in these contracts, that is, the result and the answer to the research question. Moreover, the comparative analysis of the extracted set of parameters needed to draft these clauses legally, with the related ones in IPC, is conducted. Therefore, the existing contractual shortcomings are detected. After that, the necessary suggestions to resolve them are offered, which can enhance the effectiveness of the upstream petroleum contracts and avoid potential litigation in this regard.

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1. Introduction

As one of the significant natural resources and national wealth, petroleum plays a strategic role in each country. It is counted as one of the largest industries and the primary source of energy supply in today's world, especially in the oil-producing countries such as Iran, generating a large portion of national income. This vital industry has much more importance in the upstream operation with large scale, capital-intensive, and hazardous activities. Without accomplishing them safely and adequately, the rest of the midstream and downstream operations would not be realized.

The standard upstream contracts in the petroleum industry include four central concession systems, production sharing contracts, service contracts, and hybrid ones at different levels, including the primary parent, cooperation, financing, and subsidiaries (Shiravi, 2018). The wordings of the primary parent contract constitute from different sections such as financial regimes, costs and expenditures, work plans and budgets, records, reports and inspection, applicable law, dispute resolution, recruitment and training of personnel, assignment, and termination of the contract. The risk allocation section comprises provisions about the liabilities and responsibilities for losses and damages in line with determining the best contracting party to bear the risks and the related obligations. This section contains several clauses such as indemnity, insurance, exclusions/exemptions, liquidated damages, and limitation of liabilities, and these contractual clauses are all considered subsets of the contractual risk allocation mechanisms. The primary purpose of any contract is to allocate risks and uncertainties between the parties to the contract (Pipatanapyung, 2004). Thus, it should be noted that, in case of unforeseen and unexpected adverse upstream petroleum events, none of the contracting parties will be willing to undertake the incurred enormous costs in the absence of the appropriate contractual clauses regulating the risk allocation provisions, especially insurance and indemnity clauses, playing a significant role in this regard, which can lead to serious legal disputes.

Therefore, this paper focuses on the insurance and indemnity clauses in the main types of upstream petroleum contracts. In contrast, the fundamental function of risk allocation is meted by indemnity obligations and is effectuated by the insurance clause, which is discussed subsequently. To this end, this study addresses the research question of "What are the necessary parameters for drafting the insurance and indemnity clauses contractually in the main types of upstream petroleum contracts?". Hence, the hypothesis of this study states that there should be a set of several parameters such as liability towards risks, determination of liable contracting party for the procurement of insurance and indemnification of losses, the limitation of liability, exclusions/exemptions, and consequential damages. Drafting the insurance and indemnity clauses contractually in the main types of upstream petroleum contracts is examined. Finally, by applying the obtained set of necessary parameters, the possibility of eliminating the existing weaknesses, clarifying any ambiguities, completing the shortcomings, and regulating them more precisely will be achieved, which enhances the efficiency and effectiveness of the upstream petroleum contracts in this area.

This study's theoretical and empirical approach to addressing the main question is qualitative–descriptive and comparative. The insurance and indemnity contractual clauses as a part of the risk allocation provisions stipulated in the main types of upstream petroleum contracts of 15 different countries worldwide have been examined. After extracting the necessary parameters needed to draft them, they have been classified based on their standard features, enabling a comparative analysis with the related contractual clauses in IPC in the next step. Finally, the possible ambiguities and the existing shortcomings are found out, and the necessary suggestions for overcoming the existing deficiencies and drafting the clauses described above are presented more efficiently for the upcoming petroleum contracts.

Kaarbo and Beasley defined comparative analysis as the systematic comparison of two or more data points (cases) obtained through use of the case study method. They also confirmed that case studies can be qualitative and narrative and do not necessarily need to rely on multiple sources of evidence to function (Kaarbo and Beasley, 1999, pp 369–391). Pickvance, validating the usefulness of comparative analysis as a research method, stated that it aims to understand events and their cause. He identified two conventional types of comparative analysis: the first explains the rationale for similarities and differences between phenomena, and the other emphasizes data collection; he also proposed two additional types that reveal a pluralist approach and focus on emergent phenomena in different societies (Pickvance, 2005, pp 2–6).

In the current study, the original versions of upstream petroleum contracts and the model contracts of 15 countries in the cases due to the confidentiality and lack of access to the original ones are applied.[2] This paper is divided into five parts. The first part sets the stage for the study by defining the theoretical and jurisprudential understanding of risk allocation provisions along with insurance and indemnity contractual clauses as the central concept. After that, the study addresses the question of "How the insurance and indemnity contractual clauses effectuate the risk allocation of upstream petroleum contracts?" by highlighting their roles and contributions. The third part dissects the insurance and indemnity clauses in different upstream petroleum contracts and introduces the set of parameters obtained in an organized table. The fourth part undertakes a comparative analysis, and at last, the study is wrapped up by the main conclusions from the preceding discourses. The study's limitations and suggestions for future research are also offered in this part.

2. Literature review

According to the investigation of the research background, none of the previous studies have dealt with the subject of this study, i.e., the parameters for drafting the insurance and indemnity clauses as the subset of risk allocation provisions, which indicates the novelty and significance of this study. However, some domestic and foreign studies discuss risk allocation, insurance, and indemnity in the different petroleum contracts but with different viewpoints. Some of these research papers are presented in summary below.

An empirical study on the contractual risk allocation and indemnifying and holding harmless clauses in the oilfield service contracts in Malaysia was conducted by Wan Zulhafiz Wan Zahari (2015). This empirical study was conducted to investigate the issues and problems concerning risk allocation provisions and to indemnify and hold harmless clauses of oilfield service contracts in Malaysia. The main finding of this empirical study indicates that contractors are concerned about the one-way adversarial style of the operator–contractor relationship.

A paper by Onukwube and Achi, entitled "Risk allocation in oil exploration contracts in Nigeria", examined the risk allocation between parties in oil exploration contracts. A questionnaire survey based on 23 identified risk factors and criteria for distributing these identified risks was distributed to a population of 60 senior management staff of four multinational oil companies and government-owned oil companies. The results show some of the leading risk factors and the way of allocation, and the study suggests that similar studies should be conducted in other oil-producing countries since risks vary with culture, social, political, and economic environments.

Another research entitled "A comparative analysis on the enforceability of knock-for-knock indemnities in Thailand and the United Kingdom" by Wan M. Zulhafiz (2017) addressed the issue of enforceability of knock-for-knock indemnities pertaining to bodily injury and death in oilfield service contracts in Thailand. It concluded that despite the restriction under the Thai Unfair Contract Terms Act (TUCTA), the knock-for-knock indemnities in standard oilfield service contracts, e.g., the leading oil and gas competitiveness (LOGIC) model, could still be enforceable in Thailand, subject to certain limitations.

Abdul Rahman (2020) researched "Unfair risk allocation in oil and gas upstream service contracts in Malaysia: the necessity for oilfield anti-indemnity act". He argued that a specific legal mechanism should be adopted in Malaysia to protect and limit the contractors' liability under oil and gas service contracts. It is suggested that the Malaysian Parliament should pass a particular law, such as Oilfield Anti-Indemnity Act.

The paper of Olomi and Hajmohammad Jafar (2017) on "Analysis of risk allocation of the blowout and kick in offshore drilling contracts and insurance coverage of those risks" examined the allocation of risks in day rate, turnkey, and footage drilling contracts for "blowout" and "kick" risks. According to the insurability criteria and energy exploration and development (EED) policy wording, it showed that kick as a drilling risk and a kind of blowout, depending on the situation, is not insurable through the standard available insurance policies in the market.

Sadeghi Shahdani et al., in a paper entitled "Juridical survey of enforcement of oil contractors to ensure oil and gas wells", used descriptive analytic methods and referred to jurisprudence texts and criteria (MASLAHAT and rationality criteria) to prove the hypothesis of enforcement of oil contractors so as to ensure oil and gas wells.

[2] Actual and model upstream petroleum contracts from 15 different countries, including Libya, Russia, Tanzania, India, Georgia, Azerbaijan, Australia, Brazil, Lisbon, Pakistan, Island, Iraq, Angola, Ecuador, and Gambia.

"Designing oil risk securities based on risk transferring insurance-linked securities", by Seiflou et al. (2017) tried to develop a model for issuing oil risk securities based on Simon's theory of bounded rationality (1996). This model is consistent with conditions in the Iranian oil and insurance industries and the Islamic juridical (Shari'ah) considerations for the corresponding investments.

3. Risk allocation provisions

Participation in the upstream oil and gas sector requires significant capital contribution and brings a high degree of risk to property damage and loss of life.[3] The oil and gas industry is capital intensive and embedded with multifarious risks (Dike and Chigonu, 2020, p.172). This issue raises more difficulties when facing multiple parties in an upstream petroleum contract. Moreover, the nature of risks is different in upstream operation, whereas the level of risks downstream is not as high, according to the main types of activities involving transportation, processing, and storage of oil and gas (Dike and Chigonu, 2020). Contractual risk management is an approach to protecting an organization from losses caused by potential risks. One of the significant elements of contractual risk management as a critical solution is risk allocation that always occurs in any situation where more than one party (owner, contractor, and consultant) is responsible for the execution, ensuring that every risk recognized and managed is good practice in any business. This activity is an essential step since this allocation can significantly influence the behavior of the business participants and hence impact both project performance and final cost (Zaghlol and Hartman, 2002). Risk allocation in the industry may be achieved by setting out in the contract's clauses which party will be liable for (or exempted from) a given risk and to what extent (Badiru and Osisanya, 2016). The risk allocation provisions have been consistently at the heart of negotiation between the contracting parties to achieve this purpose. In general, most of the provisions of contracts allocate risk. However, specific provisions are designed to do this deliberately and aim to achieve particular objectives (Coates, 2012). Primarily, these provisions are organized into five broad groups: indemnities, insurance, exclusions/exemptions, limitation of liability, and liquidated damages (Gordon, 2011). This paper intends to deal with the contractual mechanisms of insurance and indemnity clauses, which are discussed more thoroughly.

3.1. The concept of insurance and indemnity contractual clauses

In a legal viewpoint, a "clause" is defined literally as a particular part of a written legal document or agreement, dealing with a particular subject. [4] In addition, contractual clause is any provision forming part of a contract and gives rise to a contractual obligation, a breach of which can give rise to litigation (Martin, 2006). According to the literal meaning of the clause and its implication on a particular subject, one of these particular areas is insurance and indemnity which is the subject of this study. In general, the insurance and indemnity contractual clause as the risk allocation mechanism constitutes the risk allocation provisions as its subset. Generally, all policies issued in the energy should include provisions relating to law and jurisdiction. Policies issued by local insurers may require by law that they are subject to the law and practice applying in the country although they may allow jurisdictions in other countries. There may well be generic insurance laws applying in certain countries, affecting the rules relating to the disclosure of information or time limits for the notification of claims. These issues will then govern the interpretation of the contract despite specific provisions in the policy; an overriding clause should ideally deal with such conflicts in the policy (Sharpe, D., 2009 p35).

3.2. Indemnity contractual clause

The philosophy of the existence of an Indemnity contractual clause lies in the emergence and evolution of risk allocation. One of the fundamental purposes of any contract is to allocate risk and uncertainty between the parties, which is a challenging area, especially for operators and contractors of petroleum projects. However, referring to the concept of risk allocation means allocating the risk to one party that can handle the risk more effectively. In the traditional approach, risk allocation clauses are usually drafted in a false-based manner; it means the party in breach is liable, not the party who is best able to handle the risk. Thus, a contractual response to this problem is given by the indemnity contractual clause.

[3] Caledonia North Sea Ltd v London Bridge Engineering Ltd [2002] UKHL 4; [2002] 1 Lloyd's Rep 553, HL.

[4] Cambridge Dictionary. https://dictionary.cambridge.org/dictionary/english/clause. (Last accessed at: 27.02.2021)

In general, the risk allocation process can be accomplished through three approaches: the efforts and contractual response of contracting parties, judicial process, and legislative intervention or operation of law. The indemnity contractual clause is under the first approach of the risk allocation process. Under the indemnity clause, the indemnifying party agrees to make a payment to the party having the benefit of the indemnity if the indemnified party suffers a loss due to the occurrence of a specified event (Gordon, 2011). The indemnity clause has been examined as mutual and straightforward. According to traditional oil and gas industry practice, contractual liability is allocated based on knock-for-knock indemnity. However, after the Macondo incident, it has been argued that the operators tend to shift greater risk to the contractors (Zulhafiz, 2017c). The mutual indemnity clause is named by several terms, including knock-for-knock indemnity, hold harmless clause, cross-indemnity, and reciprocal indemnity. A simple indemnification clause is where one party (i.e., the operator) undertakes the responsibility to indemnify another party (i.e., the contractor) should a loss be suffered during their contractual relationship. The operator effectively agrees to absorb the loss (or might choose to insure against it) (Hewitt, 2008, p.177) for breach of contract or care even if the contractor is at fault (Wang, 2016). Under the mutual hold harmless indemnity regime, each party to the contract (as indemnitor) agrees to take responsibility for and indemnify the other (as indemnitee) against injury and loss to its personnel and property and its own consequential losses. Such provisions are ordinarily intended to be effective even if the accident and related losses are caused by negligence, breach of statutory duty, or breach of contract of the party protected by the indemnity regime by setting up the cross-indemnities mechanism (Hewitt, 2008, p.182). The clause is designed to avoid the problem of determining the respective liability of parties for a given loss in which the contracting parties will exchange mutual indemnities for any suit or action brought against a counterparty for injuries to or death of both the indemnitor and indemnitee's employees regardless of fault or negligence (Zulhafiz and Abdul Rahman, 2020, p.179). The parties which hold greater bargaining power might not be willing to include such a clause in the contract (Zulhafiz, 2018).

Indemnity clause commonly includes three interrelated requirements: (1) to indemnify that is to compensate a party for its liabilities and losses or settlements of the claims, (2) to hold harmless in which one party will not assert a claim against the other party, and (3) to defend that is considered as paying the fees of the attorneys who defend the claims (Peddycord, 2019).

3.3. Insurance contractual clause

According to Iran's Insurance Act, 1938, insurance is defined as a contract under which one party in consideration of a specific payment (the premium) undertakes to pay a certain amount as the compensation or indemnify the other party in case of the occurrence of events that lead to losses or damages.[5] The insurance clause generally speaks about the responsibility for losses and damages, or the liability of funding the costs of losses and damages, which may arise out of the occurrence of adverse events. The contractual insurance clause requires a party, usually the one to whom risk is allocated, to carry certain types of insurance with specific coverage limits and requirements and to name the other party as an additional insured (Kagan, 2020)[6]. Insured risks are shifted to a third party that is the insurer. This can be especially helpful if the party required to carry the insurance is not financially strong (Peddycord, 2019). As an instance, David Sharpe states in his book that the Insurance clause stipulates that a contractor must maintain admitted insurance (i.e., with carries licensed to do business in the applicable state or country), in respect of various liabilities set out in an exhibit attached to the contract. Evidence of such insurance must be furnished by the insurer, in the form of certificates or insurance policies, or using certification from a self-insurance fund. The operator is similarly required to maintain specific liability insurances as provided in the contract, with evidence to be furnished to the contractor. Both parties undertake to name the other as additionally insured parties, but only to the extent of the respective indemnification obligations assumed, and this extends to a mutual waiver of subrogation from respective insurers (Sharpe, D., 2009 p65).

Moreover, some other supplementary clauses as the risk allocation mechanisms have roles in addition to the

[5] Insurance Act of Iran, 1316. Article 1.

[6] Additional insured is a type of status associated with general liability insurance policies that provides coverage to other individuals or groups that were not initially named in the policy. With an additional insured endorsement, the additional insured will then be protected under the named insurer's policy and can file a claim in the event that they are sued. https://www.investopedia.com/terms/a/additional-insured.asp (last accessed at: 22.03.2021).

indemnity and insurance clause, such as the limitation of liabilities, exclusions/ exemption clauses, and liquidated damages.

3.4. Exclusion/exemption clause

Exclusion of liability clause absolves a party or parties to a contract for being liable or responsible for damages, losses, injuries, and other dangers that may arise from there (Dike and Chigonu, 2020, p190). Exclusions are usually used in cases of consequential loss, willful misconduct, and gross negligence in upstream petroleum contracts.

3.5. Limitation of liability

The limitation of liability or a "liability cap" is another contractual mechanism commonly used in the petroleum industry. Unlike indemnities, which look to shift liability, a liability cap looks to the limitation of a party by reference to a total sum of money payable rather than by reference to a particular species of loss (Moller, 2016).

3.6. Liquidated damages

Simply stating, liquidated damages are amounts fixed, settled, and agreed upon in advance to avoid litigation as to damages sustained; they may exceed or fall short of the actual damages sustained, but the sum thus fixed and determined (in advance) binds the parties to such agreement.[7]

4. How insurance and indemnity contractual clauses effectuate the risk allocation provisions of upstream petroleum contracts

For clarifying the contribution of the insurance and indemnity contractual clause in the risk allocation process of upstream petroleum contracts, it is necessary to perceive the concept of risk as to the core part of risk allocation and to discover its relationship with insurance and indemnification.

The term risk is variously defined as (1) the chance of loss, (2) the possibility of loss, (3) uncertainty, (4) the dispersion of actual from expected results, or (5) the probability of any outcome different from the one expected. Nevertheless, more specifically, risk is defined as a condition in which there is a possibility of an adverse deviation from the desired outcome expected or hoped for (Vaughan and Vaughan, 2007, p2). Insurance derives its existence from the nature of risk. If there is no risk, there will be no need to have insurance. Moreover, risk management is a scientific approach to dealing with risks by anticipating possible losses, designing, and implementing procedures that minimize the occurrence of the loss or the financial impact of the losses that do occur (Vaughan and Vaughan, 2007, p16). In the terminology of modern risk management, the techniques for dealing with risk are grouped into two broad approaches: risk control and risk financing. Of course, the purchase of insurance contracts is a direct approach to risk transfer. Considering one party's specific payment (the premium), the second party contracts to indemnify the first party up to a specific limit for the specified loss that may or may not occur (Vaughan and Vaughan, 2007, p19). Hence, risk transfer as the core concept of risk allocation is achieved by insurance. Insurance is a complicated and intricate mechanism. However, in its simplest aspect, it has two fundamental characteristics: 1) transferring or shifting risk from one individual to a group. 2) sharing losses, on some equitable basis, by all group members. Van der Merwe approaches insurance as a contract in which one party (insurer), in return for monies paid, will recompense the other party (insured) upon the occurrence of a specific event in a manner that seeks to restore the latter to the status quo ante (Van der Merwe, 1970, p149). It works on the principle of pooling risks by a collectivity of people exposed to the same specific risk, each of whom is willing to make a payment (premium) to avoid bearing the incidence of the economic consequences of an event when it occurs. The insurer arrives at this premium by estimating the frequency of the risk events and applying this outcome to a calculus of probabilities (Ewald, 1991) to predict the chance of the risk materializing. Therefore, to achieve an effective risk allocation, loss mitigation, and meeting the economic costs of losses as the primary function of indemnification, the existence of insurance is essential. Furthermore, we can conclude the close inter-related relationship between insurance, indemnity, and risk, which is quite evident from the definitions provided.

Insurance is one of the most important and widely used risk management techniques that play an influential role in the risk allocation process. Risk allocation is not about transferring risk itself to the best party who can manage it, but the economic costs and financial burdens are allocated. In other words, the economic costs necessary to indemnify losses and damages caused by adverse events due to the risks will be allocated.

[7] Pacific Hardware & Steel Co. v. United states

Therefore, insurance plays a complementary role for indemnity obligations in the risk allocation process because insurance provides the financial resources needed for indemnification and increases the financial solvency of the contracting party to whom risk is allocated and then is in charge of paying the costs of claims. On the other hand, with the aid of insurance, the responsible party will be able to do risk management and mitigation in a more efficient manner, which both have crucial impacts on risk allocation.

Generally, insurance can be obtained on three main approaches: (1) on a personal voluntary basis, (2) by contractual obligations, and (3) as the enforcement of laws and regulations. Despite the approach used, the contribution of contractual insurance clauses is pursuant to the risk allocation, leading to the fulfillment and meeting of contractual indemnity obligations. The insurance and indemnity contractual clauses affect the risk allocation process differently. The contracting party to whom the risks have been allocated and assigned to bear the economic costs of adverse events is called an indemnitor responsible for indemnification following this assignment. Moreover, because of this promise and commitment, there should be sufficient financial capability for fulfilling this obligation so that if any adverse event occurs that leads to losses, it should be able to pay the costs and compensate the other party who is indemnitee. Therefore, by employing contractual insurance clauses, the contractual requirements to obtain an appropriate insurance plan by the designated party for risk allocation are constituted to ensure that the obligations set out in the indemnity clauses against the affected persons would be realized completely. The insurance company leads to enforcement of the indemnity clause, and the insurance policy here acts as a guarantee of compensation so that the contract's beneficiaries, who are affected by damages, would receive the committed compensation or indemnification services as it is stated that indemnification protections are only as good as the indemnitor's balance sheet (Thornsjo and Hasan, 2007, p.68).

It is inferred that a linear relationship exists here, in which risk allocation is at the first stage, then the obligation to indemnify, and eventually the insurance device to fulfill the preceding obligations. In addition, the function of insurance, in addition to the risk transferring from one individual to a group, i.e., the insurance company, is financing. In other words, the contractual indemnity clause as a part of risk allocation provisions should be supported by adequate financial resources, including insurance, self-insurance, and any other appropriate and relevant method. Self-insurance as an alternative to the insurance, which is performed out of the insurance market, can be utilized to effectuate the indemnity obligations, provided that the indemnitee has agreed and confirmed this method and the indemnitor has proved that there are adequate funds for this goal.

The contract would usually state that the insured is regarded as the additional insured and an endorsement made on the policyholder (indemnitor's) insurance policy in this regard to give efficacy to the insurance requirement arising from the contractual indemnity obligations (Anderson, 2008). The additional insured is usually a business partner to a policyholder, and their business relationship makes it sensible to endorse that individual onto the policyholder's insurance policy. Anderson also states that this is usually done to ensure that the indemnity obligation is duly funded and procure a waiver of the right of subrogation regarding the policyholder's insurer (Anderson, 2008 p.88).

5. Parameters of insurance and indemnity contractual clauses of upstream petroleum contracts

The key players in the oil and gas industries adopt different contractual risk allocation mechanisms in oilfield service contracts to mitigate their risk exposure in every project (Patson Wilbroad, 2014; Zulhafiz, 2017b). In general, upstream petroleum contracts express risk allocation provisions explicitly and implicitly. In the implicit cases, it is stated under different contractual clauses, such as those relating to the expenses and financial aspects of the contract, that the burden of some costs and expenses related to the risks or losses may be allocated to one of the parties implicitly. Nevertheless, the clear cases are stated under specific clauses by clear titles[8], such as "responsibility for losses and damages" [9] and "insurance, liabilities, and indemnities"[10], which is the main subject of this study.

Although the insurance and indemnity contractual clauses comprise only a tiny portion of the contract wording, the multiplicity of parameters and elements constituting them indicates their inherent complexity and crucial role in dealing with the risks of the petroleum

[8] The other titles are "Insurance and indemnification", "Liability and indemnification", and "Liability and insurance", "Liability for losses and damages".

[9] Risk Services Agreement, Angola, June 1976 Clause 33.

[10] Production Sharing Agreement, The Azerbaijan Republic, June, 1996, Clause 20.

contract, especially in the upstream operation, which is large-scale, hazardous, and capital intensive, leading to irreparable consequences. Thus, in this section, the primary and complementary parameters needed for drafting the insurance and indemnity clauses are being derived, along with the classification based on their standard features, which enables us to do a comparative analysis with the related contractual clauses of IPC in the next step. The basic parameters in this study refer to the parameters that are deemed necessary. Without them, the contract is incomplete, leading to legal disputes. Moreover, they are the most repeated ones in the reviewed contracts.

On the other hand, the complementary or ancillary ones, including those lacking, do not fundamentally affect the contract's completeness and are rarely mentioned, but they are recommended for more optimality. In general, the outcome of both basic and complementary extracted parameters in this study are classified into three main categories of 1) liability towards risks, 2) insurance, and 3) indemnity based on their core subject matter. Since the underlying concept of these categories is expected in the majority of the contracts and has formed the basis of insurance and indemnity clauses, the first main category includes responsibilities for losses, damages, risks, and any matters related to them. Therefore, this group of parameters explicitly address the contractual liabilities of the parties in terms of risks through the designation of the eligible contracts' parties and stakeholders, including contractor, operator, government, National Oil Company (NOC), concessionaire, subcontractors, and other beneficiaries, to undertake the obligations in respect thereof. For example, in the case of the responsibility for operator's equipment, the operator is responsible for any owned equipment, including equipment owned by joint ventures or co-lessees. This equipment will include casing, tubing, wellhead equipment, and platform, if applicable, and the responsibility applies irrespective of when or how such damage occurs. The operator provides a release to the contractor (Sharpe, D., 2009. P68). The second category discusses insurance parameters specifically as the most fundamental and practical risk allocation tool. The indemnity parameters are also classified as the final stage required to meet the third category.

Table 1 lists the set of necessary parameters of insurance and indemnity clauses for upstream petroleum contracts, involving the basic and complementary ones within the three mains categories.

Table 1. The set of parameters of insurance and indemnity clauses in the upstream petroleum contracts; source: the findings of this study.

Type	Category	Parameters	IPC[11]	Others[12]	No. of clause (as an instance) *
Basic	Liability towards risks	Determination of liable contracting party for dealing with risks, losses or damages	✓	✓	Azerbaijan Republic, PSC[13], Clause 22.2 Iranian Petroleum Contract (IPC), Clause 11.6
		Determining a definite territory or location for losses incur liabilities, i.e., contract area	×	✓	Angola, Risk service contract, Clause 33
		Defining the extent of liability according to the provided law to avoid a high degree of generality	×	✓	Angola, Risk service contract, Clause 33 Brazil, Technical services agreement 8.5
		The duty of "loss prevention" as the contractor's liability based on best industry practice (BIP)	×	✓	Angola Risk service contract, Clause 22
		The requirement of operator or NOC to comply with the related national legislations[14]	×	✓	Iraq PSC, Clause 2.6

[11] Upstream Iranian petroleum contract, exploration, development and production service contract.
[12] Other countries' upstream petroleum contracts including model and actual contracts of 15 different countries.
[13] Production sharing contract
[14] Such as applicable workers' compensation and employers' liability laws or insurance laws of the state

Type	Category	Parameters		IPC[11]	Others[12]	No. of clause (as an instance) *
		Exercise of reasonable care and diligence in petroleum operations as a precondition for indemnification		×	✓	Brazil, PSC, Clause 19.1 Iraq, GSDPC[15], Clause 2.6
		Joint and liability for the cases of more than one contractor		×	✓	Iceland. License, Clause 19
		Exclusions/ limitation of liability	Consequential damages or indirect losses [16]	✓	✓	Russian, PSC, Clause 21.3 IPC, Clause 11.13
			Losses not arising out of a failure to conduct petroleum operations as provided	✓	✓	Georgia, PSC, Clause 24.3.1 IPC, Clause 11.5
			Damages arising from any environmental condition or damages existing in the contract area prior to the contract effective date	×	✓	Georgia, PSC, Clause 24.3.2
			Force majeure events[17]	×	✓	Georgia, PSC, Clause 24.3.2
			Any damages caused by contamination entering the contract area as a result of state, NOC, or third-party activities beyond or within the boundaries of the contract area	×	✓	Georgia, PSC, Clause 24.7
			Damages not under the direct possession and control of the contractor or its affiliate, its	×	✓	Georgia, PSC, Clause 24.8

[15] Gas service development and production contract
[16] Such as loss of profit or revenue, costs, and expenses resulting from business interruptions; loss of delay in production; loss of or damage to the leasehold (Sharpe, 2009, p69);
[17] The exception: The contractor shall be liable for environmental conditions, damages resulting from a force majeure event to the extent that such conditions, or damages resulting from contractor's failure to exercise good oil field practices that would have prevented or ameliorated such environmental conditions or damages.

Type	Category	Parameters		IPC[11]	Others[12]	No. of clause (as an instance) *
			subcontractors, and the operating company			
			If the contractor has no possibility of exercising direct control following the standard practices of the international petroleum and natural gas industry	×	✓	Russian, PSC, Clause 21.4
			Any damages whatsoever in respect of the state share of petroleum, storage, or transportation thereof once NOC has taken custody of the state share of petroleum	×	✓	Georgia, PSC, Clause 24.8
		Risk Management of petroleum operations according to the relevant national legislation or the instructions, rules, and procedures approved by NOC or complying with the underlying insurance law[18]		×	✓	Angola, PSC, Clause 35
		Definition of third parties and excluding the governmental authorities not considered as the third parties		×	✓	Azerbaijan Republic, PSC, Clause 20.2
	Insurance	Determination of responsible contracting party for procurement of insurance policy[19]		✓	✓	Ecuadorian, Risk service contract, Clause 10.2 IPC, Clause 11.1 IPC, Clause 11.4
		The duty of sub-contractors adequately to insure their risks under their relevant sub-contracts in addition to the duty of the contractor and operator		✓	✓	The republic of the Gambia, Petroleum License, Clause 14.3 Iraq PSC, Clause 24.5 IPC, Clause 11.1

[18] e.g., The Contractor shall comply with what is established in Decree Nr. 39/01, of June 22, "Petroleum Activities Insurance Decree"

[19] Mostly the contractor is liable, even sometimes, referred to; "Contractor will be *solely liable* to maintain all the necessary national and international insurance policies.

Type	Category	Parameters	IPC[11]	Others[12]	No. of clause (as an instance) *
		The determination of the market for obtaining the insurance policy, domestically or internationally, especially in the case of unavailability, domestically	✗	✓	Iraq PSC, Clause 24.6 Ecuadorian, Risk service contract, Clause 10.2
		Reasonable insurance rates-premium rates and prevailing conditions not greater than market rates, as well as the need to update the commercial value annually	✓	✓	Azerbaijan Republic, PSC, Clause 20.1 IPC, Clauses 11.2 and 11.4
		Preparing third-party liability coverages according to the relevant laws in the field of liability, such as applicable workers' compensation and employers' liability laws[20]	✓	✓	Pakistan, Concession, Clause 24.2 IPC, 11.1
		Procurement of insurance in compliance with insurance laws and regulations of the relevant authorities; such as the management committee, and in accordance with the BIP	✓	✓	Pakistan, Concession, Clause 24.1 India, PSC, Clause 24.1.1 IPC, Clause 11.3
		Duration of insurance policy, ordinary from the effective date of the contract	✓	✓	Ecuadorian, Risk service contract, Clause 10.2 IPC, Clauses 11.1
		Arranging appropriate reinsurance plans for supporting direct insurance coverages	✗	✓	Iraq PSC, Clause 24.5 Ecuadorian, Risk service contract, Clause 10.2.6
		Waiving all rights of subrogation against NOC and the government, any designated authority and the members of the joint commission	✗	✓	Tanzania, PSC, Clause 18.3 (d)
		Considering NOC and the government (and their directors, officers, and employees) as the additional insured and name the designated authority and the members of the joint commission as the co-insureds	✗	✓	Australia, PSC, Clause 17.2 (b)
		The requirement of reviewing and approving the insurance plan by the JMC/BOD or coordination committee and the prior written approval of NOC[21]	✓	✓	Iraq, Service Contract, Clause 24.5, 24.8 Georgia, PSC, Clause 6.4.4 IPC, Clauses 11.1, 11.2, 11.3

[20] However, IPC includes this parameter but it has mentioned that the third-party liability coverage should be procured according to the good industry practice that needs amendment.
[21] Notwithstanding any such approval, the contractor shall be fully liable for the adequacy, sufficiency and suitability, as well as any shortcomings, of any such insurance program.

Type	Category	Parameters	IPC[11]	Others[12]	No. of clause (as an instance) *
		Determining the types of insurance coverages of such type and amount as is customary in the international petroleum industry[22]	✓	✓	Libyan Arab Jamahiriya, PSC, Clause 6.2.10 Ecuadorian, Service contract, Clause 10.2.9 IPC, Clause 11.3, 11.1
		The need for the approval of the steering committee for additional insurance coverage or any further insurance, the contractor may at its discretion deem necessary	✗	✓	Azerbaijan Republic, PSC, Clause 20.1 Ecuadorian, Service contract, Clause 10.2.12
	Indemnity	Determination of liable contracting party for indemnity obligation	✓	✓	Lisbon, Concession, Clause 10 IPC, Clause 11.8, 11.9
		The duty of indemnify, defend and hold harmless as three main functions in the indemnity process	✓	✓	India, PSC, Clause 24.2 Australia, PSC, Clause 17.1 IPC, Clause 11.10
		The conditions related to gross negligence, willful misconduct, or serious fault	✓	✓	Iceland. License, Clause 18 Angola, PSC, Clause 34.2, 34.3 IPC, Clause 11.11
		The joint, concurrent negligent, or intentional acts or omissions and assigning to each parties' liability relative to the degree of fault	✗	✓	Tanzania, PSC, Clause 26.2 (d)
		The limitation of liability for indemnification	✓	✓	Tanzania, PSC, Clause 26.1 Brazil, Service Contract, Clause 8 IPC, Clause 11.11, 11.6
		The indemnity inclusions; repairing, replacement, Restoration and covering the underinsured property	✗	✓	Iraq, Service Contract, Clause 2.9 (a) Ecuadorian, Service contract, Clause 10.2.8
		The duty of the government to release and exempt contractors from the claims of third parties caused by the actions of the government or its representatives	✓	✓	Russian, PSC, Clause 21.5 IPC, Clauses 11.6, 11.8
		Indemnification for fines and penalties as the sole responsibility of the non-complying party[23]	✓	✓	Tanzania, PSC, Clause 24.6 IPC, Clause 11.5
		Indemnification exemptions for the party claiming indemnification if	✗	✓	Tanzania, PSC, Clause 26.2 (a)

[22] Some prevalent types of insurance coverages customary in the International Petroleum Industry are full oil industry risk coverage for contract activities, public and civil liability insurance, fire insurance, electronic equipment insurance, personal injury and life insurance, blowout insurance, cratering, well cost control, drilling expenses, environmental pollution and damage insurance, and petroleum seepage and pollution.

[23] However, IPC has different condition, the contractor shall indemnify and hold harmless NIOC in respect of fine and penalty arising out of or resulting from violation by contractor or its employees and personnel of any laws, rules, regulations and measures.

Type	Category	Parameters	IPC[11]	Others[12]	No. of clause (as an instance) *
		reimbursed pursuant to any insurance policy			
		Indemnify and hold harmless concerning ESHIA requirements	✓	×	IPC, Clause 11.7
		The duty of indemnitee for giving timely notice of the claims and the opportunity to defend	×	✓	Angola, PSC, Clause 34.1
		Indemnity exclusions/limitation of liability, reduction or cancelation of compensation if the party who suffered loss or died was himself partly responsible for the loss either intentionally or through gross negligence, failure during petroleum operation	×	✓	Iceland, Petroleum License, Clause 18
		Cancelation of compensation for environmental damages caused by a natural catastrophe or by other uncontrollable events	×	✓	Iceland, Petroleum License, Clause 18
		The preconditions for indemnification: those not controllable by contractor and operator through the exercise of reasonable care and diligence in operations; those not resulting from contractor and operator's failure to timely file and diligently pursue claims against insurance companies	×	✓	Iraq, Service Contract, Clause 2.6
Complementary	**Liability towards Risks**	Sole Risk: when the operation is conducted at the sole cost, risk, and expense of one party, usually the contractor	×	✓	Angola risk service contract, Clause 29
		The duty of the government to protect and ensure the safety and security of the contractor's property and personnel in the territory of the contractor for the perils such as war and political issues, especially in the presence of foreign contractors[24]	×	✓	Georgia, PSC, Clause 24.9
		The liabilities of co-ventures in terms of risks as the possible contracting parties	×	✓	Brazil, PSC, Clause 19.1 and 19.2

[24] The other perils in addition to war (declared or undeclared), include civil conflict, sabotage, blockade, riot, terrorism, unlawful commercial extortion, or organized crime. Notwithstanding anything to the contrary contained herein, contractor acknowledges and agrees that the obligations undertaken by the state are no greater than the general obligations of the state towards citizens of the country in respect to the perils named above. Furthermore, the contractor agrees that it shall have no claim for legal or equitable relief for the failure of the state to comply with the provisions of the article, except as may be permitted by law.

Type	Category	Parameters	IPC[11]	Others[12]	No. of clause (as an instance) *
	Insurance	Engaging, renewing, and keeping in force all insurances as a duty of the contractor	×	✓	Ecuadorian, Service contract, Clause 5.1.17
		Failure to procure insurance triggering the liability of operator or government to undertake	×	✓	Tanzania, PSC, Clause 18.4
		The possibility of self-insurance according to the rules and written approval of NOC	×	✓	Federative Republic of Brazil, Concession, Clause 22.2 Australia, PSC, Clause 17.2 (i)
		Setting forth the insurance terms and conditions in more detail in the contract Annex	×	✓	Tanzania, PSC, Clause 18.1
		The duty of notifications to NOC in respect of any issues related to the insurance policies, especially insurance reports and the duty of NOC to not disclosing	×	✓	Tanzania, PSC, Clause 18.5
		Cancelation and renewing or any material changes of the insurance policy after giving 30 days prior written notice to the government or NOC	×	✓	Tanzania, PSC, Clause 18.3 (e)
		Insurance proceeds to be considered as petroleum costs and cost recoverable[25] or direct capital costs (DCC)	✓	✓	Azerbaijan Republic, PSC, Clause 20.1 Iraq, Service Contract, 24.7 IPC, Clause 11.12
	Indemnity	Emergency situations and events for which government provide the necessary assistance to the contractor in addition to any indemnity obligations	×	✓	Georgia, PSC, Clause 24.6
		Warranty or representation that there is not any kind of licensing or exclusive commercial relationship with any other enterprise (NOC competitor) which can become or create an obstacle for NOC	×	✓	Brazil, Service Contract, Clause 7.4
		Infringe the intellectual property rights of third parties, no responsibility for the contractor in terms of any information, materials, or equipment arising from the project either by NOC or by any third party, except those arising out of its negligence	×	✓	Brazil, Service Contract, Clause 7.1

[25] Provided that it is not attributable to the gross negligence or willful misconduct of contractor and operator or sub-contractors.

Type	Category	Parameters	IPC[11]	Others[12]	No. of clause (as an instance) *
		Cancelation or recession such as failure to comply with the obligations, constitutes a serious violation and excluding the emergency situations	✗	✓	Georgia, PSC, Clause 24.10

6. Comparative analysis

As the results and discussion of the preceding discourses, this section presents the comparative analysis of the necessary parameters of insurance and indemnity clauses, which were derived by examining the risk of allocation provisions of the upstream petroleum contracts from different countries in the last part with the related clauses in IPC. As a result, similarities, differences, strengths, and weaknesses, including contractual shortcomings, have been detected. Therefore, enabling to resolve the existing weaknesses and clarify the ambiguities by proposing the needed parameters for drafting and improving the previously mentioned clauses in upcoming upstream petroleum contracts of Iran.

The comparative analysis indicated that the insurance and indemnity clauses in the upstream Iranian Petroleum Contract are similar to the other related contracts regarding the obtained parameters with a checkmark in the preceding table. Moreover, it has different points and deficiencies due to the lack of parameters illustrated by a cross sign, which represented the weaknesses and contractual shortcomings that need to be meted to prevent any ambiguities leading to judicial interpretation of the contract as a time-consuming and costly process. However, among the different points, some of them can be considered the strengths of IPC compared to the other countries' contracts while the others lack them.

This analysis also shows that almost all of the contracts in addition to the Iranian one include the three main categories in the way they allocate risk between contract parties using the insurance and indemnity contractual tools as described. There are still many deficiencies involving the basic and complementary parameters that should be considered for having a thorough and effective petroleum contract in the context of insurance and indemnity clauses.

The common parameters stated in the IPC comprise:

- Coordination with the National Iranian Oil Company (NIOC) and its prior written approval but with a higher emphasis in comparison to the other contracts as it is repeated several times in the clauses;
- Compliance with laws and regulations as well as considering the best industry practice;
- Appointment of the responsible contracting party for the procurement of insurance coverage along with mentioning the inception time to be within six months from the effective date;
- Types of insurance coverages but with more concentration on third-party liability insurance; the different point here as a deficiency is about the preparation of the third-party liability coverages according to the best industry practice since BIP is mainly used in the case of operational risks and its relevant insurance policies as they addressed the practical and technical issues. Therefore, it is better to procure the third-party liability insurance according to the relevant laws in liability, such as applicable workers' compensation and employers' liability laws instead.
- Exclusions, including the popular one as indirect loss;
- Limitation of liability;
- Indemnity and its related duties such as defending and holding harmless.

Apart from the similarities, the focus of this study is more on the differences, especially those leading to the shortcomings of the petroleum contract and the differences that can be regarded as the strengths.

The differences of the contractual shortcomings were mainly derived from detected parameters, both basic and complementary ones in the preceding section that was not drafted in IPC. Thus, they can be resolved by including them and codification according to the legal wordings. In the case of the differences regarded as the strengths of IPC, in the insurance clauses category, it is stated that, in addition to the contractor, NIOC is also liable for the procurement of insurance coverage. While it is customarily considered the contractor's duty even solely, it is observed that just the failure to procure necessary insurance plans triggers the liability of the operator or government to undertake in the other

contracts. Moreover, it has mentioned that NIOC shall have and may exercise the option to provide at the contractor's cost such insurance coverage at a premium not greater than market rates for obtaining equivalent insurance coverage and security. A prerequisite is also determined here, provided that there is a requirement to notify the contractor of the said coverage for enabling him to arrange for substitute or additional policies to remedy any omissions.[26] A high level of emphasis also exists about the market rate for the premium and the prevailing conditions compared to the other contracts merely mentioning the reasonable premium rates.

In the case of indemnity clauses, it had very similarity with the other contracts except for the violation of the contractor or its employees and personnel and the inclusion of fine and penalty. In contrast, indemnification for fines and penalties in the other contracts is addressed as the sole responsibility of the non-complying party. The other constructive difference as the strength was the contractor's liability to indemnify and hold NIOC harmless from and against any loss or damage to the environmental, social, safety, security, and health (as per the ESHIA plan requirements) resulted from or connected with the petroleum operations carried out by contractor under the contract. Therefore, it is recommended for inclusion in the other contract as a complementary parameter. Moreover, addressing the direct capital costs (DCC) as the costs of insurance coverage obtained and maintained under the contract for insurance premiums, which paid by the contractor for obtaining such insurance coverage to be recoverable under the contract, is an efficient clause in IPC, which in most of the reviewed contracts had not been drafted. Nevertheless, assuming it as the petroleum costs needs to be added as a complementary parameter.

In addition, the comparative analysis highlighted that nearly all the contracts and IPC allocate the responsibility for indemnification of the particular adverse events, including the death of and personal injury to the members of both operator and contractor, firstly on a knock-for-knock basis. After that, the parameters of indemnity are determined by assigning the best party suited to bear the risk and the duty of indemnity based on different rationales, such as the ownership of, or access to, resources to prevent a specific risk from occurring, in addition to the capability to bear the economic consequences. For instance, the contractors have mostly been considered as the principal party responsible for the economic consequences of almost any damages related to the petroleum operation in all of the contracts mentioned above. This rationale is based on the assumption that contractors can reduce risk volatility according to the width of their properties or investment relative to the risk of damage to the petroleum facilities and due to the role as the leading party in charge of most portion of the petroleum operations. It also found out that even some contracts consider the contractor's liability so broadly to include all and any damages, even due to the acts of gods and force majeure, climate changes, or weather-related natural disasters, the catastrophe events although such events customarily shall be considered exclusions. On the other hand, the economic benefit principle justifies the stance of contractors who presume that most risks arising from the petroleum operation in addition to the responsibility for indemnification should be allocated to the operators as they benefit economically from production in the oilfield.

In the case of the insurance clause, IPC and the other contracts obliged the contractor to obtain insurance regarding the liabilities it has assumed under the contract. Therefore, it can be analyzed that the contractor's responsibility for bearing the economic costs of the adverse events may be too much for it to carry without the utilization of insurance. Hence, indemnification would be idle if the responsible party could not handle the economic consequences, so these contracts bind the contractor to maintain insurance and specify the types of insurance and the applicable thresholds and limits. Furthermore, the contractor is mandated to show evidence of compliance with the contractual requirement in this regard.

Given the type of the contract, however, it was not the objective of this study to compare them, and just the general outcome of examining them was intended. It should be noted that PSCs and service contracts are mostly the same in terms of the insurance and indemnity clauses. At the same time, the liability of the concessionaire, due to the nature of the license, is ordinarily considered such widely or even expressed by the term of "full responsibility" for any loss and damage incurred out of hydrocarbon activities, [27] which

[26] Iranian Petroleum Contract, (IPC), Exploration, Development and Production Service Contract, Clause 11.4

[27] The Concessionaire shall assume full and objective responsibility for all damage to the environment that may result, directly or indirectly, from the execution of the operations. (Federative republic of Brazil, Concession Contract, Clause 21.7).

subsequently constitute a broad exemption for the government implicitly.

Finally, according to the findings, the possibility of setting the aforesaid contractual clauses in the future petroleum contracts of Iran by applying the derived points would be provided in a more efficient manner, which eventually enhances the effectiveness of petroleum contracts in respect of insurance and indemnity and prevents potential future disputes, demonstrating the significance of the results of the study. Especially in comparison with the previous researches, none of them have addressed the parameters of this issue. Moreover, the achieved set of necessary parameters can be applied at the negotiation stage of petroleum contracts as one of the most challenging topics, ensuring the interests of the contracting parties and the balance of bargaining power.

7. Conclusions and suggestions

The discourses in the previous parts lead to two certain principal conclusions. As the answer to the main question, the first is the extracted and achieved set of necessary parameters of insurance and indemnity clauses in the upstream petroleum contracts as mentioned in Table 1. As a result, it is indicated that there are several parameters, including liability towards risks, the determination of liable contracting party for procurement of insurance and indemnification of losses, the limitation of liability, exclusions or exemptions, consequential damages, and waiving all rights of subrogation, playing roles in drafting the insurance and indemnity clauses contractually in the main types of upstream petroleum contracts. These obtained parameters should be considered in the wordings to have thorough and efficient insurance and indemnification clauses in the petroleum contract.

The second main conclusion is the identification of the existing contractual gaps and the common points, which were derived from examining and comparative analysis of the parameters, related to the foreign countries' contracts around the world with the IPC as stated in the comparative analysis section in detail.

In addition to the main desirable outcomes, some subsequent results have been inferred. It is concluded from the preceding clauses that it is the economic consequences arising out of the adverse events, which are being allocated, not the risk itself. Thus, the term risk allocation appears to be misleading since by allocation of any risk event and the liability to indemnify subsequently, despite several physical, bodily injury, legal, and reputational consequences, the economic costs of the occurrence are being allocated.

The study has also shown a transition in regards to the assignment of the best parties suited for bearing the risks and indemnification of petroleum contracts by development and utilization of risk allocation mechanisms such as indemnities, insurance, exclusions, and limitation of liability on a knock-for-knock basis, rather than the bedrock fault-based regime. Therefore, the contracting parties can codify these mechanisms into their contracts and regulate the contractual provisions to express their intent unequivocally, which is more consistent with their contract objectives and expectations. This is contrary to the fault-based regime as a default indemnity bedrock based on certain principles and theories of liability, in which the contract parties must bear and indemnify the full brunt of economic costs arising out of the adverse events if they have occurred, which can lead to more dissatisfaction.

Furthermore, the study found that a knock-for-knock basis is mainly used regarding death, personal injury, loss of, or damage to operators and contractors' items and property in the petroleum contracts. In contrast to the consequential losses indemnified on a fault basis, especially in respect of third-party death, personal injury, property loss or damage, intellectual property, patent infringement, and insurance to cover assumed liabilities, the other losses are allocated based on optimality, where they are assigned to the party that appears to handle and compensate them.

Ultimately, it is suggested to apply the findings of this study in the petroleum business, especially the Ministry of Petroleum of the Islamic Republic of Iran, enabling it to take more effective measures for the promotion of this industry contracts in terms of the issues of insurance and indemnity in the process of risk allocation. As a specific suggestion for this ministry, focusing more on the insurance aspect, especially for the upstream industry, is recommended since most insurance schemes are designed for the downstream industry. In addition, the optimization of the wordings of these contracts for more conformity with the legal system of Iran due to the lack of so many parameters is suggested.

As a specific suggestion for future research in this area, it is proposed to codify the insurance and indemnity contractual clauses based on the legal wording of the contract, utilizing the set of insurance and indemnity clauses parameters extracted in this study having a more precise and thorough petroleum contract. The examination of the insurance model for the National

Iranian South Oil Company (NISOC) contracts is also offered for future research papers. Moreover, as a general suggestion, future research in this area is inevitable to continue its development.

The most important limitation of the present study was the lack of access to the petroleum contracts due to confidentiality and the reluctance to provide information in this regard, according to the significance of the upstream petroleum industry.

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