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A Review of Kuwait's Petroleum Technical Assistance Contract in Terms of Establishing Requirements for Technology Transfer: Recommendations for Iran's Oil Sector

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Highlights

- Technical assistance contracts provide a better structure for technology transfer than other upstream oil contract formats;
- Coordination procedures and contractual sanctions to ensure their compliance are crucial in technology transfer;
- The balance of obligations is critical to facilitate technology transfer;
- Since Iranian oil companies have operated Iran's oilfields in recent years, the technical assistance contract format would be more helpful, especially for enhancement projects and technology transfer.

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Abstract

Considering the long-term nature of oil and gas contracts, managing the relationship between the parties to the contract is fundamentally essential. In upstream oil contracts, according to the level of supervision and control of the host state over the petroleum project, the level of communication is variable. In risk service contracts, due to extensive oversight, there should be a lot of interaction and cooperation between the parties. This study examines Kuwait's model of technical assistance services contracts. It concludes that, due to its improved cooperative structure, this format of service contracts is more compatible with current conditions in Iran's oil fields, such as southern Pars. Iranian oil companies operate in these fields but need more technology to function correctly. This article discusses how technical assistance contracts (TACs) can generate an efficient solution for the issue at hand. The methodology is based on describing and analyzing Kuwait's TAC.

Keywords: Upstream Petroleum Contracts, Technical Assistance Contracts, Services Contracts, Coordination, Technology Transfer

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1. Introduction

As the relationship in upstream petroleum contracts is long-term, involving different challenges, it is imperative to set up an optimized structure that prevents disputes and simultaneously leads toward the project goals (Maddahinasab, 2015, p. 41). Depending on the host state's policies and strategies and the characteristics of an oil field, one of the leading petroleum upstream contracts (concession, PSA, and services contracts) may be chosen. Risk service contracts (RSCs) provide the highest level of

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supervision and control for the host state. In countries like Iran, their major regulations specify that the National Oil Company (NOC) must own the oil in place and supervise the project at the wellhead. This is usually obtained through RSCs. In the case of Iran, buyback contracts and Iranian petroleum contract (IPC) have been Iran's petroleum upstream contracts for the past few decades. Technology transfer and local content enhancement have always been crucial in reforming Iranian oil contracts. Although designers believed the updated Iranian petroleum contract would facilitate technology transfer to Iranian oil companies, some writers argue that the IPC only helps Iranian oil companies get obsolete technology related to oil and gas production. The experience and knowledge of management, engineering, and procurement, which are more relevant for Iranian oil companies, are not transferred (Ameri, 2017, p. 83). Due to the sanctions, Iranian oil companies are developing and operating oil fields in Iran. The lack of appropriate technology in these companies is undoubtedly a big issue.

There are already enough publications criticizing former Iranian upstream petroleum contracts regarding their inability to actualize technology transfer for Iran's petroleum industry. Kashanei et al., in their article, pointed out that foreign International Oil Companies (IOCs) are unwilling to transfer their technology quickly as it is their tactical advantage (Kashanei et al., 2023). Therefore, contractual clauses like local content or even Iranian oil companies working in the setting of a Joint Operation Agreement (JOA) are not enough to bring about technology transfer from IOCs.

Due to the sanctions, it is impossible to sign contracts with the IOCs that hold the state of the art of technology; nevertheless, this paper aims for a future that may arrive when the Iranian oil industry is open for foreign investment again. Therefore, preparing for that day is helpful as the Iranian oil industry needs more time for trial and error. Thus, Iran's oil industry must develop scholarly literature and knowledge-based solutions for future scenarios. Accordingly, this article analyzes the technical assistance contract (TAC) format to indicate how this RSC format can help deal with the likely future issues of Iran's petroleum industry. The hypothesis is that the TAC format offers a unique structure of cooperation between NOCs and International Oil Companies (IOCs) that can benefit Iran's oil sector more than other service contracts.

Kuwait's oil sector is well known for using the TAC format to obtain technology and management from IOCs in the petroleum projects that Kuwaiti oil companies operate. Kuwait's TAC will be described and analyzed to better understand how it provides the collaboration framework for technology transfer. Lastly, the article will compare it to IPC (regarding its technology transfer potentiality) and address recommendations for Iran's use of upstream oil contract formats. In this regard, the research methodology is descriptive, analytical, and practical. It must be noted that since IPC has not been fully initiated and practiced in a project, it is impossible to provide an empirical analysis of its function in transferring technology. Thus, the article theoretically provides its analysis based on the content of the drafts and other publications regarding IPC's ability to transfer technology.

2. Technical assistance contracts

One of the most popular contractual tools for developing countries to obtain technology is technical assistance contracts (Saini, 1981, p. 35; Tesdell, 1961, p. 389). TAC integrates the human resources and enterprises of the recipient country into activities that help them gain relevant experience, thereby facilitating technology transfer (Walker et al., 2008, p. 529). It is a suitable option for countries that have achieved some level of technical advancement. They can handle the project with their internal organizations and experts but must use more advanced technology and improve their management structure (Aghaei and Aghaei, 1990, p. 17).

TAC requires the contractor to use its technological and managerial advantages to aid the owner in achieving the project's goals (Svensson, 2000, p. 105). The contractor undertakes the complicated and challenging parts of the project. It should perform its duties such as assessing the cost, purchasing the equipment and services, designing the technical plans, and defining timespans for completion of the different phases of the project and engineering according to the initial master plan and goals set out by the owner (host state). Furthermore, it is determined which parts of the project are to be managed by the main contractor and which parts are to be handled by the local subcontractors assigned to the project by the host state. In a TAC, it is pertinent to define the relation and cooperation structure between the participants in the project precisely as that is the channel to transfer the technology to the host state (UNIDO, 1996, p. 212).

The primary duty of the owner under TAC is to prepare the proper conditions for the contractor's activities. It may include providing the contractor with the raw and primary materials, employing laborers, and obtaining regulatory approvals and licenses (Rahbari, 2013, p. 228).

Technology transfer success depends on the dynamic and interaction between the main contractor, local companies, and experts (Arabi, 1998, p. 63). Therefore, reviewing the framework of coordination in the context of petroleum TACs can lead toward the aim of this article.

2.1. TAC in the petroleum industry

TACs, in the context of upstream petroleum contracts, are a form of RSC. In a generic view, RSCs can be categorized into two types[†]:

- RSCs, such as buyback and IPC, are signed with contractors to perform almost all upstream activities (exploration, development, and production).
- RSCs employ contractors to manage and help the local oil companies or NOCs perform upstream petroleum activities or undertake the improvement/enhancement of oil recovery (IOR/EOR).

TACs belong to the latter category of upstream service contracts. A petroleum upstream TAC requires the contractor to assist local companies by providing them with the capital, technology, and managerial expertise necessary to carry out these programs. Additionally, the contractor may perform enhancement programs such as IOR or gathering and storing associated natural gas (Kazemi Najafabadi, 2014, p. 24).

It must be noted that an upstream petroleum TAC, in its format, is the same as other petroleum contracts. Even the substance does not have many differences. The only thing that sets a TAC apart from other upstream petroleum contracts is its goal of transferring technology to the oil companies in the host state. In other words, the clauses, fiscal regime, and context of obligations are similar to those in other upstream petroleum contracts. Nevertheless, these clauses and the format are boldly applied in a TAC to promote a unique duty of cooperation. It sets a structure for collaboration between IOCs and NOCs or local oil companies so that technology transfer is secured through contractual obligations. Another difference is that the IOC is only engaged in some project regions and helps the operating local companies. Thus, of course, the more substantive differences of a TAC can be found in the documents that set out what exact services the IOC is to provide and how to provide them (i.e., the service order). Such documents are usually annexed to the negotiated TAC, and their content depends on each project's requirements and the project owner's objective goals. This sort of content is technical and not relevant to this study as it is a legal study. Therefore, this paper assesses the remedies and functionality of the structure a TAC must set. This highlights how a TAC can set the foundation for technology transfer in

[†] It is only one of the possible categories of RSCs and may not be inclusive.

the petroleum industry. The same generic clauses in other upstream petroleum contracts manifest these remedies and structures. Nonetheless, this research highlights how this usual format builds toward a secure framework that enforces the contractor's obligation to transfer the technology to the host state's NOC or local oil companies.

Some oil-producing countries entrust their low-risk oil fields to their NOCs or local oil companies. They sign TAC with the appropriate IOC to ensure the project goals are achieved and to gain updated technology and knowledge. Kuwait, Iraq, Qatar, Brazil, and Venezuela are among these countries. However, Kuwait is the most prominent user of TAC. As Kuwait's largest oil field, Burgan is a young oil field with high pressure. Thus, it is a low-risk oil field and does not need too much complex drilling to develop and produce oil. Therefore, Kuwaiti oil companies could operate in the field. They use TAC only in challenging oil activities that require technical assistance because they tend to take advantage of the expertise and technology of an experienced IOC (Stevens, 2008, p. 8).

Kuwait introduced its updated TAC version in 2008. In 2010, they signed a TAC with Shell. Kuwait Oil Company (KSC) receives long-term consultation and assistance from IOCs during different phases of the petroleum project under the TAC. In exchange, it pays the IOCs a fixed-rate remuneration that increases based on better results. The following sections will study the relevant characteristics of Kuwait's TAC. This is to understand how it establishes a structure for coordination between the NOC and contractor, which is critical for obtaining the necessary technological and managerial skills.

3. Cooperation framework in Kuwait's TAC for technology transfer

A common feature of most upstream oil contracts is that the contractor or investor obtains an exclusive right regarding the determined petroleum project. Accordingly, the owner or the host state cannot employ another contractor (under another contract) working on the same project horizontally along with the previous contractor (Iranpour, 2010, p. 58; Shiravi, 2014, p. 448). The distinguishing characteristic of the petroleum TAC is that it does not grant the contractor this exclusive right. This is because these contracts naturally require the contractor to work alongside other contractors involved in the project so that technology transfer can occur. Therefore, in Kuwait's TAC model, in Article 9.2.1, it has been specified that "the company (KSC) shall give the contractor 'non-exclusive' possession of the site". That means other contractors could be under contract with KSC on the same site. It is different from a joint venture (JV) or joint operation agreement (JOA) since, under these settings, oil companies share one contract, but in the context of TAC, local oil companies operating in the field have their contract separate from the TAC, which is between IOC and host state. They are not to be mistaken for subcontractors since they are not hired by the contractor IOC. Those contractors are the local Kuwaiti oil companies that the IOC will assist in operating and managing the project. Furthermore, Article 9.2.3 stipulates that the contractor must allow other KSC contractors and employees access to the project and perform the services in coordination with them. This indicates the first step toward channeling the project so that the IOC has no choice but to cooperate with local oil companies. The design of the obligations limits the contracting IOC's conduct toward the project. In other upstream petroleum contracts, the IOC can conduct the project more freely. Hence, they can devise excuses for not cooperating with the host state's oil companies. For example, in a buyback or any other RSC that relies on local content clauses for attaining technology, the IOC has excuses for not transferring technology. This is either by stating that the local content is not capable enough or not engaging the local content in the project in a manner they obtain the technology. In a TAC, the contractor is bound to certain limitations to ensure it cannot avoid technology transfer. The local oil companies operate the project and are not subordinate to the IOC contractor. Thus, the IOC contractor cannot bypass them.

Therefore, a robust cooperation framework must be established in TAC to prevent chaos and establish conditions where local oil companies can obtain technology from the IOC. The following subsections will study elements in Kuwait's TAC draft that form this coordination framework.

3.1. Familiarization program

As part of Kuwait's TAC draft, a several-month familiarization program is held to familiarize the contractor with the project and previously associated local oil companies (incumbent contractors). In Kuwait's TAC model, in Article 19.3, before the commencement date, the contractor (IOC) must adhere to the familiarization program specified in the contract specification. As stated in Article 19.4, the contractor must be in harmony and coordination with the incumbent contractors during the familiarization process. According to Kuwait's TAC model, failure to comply with the familiarization program is a fundamental breach of contract. The owner (KSC) can terminate the contract if the contractor fails to work with the incumbent contractors. It is up to the owner (KSC) to decide whether or not the contractor has succeeded in familiarization. Thus, if the owner is unsatisfied with the contractor's performance during the familiarization program, it can terminate the contract without compensating its expenses.

Putting such a contractual solid remedy for the contractor's obligation to familiarize themselves with the project and incumbent contractors (recipients of the technology) indicates how much this obligation has a central role in a TAC. This program establishes the foundation for the coordination framework necessary for technology transfer.

This obligation, coupled with a strict level of contractual remedy, is unique to petroleum TACs. There is no similar provision in other upstream petroleum contracts.

3.2. Strict and dynamic coordination procedures

When multiple firms work together in different industries, a standard and well-defined set of procedures is imperative for achieving optimal results (Brousseau, 1994, p. 320). With clear communication protocols, the parties involved in a contract can collaborate and coordinate to reach the goals. Moreover, without coordination procedures, disputes will likely arise among the parties interested in the project. Because the TAC format relies on dynamic communication between the IOC and the incumbent contractors from the host state, developing robust coordination procedures is even more crucial.

In other formats of upstream petroleum contracts, a coordination procedures document may be annexed to the agreement. This document describes how the parties to the contract must communicate to prevent project disputes and delays. These procedures, however, are much more prominent in the TAC format. This is because the critical goal of transferring technologies will only be achieved if effective communication and coordination between the project participants exist. Therefore, these protocols have been explained regarding each matter in Kuwait's TAC.

According to Kuwait's TAC, such procedures are managed under the owner's strict and in-field supervision. The owner appoints a superintendent who handles the coordination procedures. In almost all project parts, the superintendent will have representatives whose primary purpose is facilitating constructive communication between the parties involved. More importantly, the superintendent's duties focus on keeping the coordination in a state appropriate for transferring technology from the IOC to the incumbent local contractors. In other words, the superintendent is an intermediary between the primary and incumbent contractors. The superintendent and its representatives have considerable authority to approve or reject the contractor's work. In addition, they have significant authority to issue certificates that the contractor must obtain following the contract. This is to be regarded as having

performed the work. In fact, in TAC, the role of the joint management committee (JMC), as perceived in other formats of oil contracts, has been given to the superintendent. In other words, there is no JMC in TACs (or at least Kuwait's TAC). Instead, the superintendent performs the JMC's duties more efficiently as it is present in the field and can sort out the work faster. Further, superintendents give owners a better advantage by ensuring the contractor performs services to the owner's satisfaction in all project phases. Since the contractor is a powerful IOC, it may avoid coordinating with the incumbent contractors. In this case, the superintendent in the middle will bring a balance that makes the IOC work constructively with the incumbent contractors to transfer technical and managerial knowledge.

3.3. Local content

Local content policies in oil-producing countries have gained priority in recent decades as these countries tend to develop their internal capabilities to perform petroleum operations (Acheampong et al., 2016, p. 282). One of the means to support local content is setting it as the foreign contractors' obligation to use local content to a minimum measure specified in the contract.

Domestic contractors are already working with the IOC for projects under a TAC, so imposing heavy local content requirements on the IOC is optional. After all, enforcing local content in a manner that technology transfer is realized is also very challenging as the IOCs have the upper hand in bestowing the knowledge to subcontractors or employees who work for them.

Therefore, Kuwait's TAC obliges the contractor (IOC) to comply with a simple local content obligation because there is no need to impose unnecessary obligations on the contractor, especially when those unique TAC obligations (like the familiarization program) come with such strictness. According to Article 8.17, under the title "Kuwaitization", the contractor must hire Kuwaiti citizens to comply with the requirements outlined in the contract specification. The contractor is also obliged to train the Kuwaiti employees whenever necessary. Although there are no more local content requirements such as procurement of domestic equipment and other services, in this TAC model following the mentioned article, KSC has emphasized that employment of the Kuwaiti citizens is fundamentally essential to its present and future operational and strategic planning. Nevertheless, as this clause indicates, no strict remedy has been stipulated for this obligation. They have sufficed to an abstract definition of the obligation, contrary to the unique TAC obligations defined objectively with firm remedies.

3.4. Intellectual property rights

As mentioned before, the TAC format is based on technology transfer. Therefore, the contract must stipulate that the owner will be the exclusive holder of the intellectual property rights in all services produced by or on behalf of the contractor(s) in connection with the contract. Under Kuwait's TAC, in addition to that, it has been highlighted that the contractor shall indemnify, defend, and save harmless the owner (and its subsidiary incumbent oil companies) from and against all liability, claims, suits, actions, losses, and damages brought against the owner or incurred by it as a result of or in connection with any infringement of the intellectual property rights allegations. In this contract model, this specific indemnification obligation has been stated separately from the general indemnification clause to show the authenticity of the technology and methods that the contractor applied to the project and transferred to the owner.

3.5. Indemnity obligations

In an indemnity obligation, a party agrees to cover any liabilities resulting from operational activities (Zahari, 2017, p. 177). In some cases, indemnification is mutual between the two sides of the contract[‡] (Evans and Butler, 2010, p. 77). As a principle in upstream oil contracts, the contractor must take risks as the contractor handles the project. Therefore, indemnification is one-sided, with the contractor indemnifying the owner (Pugh, 2018, p. 322).

In Kuwait's TAC, the contractor also must indemnify the owner. Nevertheless, the contractor is not obliged to repay the incumbent contractors. Article 42.4 states that "neither the contractor nor the owner shall not be liable to the others in contract, tort, or otherwise for consequential damages resulting from or arising out of the contract". This includes the incumbent contractors as well. Therefore, in the event of liability arising from these incumbent contractors, they will be held accountable and responsible. This is more reasonable and makes it easier for the contractor to coordinate positively with incumbent contractors. Hence, it can perform its services without fearing becoming responsible for damages and liability caused by incumbent contractors who are not its subordinates. Again, the contractor has been relieved of unnecessary responsibilities, which, rather than helping achieve the main objective (technology transfer), are obstacles to the contractor. This is a critical point, especially for Iranian contract designers. All contractors' substantial obligations in Iran's IPC have been held too strictly. This approach will not produce effective results for a petroleum project as it raises unnecessary costs for the contractor and keeps it from applying its efficient efforts to perform the obligations that serve the project's primary goals.

4. Contractual remedies for enforcing technology transfer

As described in previous sections, the petroleum TAC requires the contractor to perform services, coordinate with the incumbent contractors, train them, and make sure the technology and experience of the contractor are transferred to the domestic collaborating oil companies and the relevant workforce. The contractor's obligation to transfer the technology is usually a commitment to outcome, not a commitment to means. In other words, the contractor has not completed its work until the goal of technology transfer has been met. Therefore, solid contractual guarantees are needed to ensure the services are conducted accordingly.

In Kuwait's TAC, three main remedies for technology transfer have been stipulated: liquidated damages, execution of the services by a new contractor at the previous contractor's expense, and finally, termination of the contract. In the following sections, these remedies are reviewed under Kuwait's TAC.

4.1. Liquidated damages for technology transfer

Article 35 of Kuwait's TAC specifies liquidated damages for failure to perform the services specified in the contract specification or service order. Most of the time, it is up to the superintendent to verify that the contractor has provided the services correctly. The contractor's obligation for the familiarization program has been specifically mentioned and is subject to liquidated damages in this article. Following Article 35.1, the liquidated damages will be paid for each day of the contractor's delay in fulfilling the services or obligations.

Because technology transfer is the primary duty of a contractor under TAC, this clause indicates a solid remedy for the contractor's failure to materialize its obligation to owners.

[‡]- Knock for knock indemnification

According to Article 34.3, there is a maximum amount of delay liquidated damages payable by the contractor. This amount shall not exceed the percentage of the contract price specified in the contract's specification. If the sum exceeds the maximum amount, the owner will have the right to terminate the agreement.

According to this TAC model, the liquidated damages sum or any other sums will be deducted from the performance bond or any debts to the contractor.

4.2. Execution by another contractor

In cases where the contractor fails to perform the services according to the specifications and will not or cannot perform them accordingly, the nature of the services is in a way that another contractor can execute them; the owner will have the right to employ another contractor to perform the services at the expense of the previous contractor.

Article 37.2 of Kuwait's TAC states that, where the contractor does not comply with any instruction issued by the superintendent, the company (KSC), within seven days immediately following the date of such instruction, may employ and pay others to execute the work and all costs incurred in connection with it, plus reasonable administrative costs, shall be recoverable from the contractor by the company (KSC) as debt or may be deducted from any money due to contractor under his or any other contract between the parties without notice or any judicial proceeding.

As another contractor cannot deliver some aspects of technology, it can be debatable whether this remedy can be applied to contractors who fail to transfer their technology. Nevertheless, this remedy applies to those aspects of technology transfer when some intellectual properties must be purchased (such as licenses) or when a contractor has to perform research and development (R&D) services.

4.3. Termination of the contract

The owner may terminate the contract as a last resort if the above remedies do not help the contractor's performance in transferring technology. Terminating the contract can have detrimental consequences for the contractor, such as losing the right to recover the capital it has spent on the project and reimbursing the owner for the owner's loss.

According to Kuwait's TAC, when the contractor's debt as liquidated damages exceeds the maximum amount or when it does not pay the liquidated damages and there is no other way to offset the sum, it will be entitled to terminate the contract after 30 days under the owner's notice. Moreover, when the services (including technology transfer) that the contractor refuses to perform are of a nature that another contractor cannot accomplish, the owner has the right to end the contract.

According to Article 40.3 of Kuwait's TAC model, in the event of a termination by the owner, the contractor shall assign to the company all subcontracts, purchase orders, and other agreements as well as all intellectual property rights, technology licenses, and other rights relating to the services and necessary for the construction, ownership, and operation of the facilities.

Plus, in the contractual remedies, the owner has reserved the right to seek compensation for its loss according to legal means by proceeding the case to arbitration or litigation.

5. Conclusions

When comparing Kuwait's TAC with Iran's recent Iranian petroleum contract, which was supposedly intended to transfer technology, IPC has almost high goals for technology transfer. Still, there is no appropriate structure for the actualization of these goals. According to the general terms and conditions

of the new Iranian petroleum contracts, approved by the board of ministers in 2016, IPC requires the contractor to establish an incorporated/unincorporated joint operating company with an Iranian private company. This is the platform on which the contractor transfers its technology and know-how to the Iranian private oil company. The problem with this framework is that the contractor has the upper hand in such dynamics and can evade technology transfer. Although the technology transfer is a commitment to the outcome under IPC, there is no contractual remedy to guarantee that. However, this is pursued dynamically under TAC with proper contractual sanction mechanisms. Additionally, local content obligations under IPC are unnecessarily heavy, impeding technology transfer. In this case, as the contractor must use Iranian equipment and materials, which are inferior to foreign equipment and materials, it can inhibit the use of some high-tech methods. Additionally, the contractor is required to hold indemnity obligations on behalf of the Iranian private oil company. Under Kuwait's TAC, the contractor is not responsible for liabilities incurred by incumbent contractors. Consequently, the contractor under a TAC is not concerned with the risks arising from the local contractors and can work with them more effectively. Another issue with IPC is that it is a format that covers all upstream petroleum operations (exploration, development, and production). When the contract covers such a vast range of activities, setting up a structure for technology transfer becomes more challenging. However, under TAC, certain services are subject to the contract. Therefore, it is easier to focus on technology transfer using simple methods such as a highly empowered superintendent instead of a joint management committee.

From reviewing the Kuwaiti TAC model, it is concluded that this format of upstream petroleum contracts offers an efficient goal-oriented structure that is well suited for transferring technology to domestic oil companies in developing countries. This is because of the appropriate coordination mechanisms between the main contractor (IOCs) and incumbent contractors (domestic oil companies). Further, there is a better balance of obligations that focuses on the specific goals of the contract, such as performing certain services (especially enhancement projects) by the contractor to assist the incumbent contractors and improve their technology. In TAC format, unnecessary structures have been removed or reformed into a more functioning frame. For example, using the superintendent role instead of a JMC has made managing the project, communication, and owner's supervision more effective, preventing delays in the project. For a TAC, a host state should reduce contractor risks as much as possible by selecting low-risk projects and simplifying the contractor's responsibilities. However, the project must be challenging enough to require high technology. Yet, unnecessary obligations such as heavy local content and indemnifying the cooperating local companies could be eased so that the contractor would have more freedom in performing services and transferring technologies. On the other hand, obligations crucial to technology transfer success must be taken seriously. For example, it must be stipulated in the contract that technology transfer is a commitment to the outcome, and without it happening, the contract has not been executed. Similarly, coordination procedures such as familiarization programs that establish the venue for communication between the contractor and local contractors must be taken seriously and protected by solid contractual remedies.

Thus, when foreign investment is once again available in Iran for oilfields that Iranian contractors have operated, the TAC format can be very helpful in obtaining technology and enhancing existing projects by applying EOR or capturing associated natural gas that is essential for Iran's oil industry. To attract more technology to Iran's upstream oil sector, the country should consider implementing a technical assistance contract format similar to the one used in Kuwait. The Kuwaiti TAC model has proven to be an efficient structure for transferring technology to domestic oil companies in developing countries. By adopting this format, Iran can benefit from the appropriate coordination mechanisms between the main contractors (IOCs) and the incumbent contractors (domestic oil companies). To attract more technology,

Iran must reduce contractor risks. This can be achieved by selecting low-risk projects and simplifying the contractor's responsibilities. However, the projects should still be challenging enough to necessitate the use of high technology. Iran can encourage technology providers to engage in the sector by striking the right balance between risk and challenge. For that purpose, the TAC model can provide an appropriate contractual structure. The TAC model can be a helpful tool for obtaining technology. However, it is insufficient for that end as many other non-contractual factors can affect technology transfer. There are many factors to consider, such as political and economic factors, transparency, and anti-corruption structures. However, this study could not examine the impact of these factors, so they can be addressed in future studies.

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Nomenclature

EOR	Enhanced Oil Recovery
IOC	International Oil Company
IOR	Improved Oil Recovery
IPC	Iranian Petroleum Contract
JOA	Joint Operation Agreement
JMC	Joint Management Committee
JV	Joint Venture
KOC	Kuwait Oil Company
KPC	Kuwait Petroleum Corporation
KSC	Kuwait Shareholding Company
NOC	National Oil Company
PSA	Production Sharing Contract
R&D	Research and Development
RSC	Risk Sharing Contract
TAC	Technical Assistance Contract
UNIDO	The United Nations Industrial Development Organization

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