

Intellectual Property Rights with the Strategy Formulation Approach in the Context of Oil and Gas Industry

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Highlights

- The oil and gas industry are undergoing a shift toward innovation and intellectual property rights;
- Intellectual property rights are crucial for the survival and growth of the oil and gas industry;
- The oil and gas industry faces unique challenges in managing intellectual property;

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Abstract

The oil and gas industry, as one of the most complex industries with unique characteristics, plays a vital role in the world's energy supply. The actors of this industry are condemned to create, develop, or acquire innovative technologies to be present in this field, to gain, and to maintain a competitive advantage. With the change in the approach of companies active in the oil and gas industry compared to the past, intellectual achievements have been considered a valuable asset, and their support has become inevitable. Companies active in the field of oil and gas are well aware of the fact that obtaining maximum profits requires managing and supporting intellectual achievements and defining an intellectual property strategy aligned with the company's business goals. Therefore, each company defines its intellectual property strategy according to its role in the energy supply chain and operates based on it. The cost and profit of intellectual assets are two important criteria in determining the appropriate strategy of an oil company.

Keywords: Competitive advantage, Technological innovations, Intellectual achievements, Intellectual property management, Oil companies

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١. Introduction

With the increase in fossil fuel consumption and sensitivity to environmental considerations, creating innovation and supporting it have become important in the current situation. Innovation, with its effect on reducing costs, improving safety, and preserving the environment, has caused companies active in

the oil and gas field to create innovative technologies, which gives great importance to intellectual property rights and protections arising from them. According to the growing trend of energy consumption in the world, providing sustainable energy with low cost and minimal harmful environmental effects has been considered by oil and gas activists.

The reduction of existing oil and gas resources has led to the focus of energy markets on the strategy of diversifying activities and moving toward creating innovation and new alternative technologies, and the main players of the oil and gas industry in the new century are companies that create innovation and advance technology. They should be able to develop new technologies or adapt to them in order to influence and control the market (Orsenigo and Sterzi, ٢٠١٠, p.٥)

Despite the importance of intellectual property rights, the protections resulting from it, and the development of a suitable intellectual property strategy in the field of oil and gas, there is no comprehensive research on these issues. Therefore, this work, while explaining the necessity, importance, and services of intellectual property rights in the oil and gas industry, examines the challenges in this field and expresses the approach of the oil and gas industry to intellectual property rights. In this regard, after providing a definition of the strategy of intellectual property rights and its different levels, as well as introducing innovation evaluation indicators, we examine the state of intellectual property rights in some Persian Gulf countries due to their strong dependence on oil revenues and the impact of intellectual property rights on their income.

٢. Literature review

٢.١. Oil and gas industry in the perspective of creating technological innovations

Activists of the oil and gas industry have always investigated the possibilities of production. For this reason, today, it is possible to extract fossil fuels from fields due to technological advances in the field of production. Therefore, it can be stated that the protection of intellectual property rights has had a direct effect on the increase of these achievements. Innovation leaders who have made huge investments in research and development are mainly service providers and equipment suppliers. Because the companies active in the upstream field of the oil industry prefer to provide these things, which require huge investment and high risk from the mentioned companies. The increase in investment in research and development units has a direct relationship with the increase in patents. Unlike companies that provide services and equipment in the oil and gas industry, national oil companies have historically been behind in recognizing the value of innovation and seeking appropriate support for intellectual achievements. Nevertheless, this practice is changing today, and even national oil companies have realized that the creation of innovation and its proper support by restraining the revenue generating potential of competitors, granting exploitation licenses, preventing others from entering the market through patents, creating competitive advantages through innovative technologies, and obtaining other technologies through appropriate cross-licensing arrangements will maximize their benefits (Matour and Ameri, ٢٠٢١).

The general consensus among companies operating in the oil and gas industry is that the industry is at a critical juncture, and it is imperative that national oil companies go beyond simply acknowledging the need for innovation and start creating innovation in an organized manner to ensure that their interests will be guaranteed in the long run. In such a situation, the survival of companies in the unstable oil and gas market depends on investment in research and development. A significant part of the costs of the upstream oil and gas field is related to the development and introduction of new ideas and technologies. In the traditional standard, innovation only requires investment; however, in addition to investment, the method of implementation and management of that investment is also important today.

٢,٢. Intellectual property rights and explaining its necessity to protect intellectual achievements

According to the definition of the World Trade Organization, intellectual property rights are legal rights that are given to the creator of a work to support the creator's innovation for a certain period. These legal rights are the exclusive right for the creator's maximum exploitation of his/her innovation. Various reasons such as human progress and comfort depend on innovation and invention in various fields; future innovations depend on the legal protection of creations, and the promotion and protection of intellectual property rights lead to economic development, job creation, and promotion. The quality of life makes it necessary to protect and support intellectual achievements.

Intellectual property rights, on the one hand, seek to ensure creativity in work environments and in some way support innovation and initiative; on the other hand, they can resolve disputes arising from contracts or rights violations by taking advantage of the regulations governing the intellectual property system. Intellectual achievements are an essential asset for large and creative business organizations, so companies register patents and obtain protection of intellectual property rights to create a competitive advantage.

Companies with patent rights are increasingly incorporating the transfer of these rights into their business processes. This issue leads to an increase in the attention of companies to this field, but the factor that reduces the desire of companies to support intellectual achievements is the staggering costs of registering these achievements, especially at the international level (Stevens, ٢٠١٦). Intellectual property rights and the resulting protections provide a platform for multinational companies to transfer their technology to countries that need that technology, and both companies will benefit in this way. It is worth mentioning that companies receiving complex technologies generally localize these technologies.

٢,٣. Definition of intellectual property strategy

Investing in the field of intellectual property is one of the factors that prevent others from abusing the innovations created by companies. Big companies invest in this field to ensure their interests and to be pioneers. The method that companies adopt to invest in the field of intellectual property is called the strategy of intellectual property rights. The strategy of intellectual property rights is a factor that improves economic opportunities, controls costs, and is a tool for paying attention to valuable ideas and maintaining innovations. In an industrial economy, companies create wealth and value from their tangible assets by turning raw materials into finished products. The Brooklyn Institute in a study in ١٩٨٢ showed that the value of tangible assets accounted for ٦٢% of the value of oil companies, while ١٠ years later this percentage decreased to ٣٨%. Studies at the end of the ٢٠th century indicated that the value of tangible assets increased by ١٠%–١٥% (Cody, ٢٠٢١). Therefore, experts in the field of capital believe that the value of assets has changed from tangible assets to knowledge-based strategies. A company's strategy is usually defined based on the position of that company in the industry or the plan under which the company pursues its competitive advantage, which comes from the combination of its assets and potentials. Since the oil and gas industry is asset-based, the competitive advantage of this industry comes from the combination of tangible and intangible assets (intellectual achievements).

٢,٤. Introducing the indicators of the state of innovation

The number of patents and research and development costs are two indicators to check the state of innovation in different industries. The higher the number of patents registered in an industry or the higher the expenses spent in research and development units, the more favorable situation of innovation in that industry. To measure innovation in different industries, each of the above two criteria is used, and sometimes the result of these criteria indicates the state of innovation. Of course, due to the

differences in industries and companies in their willingness to patent, the use of the patent index to examine innovation in some industries is criticized. Regarding some industries and companies that prefer to use trade secrets instead of patents to protect their intellectual achievements, the patent index cannot be a suitable measure to estimate the state of innovation. For example, due to the reluctance of some innovative companies in the upstream oil and gas industries to patent their patents, using their patent index to comment on innovation may be misleading.

2.9. The importance of intellectual property rights in the oil and gas industry

The oil and gas industry are rapidly changing and creating innovation to meet the needs of consumers and align with modern technology. Companies active in this industry rely on proprietary technologies such as the technology of exploring energy resources and extracting it from the ground. The achievements of intellectual property in the oil and gas industry are extremely important for oil companies, so supporting these achievements in various ways, including patents and trade secrets, protects the interests of the companies. Companies active in the oil and gas industry must be vigilant about protecting their intellectual achievements. The development of new equipment and processes, the discovery of new sources of oil and gas, increasing productivity, reducing costs, increasing safety, and protecting the environment are areas of the oil and gas industry that can be a competitive advantage by using technological technologies and innovation for the leading companies in this field (Abbe, 2014). Based on this, companies active in the field of energy, including oil and gas companies, are always looking to develop and upgrade equipment and create new processes. It can be mentioned that the majority of the business aspects of this industry depend on innovation rather than competitive advantage.

2.10. Changing the oil and gas industry approach to intellectual property rights

In the oil and gas industry, the approach that considered intellectual property rights merely a tool to protect intellectual achievements has changed to an approach regarding it a tool to maximize the company's interests. Intellectual achievements have become more valuable than material assets for gaining wealth and competitive advantages. In the oil and gas industry, intellectual achievements are mainly protected under the trade secret or patent system. Although the patent system gives the inventor the exclusive right to use the innovation, gives the right to grant a license to exploit or prohibit others from using the technology, and ultimately creates competitive advantages for the inventor, trade secrets for companies prevent others from using a certain technology they own (Teece, 2006:46). Moreover, there are other risks such as reverse engineering of processes or products in the use of trade secrets as a form of protection, and it can be stated that trade secrets are a weak protection system. On the other hand, the patent gives the oil and gas industry activists the opportunity to earn money from granting the exploitation license regarding the patented invention, offers them the freedom of action in the use and bargaining power to obtain the mutual exploitation license, and is a tool to communicate with industry leaders. A well-designed patent strategy identifies the company's key objectives, taking into account competitors and key players in the specific technology field. In addition, it determines what approach, namely defensive or offensive, should be focused on.

In the defensive patent approach, the main goal of the company is to protect against patent infringement; nevertheless, in the offensive approach, the company seeks to protect and monopolize the innovation by preventing others from using or commercializing it by granting an exploitation license. A practical and effective patent strategy is the one that fully supports your intellectual achievements by taking advantage of both defensive and offensive approaches. After patenting, its commercialization is evaluated, and a decision is made to use it personally or to transfer the technology to others.

۲,۶,۱. Intellectual property rights services in oil and gas industries

Oil and gas industries are highly competitive and technologies related to this industry are constantly developing. Thus, protecting the company's assets and technologies through appropriate protective coverage is inevitable. Supporting complex technologies in such an environment requires comprehensively explaining an intellectual property strategy in a precise manner. The development of new technologies is only the first step; in the next step, intellectual property rights with proper protection of intellectual achievements ensure that the rights arising from the company's inventions are preserved, and competitors cannot overtake the company whether these competitors are known or not. Oil and gas exploration, production, and processing have developed in a way that involves a combination of technologies (Elsan, Chehreghanib, ۲۰۱۹). This combination has continued to expand as the oil and gas industry seeks to find and develop reserves in more remote and inhospitable locations and tries to produce and process oil and gas with more efficient, safer, and more environmentally friendly methods. In a competitive, capital-intensive, and high-risk industry like the oil and gas industry, it is vital to be ahead of competitors, so protecting new and unique technologies can differentiate a company from competitors and guarantee its survival and success.

Protection based on the trade secret system can help a company to protect its innovations in manufacturing processes, supply chain, and operations execution and gain a competitive advantage. Trade secrets can be very valuable in many cases in the oil and gas industry. The oil and gas industry has unique issues that can be explained and determined in the space of intellectual property rights. Managing intellectual property in the oil and gas industry is a constant challenge as one of the most sensitive industries with complex plants, equipment, and processes. Regardless of the position of an oil company in the value chain (from exploration to delivery of the final product to the consumer), setting up and following an intellectual property strategy has helped reduce the risk of the company's operations. In addition, it has created the basis for cooperation with investors and a source of acquisition; it is considered income. Formulating an internal management plan to document and evaluate the commercial and strategic relevance of intellectual achievements developed in the business environment enables the creation of a suitable intellectual property portfolio related to the industry (Anderson, ۲۰۰۰).

۲,۷. Intellectual property strategy in the oil and gas industry

Some people believe that determining the strategy of intellectual property to maximize the benefits of intellectual achievements is an inevitable necessity. In the oil and gas industry, there is no single strategy that can be implemented in all companies, and they will have different strategies according to their areas of operation: upstream, downstream, chemicals, or transmission lines. Furthermore, the strategy of intellectual property differs between international oil companies and national oil companies. Determining the strategy for intellectual property also depends on the position and role of a company in the value chain: the strategy of an oil producing company differs from that of an oil company that provides services or from that of a company that transports oil products (Prins, ۲۰۲۰:۱). Finally, the intellectual property strategy of an oil company is different based on the method of protection, geographical area, and legal costs of protection.

۲,۸. Different levels of intellectual property rights (IPR) strategy

As stated, there is no single strategy in the oil and gas industry that all companies and organizations in this industry follow. In other words, various strategies are used in different sectors of this industry, as described in five levels.

٢,٨,١. Defensive (supportive) level

At this level, companies use intellectual property rights as a defensive tool to protect their achievements and seek to protect creativity and ensure that they are not violated by others. Obviously, in this type of intellectual property rights strategy, registration costs and other costs can be very high because companies are trying to determine the protection territory. At the mentioned level, the most common method of protection is patenting, which leads to the freedom of use, reduction of infringement by others, the advantage of being a leader, introducing the company as a technological company, obtaining tax benefits, and the possibility of high-level commercial activities.

٢,٨,٢. Cost management level

At this level of strategy, companies try to support their intellectual achievements; however, they focus on finding support methods that can provide this support at the lowest cost. This means that companies are trying to protect their technologies and monitor costs at this level so that they can manage the costs incurred to create support.

٢,٨,٣. Profit center level

Companies use this level when they intend to transfer their intellectual property rights. Value production at this level can be made possible through licensing or partnership of the rights holder company with other companies. This value is obtained directly from the licensed company through the payment of royalties or indirectly from the economic benefits resulting from the partnership between these companies through mutual partnership agreements (Perrons, ٢٠١٤).

٢,٨,٤. Integrated level

At this level, companies that have different fields of activity define an intellectual property strategy for each of these fields in line with the ultimate goal of the company. The cost necessary to support the intellectual achievement determines the strategies. Further, they pay attention to the monetization of innovation and which achievement can give them the best competitive advantage.

٢,٨,٥. Ideal level

At this level, companies have a long-term view to find a strategic role for themselves in the oil and gas industry, considering the complexities in managing intellectual property rights. Therefore, they may make investments which may not create value for them at the present time but will create a competitive advantage and place them in a position that other competitors and industry activists need in the long run by supporting innovations.

It should be noted that the ideal level does not necessarily mean the best level, but each of the above levels can be best according to the needs and capabilities of each company. A company's approach to its intellectual achievements depends on that company's strategy. For example, for a company whose strategy is to make money from intellectual achievements, the profit-centered level is the best and most ideal level. The important point is that, in a company's business strategy, the development of technology and production is directly related to the company's intellectual property rights policy (Nicholson, ٢٠٠١).

٢,٩. Challenges of intellectual property rights in the oil and gas industry

Although oil companies use the patent system, one of the most important functions of which is to prevent others from using their intellectual achievements without permission, to protect their intellectual achievements, many oil companies have found that if they want to prevent others from using their intellectual achievements, they have to file a lawsuit. Therefore, there is no peace of mind regarding intellectual achievements (Wambui Mwaura, ٢٠١٩). In small-scale oil companies, intellectual

property strategy is very much related to business strategy, and determining this strategy correctly is very important both in favorable and unfavorable conditions. The noteworthy point is that it becomes difficult to maintain the advantages of intellectual achievements in order to increase the possibility of patenting as the number of competitors rises. Hence, companies with these achievements should always try to update and diversify their portfolio of intellectual assets.

Some believe that it is better to protect technology through trade secrets in oil companies because, in this way, it is better to prevent third parties from accessing the company's technologies. In its ideal state, the intellectual property strategy should enable the company to create the maximum possible economic value, ensure the company's sustainable activity, and determine the country's national development, in the case of national oil companies. On the other hand, some believe that from the defense viewpoint, patent protection provides the company's interests better.

۲.۱.۱. Intellectual property rights in some Persian Gulf countries

The presence of huge oil and gas resources in the Persian Gulf has turned this region into a strategic region. Despite the development of recent decades and efforts to replace other energies such as water, wind, sun, and nuclear energy, still oil and gas have maintained their importance as the superior energy and the main raw material for the production of industries; its value is also increasing day by day. In such a situation, the Persian Gulf countries, due to their strong dependence on oil revenues, are always trying to create technological innovations and upgrade new technologies in order to maintain their position and gain a competitive advantage in this industry. In the following, the situation of the three Persian Gulf countries in the field of intellectual property rights is explained (Perrons, ۲۰۱۴).

۲.۱.۱. United Arab Emirates

In the United Arab Emirates, each emirate is responsible for the control and development of its resources and production. Abu Dhabi National Oil Company covers all aspects of upstream and downstream operations in the oil and gas industry, which accounts for more than ۹۰٪ of Abu Dhabi's oil production, using its ۲۱ subsidiary companies. In recent years, the Abu Dhabi National Oil Company has focused on creating innovation through investment in research and development units. Financing related projects and the establishment of an oil and gas research and training center are the results of this approach. The research and training center is not just an educational institution, but it works as the research and development arm of Abu Dhabi National Oil Company.

Furthermore, Abu Dhabi National Oil Company has partnered with the Abu Dhabi Technology Development Committee to focus on providing services in the field of intellectual property management, including the management of exclusive rights resulting from the patent of Abu Dhabi National Oil Company. The above cases increased the support and variety of intellectual achievements and caused Abu Dhabi National Oil Company to become the owner of proprietary technologies (technologies that are protected by intellectual property rights) by formulating a suitable intellectual property strategy through the commercialization of intellectual achievements. For example, Abu Dhabi National Oil Company has entered a contract with Schlumberger Company, and Schlumberger Company has received offshore drilling technology from Abu Dhabi National Oil Company to use in its drilling services through exploitation license. This technology has so drastically improved the offshore drilling operations that it has resulted in the reduction of drilling time, the stability of the performed drillings, and the saving of the main power of the operating companies.

٢,١٢. Saudi Arabia

According to the report of the International Energy Agency in ٢٠٢٣, Saudi Arabia is the third oil producer after the United States of America and Russia. The National Oil Company of this country (Aramco Company) has the largest proven reserves and production of hydrocarbon resources in the world. As the largest daily oil producer, this company has considered innovation in exploration a valuable asset. Aramco's research and development activities are focused on creative ideas to achieve further, more useful, more sustainable, and more competitive reserves. Obviously, Aramco has realized that achieving innovative processes requires continuous efforts in research and development. One of the aspects of Aramco's innovative strategy in the field of intellectual property is to establish a global research network to provide research facilities with the aim of earning money and creating innovation centers in America, Asia, and Africa from this network. These innovation centers include King Abdullah University Center for Science and Technology, Boston Research Center, Paris Research Center, and several other centers. The company's intellectual property strategy first addresses the areas that lead to competitive advantage, recognition of property rights at the world level, and the diversity of products. Other efforts of Aramco are dedicated to the development of intellectual property rights in the fields of catalysts, materials science, and nanotechnology.

٢,١٣. Qatar

The state-owned Qatar Oil Company has invested in fields such as exploration, production, sale of crude oil, natural gas, gas condensate, refinery products, chemicals, steel, and aluminum. Qatar Oil Company has established the Qatar Oil and Gas Technology and Research Center, created with the aim of designing and implementing the research and development needs of existing and new technologies. The progress of the mentioned company from a small oil producing company to a global supplier is due to the cooperation of this company with international partners with an emphasis on innovation in the field of oil and gas. This company has been able to protect itself from the fluctuations of crude oil prices by focusing on innovation and acquiring modern technologies in the field of oil and gas. In the Doha Science and Technology Park, Qatar Oil Company has been active in the field of research and development of oil and gas and new ideas of technology development in cooperation with international partners such as Exxon Mobil. Further, its main focus has been on the management of environmental issues and the safety of liquefied natural gas production. As a result of these collaborations, Qatar Oil Company has succeeded in acquiring strategic technologies such as the technology of drilling deeper production wells that have a faster flow of gas than other regions of the world (Hurmelinna-Laukkanen, Ritala, ٢٠١٠).

٣. Conclusions

The exploration of oil and gas as a source of energy is one of the pillars of the world's industrial economy. Today, most of the conventional sources of oil and gas are nearing the end of their life, and sustainable energy supply requires the acquisition of innovative technologies for the exploration of unconventional sources of oil and gas. Technical knowledge, innovation, and technology are very important in the oil and gas industry, especially in the case of companies providing oilfield services. Thus, these companies put the support of intellectual achievements on their agenda. The new approach regarding intellectual achievements, which does not only take into consideration the support of these achievements, but also considers them to be valuable assets to maximize the interests of companies, has caused companies to define a strategy in line with the company's goals regarding their intellectual property rights and achievements.

A diverse portfolio of intellectual assets is provided to companies by registering patents, which is one of the forms of support used in the oil and gas industry. Today, the leading companies in this industry use patents not only for protecting investment in research and technological activities, but also for purposes such as earning money from agreements related to exploitation licenses, avoiding the problems of maintaining intellectual achievements as a business, and reducing investment risk. Moreover, increasing the company's ability to attract financial resources is one of the important reasons for the attention of companies, especially technological start-ups, to the patenting mechanism.

Reducing costs and generating value from intellectual achievements are significant issues in the optimal management of the portfolio of intellectual achievements. Oil companies should invest in technology and pay attention to changes in the energy market to improve their position in this industry. With the increasing importance of intellectual property rights, the issues of providing the best protection and how to use intellectual achievements to achieve the company's goals have become more important. Therefore, it is inevitable to define a suitable strategy to maximize the benefits of intellectual achievements, and innovation and joint activities will flourish with this maximization of growth.

Nomenclature

IPR	Intellectual Property Rights
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