Green Deep Seabed Mining: The Opportunities for Islamic Finance

KLEMENS KATTERBAUER[1], RUI ALEXANDRE CASTANHO[2,3], HASSAN SYED[1], DANIEL MEYER[3], LAURENT CLEENEWERCK[1], SEMA YILMAZ2,[4]
[1]Center for Islamic Meta-Finance,
EUCLID University,
CENTRAL AFRICAN REPUBLIC

[2]Advanced Research Centre, European University of Lefke
Lefke, Northern Cyprus, TR-10 Mersin,
TURKEY

[3]College of Business and Economics,
University of Johannesburg,
PO Box 524, Auckland Park,
SOUTH AFRICA

[4]Department of Economics
Yıldız Technical University,
TURKEY

Abstract: - Seabed mining, which focuses on extracting minerals from the ocean floor, is vital for the sustainable development of the green economy. With current initiatives targeting coastal waters exceeding 200 meters deep, these areas yield sand, tin, and diamonds crucial for meeting the growing demand in the energy transition and new technologies. Unlike onshore mining, deep-sea mining lacks stringent national regulations, presenting an opportunity for Islamic finance. This alternative aligns with long-term investment principles, risk sharing, and environmental responsibility, addressing the absence of an international legal framework. The essay explores the benefits of Islamic finance in funding deep-sea mining, ensuring project viability, sustainability, and environmental preservation. Additionally, an artificial intelligence framework is proposed to optimize funding for such projects.

Key-Words: Energy transition, deep sea mining, UNCLOS, project financing, sukuk, environmental protection, private-public partnership, international project financing.

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1 Introduction

Islamic finance may be a practical option for securing sustainable project funding, given the rising popularity of deep-sea mining to support the energy transition and the lack of an international legal framework and jurisdiction. The energy transition towards a greener and more sustainable energy system requires significant amounts of mineral resources. While extraction in onshore environments has increased considerably, 71 % of the world's surface is made up of the ocean of which the vast majority represents the deep sea. This creates a huge opportunity to access these mineral resources in these environments. Islamic finance integrates Islamic principles that emphasize long-term investment partnerships with risk sharing and ensuring that investments do not harm the environment or society. The essay discusses the advantages of Islamic finance for funding deep-sea mining projects and how its tenets guarantee the projects' viability, sustainability, and environmental preservation. A framework for artificial intelligence is also offered in order to maximize the funding of deep-sea projects. Between 1,400 and 3,700 meters below the ocean's surface, vents produce globular or enormous sulfide deposits. Silver, gold, copper, manganese, cobalt, and zinc are among the priceless metals that may be found in these deposits. The

deposits can be mined technologically using hydraulic pumps or bucket systems that bring the ore to the surface for further processing, [1].

Sea-dredged minerals and seabed minerals are two types of marine minerals. Sea-dredged minerals can only be mined at maximum sea depths of 200 meters from dredging activities near the coastal zones. This contains mineral-rich sands like diamonds and ilmenite as well as mud for building purposes and silt. Many questions come up when it comes to mining operations. These are the legal considerations around who owns the deep sea, potential environmental effects, and the best funding options for these projects. The legality of deep-sea mining is a topic of considerable public discussion. According to several organizations, deep-sea mining could seriously harm the deep marine ecology and cause heavy metal contamination, [2]. In contrast, there are several attempts underway to create new technology that doesn't hurt the marine environment in response to the rising need for seabed minerals to support businesses and the switch to electric cars. Cook Islands awarded three exploration licenses for polymetallic nodules within their EEZ, while the Clarion Clipperton Zone received 19, despite commercial seabed mining still in its infancy, [3]. Deep sea mining typically has a lot of promise on both small and large stages. Significant technological obstacles still exist, including those presented by surface mining ships and robotic mining equipment. Furthermore, refineries must be built; these are probably best suited for onshore locations. The need for deep sea mining will become even more crucial given the focus on net carbon zero and the dependence on renewable energy sources, including wind farms, solar energy, electric vehicles, and cutting-edge battery technology. These make heavy use of a variety of metals, some of which may be in low supply. Deep seabed mining can therefore offer a short-term alternative for obtaining these metals, [4].

This article will comprehensively explain the rules governing deep seabed mining and how they relate to international law. The discussion and analysis of Islamic financial funding possibilities for deep sea mining will come next. This will cover how Islamic finance aligns with fairness and preserving the ecosystem of the deep sea for the benefit of humanity. Islamic banking sets itself apart by upholding society and adopting strict Islamic principles. While significant aspects of Islamic finance include almsgiving (Zakat), endowments (Waqf), charity (Sadaqa), and interest-free loans (Qard Hasan), maintaining dominion over nature and people's capacity to survive and thrive is at the heart of Islamic ideals, [5].

2 Deep Seabed Mining Regulations

Given that the legal framework may vary depending on whether national or international jurisdiction must be applied, deep-sea mining may be a difficult region to navigate. The 1982 United Nations Convention on the Law of the Sea (UNCLOS) represents a crucial legal framework that is the most traditional. UNCLOS is a significant international multilateral treaty that provides principles, norms, and related directives for using the oceans, [6].

Determining who owns the deep sea and its riches was a difficult issue that arose throughout the more than ten years of UNCLOS deliberations. The subject of how to use the seabed and subsoil in relation to national jurisdiction was discussed for the first time in an official capacity in 1967. The inquiries were specifically focused on the ocean floor, which is often unclaimed and outside the purview of national sovereignty. The question of who owns these minerals and resources emerged when it was realized that major resources may be available. What separates the seas under national jurisdiction from those governed by international law is the fundamental issue that has come up.

Due to this, two legal systems now govern the subsurface and the entire ocean, from the top to the bottom. The territorial sea, a constrained ocean area next to the coast, is another option. The nations' territories are thought to include this area. The ocean is beyond this area; it is unclaimed by any country and is free and accessible to anyone. Although very straightforward, the problem of determining the appropriate distance to designate the boundary occurred.

US President Truman emphasized that the US has jurisdiction up to the edge of the continental shelf, defined as the submerged land adjacent to the coast and not covered by more than 183 m of water. The Second World War highlighted the haziness of the concept of ocean jurisdiction. The purpose of this description, which mostly matched the geological criteria, was to secure offshore oil. In accordance with the presumptions in place, the US possessed the hydrocarbon resources within its three-mile territorial sea, but ownership of the resources outside of this was unclear. This suggested that the US has asserted that it was not prohibited by international law from claiming mineral riches on the continental shelf.

The declaration brought up several intricate global issues. In particular, it prompted a country to claim vast portions of the ocean. Mexico decided on

its continental shelf due to the Truman declaration, and super nearby resources were also added. All fish that swim over the continental shelf were included in this. This suggests an increasing demand for sovereignty over the ocean and seafloor, which prompted the United Nations to organize a group of attorneys to provide standardized guidelines for ocean claimants. As a result, the territorial sea and the high seas were formed in 1958 treaties, which codified the zones that had been previously agreed upon.

A third convention dealt with conservation and fisheries, while the fourth one addressed the legal position of the continental shelf. The agreements came into effect in the 1960s and were essential in establishing a reasonable set of guidelines for the seas. The maintenance of consensus necessitated concessions that resulted in several ambiguous resolutions, and there were some sections that needed to be clarified. For instance, the Convention on the Territorial Sea did not include a commonly recognized breadth, and the Convention on the Continental Shelf described who has jurisdiction over the shelf but used language that was quite ambiguous as to where it ends. This suggested that the continental shelf was the seabed next to the shore that was at least 200 meters deep or where the water's depth permitted the exploitation of natural resources, [7].

Due to the ambiguity, several discussions have been about possible undersea resources and peaceful applications outside of national boundaries. There have been various endeavors to increase the capacity to utilize these resources due to expanding technical advancements, including the ability to explore the water beyond a depth of 200 meters. While the United States sought to preserve the existing quo to exploit resources, some newly independent African nations sought to challenge the status quo. For these countries, it was crucial to find an answer to the specific question of where national authority stops. For instance, the Maltese ambassador gave a thorough overview of the seas' scientific, military, technical, economic, and legal elements. The goal was to proclaim that the deep sea's riches would be used for everyone's benefit and that the bottom beyond the continental shelf belonged to all of humanity, [8].

The key consequence was that the deep sea would suffer the same fate as the 19th-century division of African nations for mining and benefitting from their resources. Support came from Eastern European nations as well, who disapproved of capitalist claims to the ocean floor.

Because the General Assembly was made up of many different countries, it took a lot of work for a few organizations to override the judgment of a few significant actors. This improved the UN's reputation and caused the creation of regulations to get substantial attention. The preceding four conventions, which had been established in 1958, were eventually superseded by the UNCLOS convention in 1982. UNCLOS has significantly influenced international ocean law, which has established several zones of authority over the ocean. The Exclusive Economic Zone (EEZ) in addition to the Continental Shelf, and the Seafloor Outside the Zones are the three zones that are crucial to mineral development. The latter makes up half of the planet's surface and is also known as the international seabed region. This is referred to as the "Area" under UNCLOS. The international seabed is often referred to as the common heritage of humanity (CHM), which is in alignment with Islamic values of respect for one another and cooperation, [9].

The territorial sea's baseline, from which the exclusive economic zone is measured, is 200 nautical miles away. According to the location and arrangement, such EEZs may overlap with other nations however the extent will be smaller. Then, bilateral arrangements are made for these border agreements. The coastal state is given ownership of the mineral rights in the EEZ, which cover offshore oil and gas reserves as well as marine aggregates. This includes both sand and gravel. Resources like polymetallic nodules, ferromanganese crusts, or sulfide deposits also belong to the coastal state if the EEZ extends beyond the continental edge. The upshot of such ownership and jurisdiction is that national governments have the authority to give licenses and utilize resources inside these territories, [10].

A vital component that aligns with Islamic values is that national regulations must be no less effective than comparable international laws, norms, and best practices. The necessity of safeguarding and conserving the maritime environment is emphasized in Article 192 of the treaty. This serves as a pillar for Islamic financial financing for projects within the EEZ, given Islamic values that emphasize protection for marine life. Additionally, UNCLOS underlines that nations must take action to conserve and maintain vulnerable ecosystems. Pollution from installations and devices must also be reduced. This goal is supported by further international accords relating to climate change.

The term "continental shelf" expands the geological sense of the term to cover the outer portion of the continental margin. Regardless of

whether the geological continental shelf reaches 200 nautical miles, this extends that far. The coastal state, therefore, has sovereign powers over the continental shelf, [11]. However, the continental shelf can go beyond 200 nautical miles, and there are legal extensions that let countries lay claim to territories beyond 200 nautical miles. There are boundaries of around 350 nm or a line 100 nm long drawn from the depth contour of 2,500 m. According to international law, in order to be awarded such rights, the enlarged continental shelf needs permission from the Commission on the Limits of the Continental Shelf (CLCS). However, the concept of the continental margin does not include the deep ocean bottom with oceanic ridges, and claims linked to the expanded continental shelf are not permitted to influence any resources discovered in deep seabeds.

Given the large number of applications that have been filed to the CLCS, there are still several obstacles to be overcome in addition to upholding the principles of environmental protection. These obstacles include confusion over the precise border between the seabed and national authorities, [12].

Nations with minimal shelf areas include those on volcanic islands and those adjacent to subduction zones. These nations are permitted to mine deep sea minerals because they have sizable sections inside their EZZ that are designated as deep sea. For instance, numerous islands in the Pacific, New Zealand, Japan, and archipelagos, like the Azores, fall within this category. Another illustration of this is Iceland. The creation of numerous state laws governing the exploitation of deep-sea resources within the EEZ is ongoing. As an illustration, the government of the Cook Islands passed legislation to control mining operations within the EEZ. The Seabed Minerals Amendment Act of 2015 also changed the Seabed Minerals Act of 2009, which went into effect in March 2013. The Environmental Act of 2003, which will eventually include new alignments with regard to deep seabed mining, covers any environmental problems.

On the basis of the Mining Act of 1992 and the Environment Act of 200, Papua New Guinea granted licenses for deep-sea mining. Both of these legislations were modified to include offshore activity. Terrestrial and seabed ecosystems are pretty different for mining activities and require various legal standards, which is a significant difference that is usually discussed, [13]. To regulate deep-sea mining operations according to international law, the Deep-Sea Minerals Project of the European Union and the Secretariat of the Pacific Community Applied Geosciences and Technology Division (SPC-SOPAC) have published advice. The research was essential in identifying the possibilities for regulatory growth.

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The ISA was given a mission by the UNCLOS to develop the region's resources while ensuring that it does so without endangering the environment. In order to fulfill this dual purpose, development must be encouraged while safeguarding rules that can hinder the development of such resources. Questioning such a mandate was not of high priority because deep sea mining was before a faraway prospect. The ISA will play an increasingly significant role in both the promotion of deep-sea development and the preservation of the environment as a result of the increasing prevalence and significance of deep-sea mining. This is a difficulty since it takes into account both the development of the mining code and simultaneously resolving environmental concerns. The national delegations' primary goal has been to increase the environmental standards of the mining code while also making sure that the mining codes are available so that they may begin development, [16].

3 Islamic Finance of Resource Projects

Project financing has grown in importance for sectors that require a lot of cash. Making decisions on the project's organizational structure and financial framework is necessary for project financing. To design, manage, and fund specific initiatives, the supporting businesses form corporations that are legally different from one another. The borrowing is restricted or non-recourse for the entities. This is more dependent on the loan repayments, which are securitized by the cash flows from the project. This differs from methods where

loans are determined by the sponsoring organizations' assets or credit rating. Even though the projects' non-recourse status could suggest a low initial capital investment, they are typically quite leveraged.

This suggests that debt-to-total capitalization ratios may range from 60 to 70 percent on average but may reach as high as 95 percent in certain cases. This suggests that conventional sources of debt might need tot webetteratch project financing prospects. The time horizons for the investment, the cash flow profile, and the risk tolerance may all differ significantly. Specifically, compared to traditional funding, the nature of projects could be simpler. The issue of whether a source of funding matches the risk and return characteristics of this business arises, [17].

When it comes to the resource and extractive sectors, the term of the loan financing is the main constraint of project financing. In general, if the government does not back the capital investment, most financial institutions may only accept limited recourse borrowing agreements within seven or 10 years. In these situations, there are difficulties since projects in the resource industry may take a minimum of seven to 10 years to provide a positive cash flow. This is especially true when the transportation of the commodities requires major downstream infrastructure construction. The investment horizons lengthened as a result of the projects' increasing complexity and the difficult legal, political, and economic conditions.

This inevitably results in a decrease in interest needed to finance these initiatives. Given the longer investment horizons and the greater patience of investors, Islamic finance may offer a beneficial distinction. This is true even when financing is subject to more stringent requirements. Since the financial crisis of 2008, investors have begun to favor long-term investment horizons, and Shariah-based loans have emerged as a compelling option. The decline in Western banks' risk affinities has increased the quest for other funding sources. Risk sharing is a major component of Islamic finance, which is more akin to an investment partnership than a debtor-creditor arrangement. This promotes increased flexibility and is maintained over time. Comparing Islamic finance to conventional financing, where the option to cancel a project is available, allows for a more secure connection, [18].

According to the notion of trade-off in a firm's capital structure, increasing a firm's leverage results in a position where the marginal benefit from additional tax shields equals the marginal loss from further distress cost. The probability-weighted cost of distress is included in the overall cost of distress. The distress cost includes direct and indirect expenses, such as opportunity costs and reputational loss. Leverage and asset risk are essential factors in predicting the likelihood of high distress costs. In particular, a positive relationship between leverage and the possibility of distress exists, which must be considered. The sale of cash flows to creditors who accept the claim on the cash flows and sacrifice the possible upside is preferred by shareholders. Low-risk investments allow shareholders to sell the anticipated cash flows to debt holders in exchange for tax-free interest, [19].

The corporation can increase leverage and fortify the interest from the interest tax shields thanks to this decrease in cash flow volatility. Resource industry projects have minimal asset risk and can handle more significant levels of debt. As a result, project finance is debt financing supported by cashflows and the asset itself.

Since the 1970s, project finance has become a useful funding method for significant natural resource finds. British Petroleum obtained more than 945 million USD through project financing to build the platform in the North Sea. Another example is when Freeport Minerals raised more than USD 120 million for the Indonesian Ertsberg copper mine. The fact that the entities may be readily divided into operational and sponsoring entities is a critical factor in project finance's appeal in the resource sector. Furthermore, important factors in project financing that might be independently addressed include information cost, credit risk, and sovereign risk, [20].

Project finance is subject to a number of restrictions, including decreasing investor tolerance for lower-than-anticipated cashflows and the mismatch between creditors' planned investment horizon and actual asset returns. The average investment horizon that banks are ready to fund has decreased over the past several years, and the credit market's tightening will present new difficulties. In particular, spreads have dramatically grown, and a decreasing number of banks are interested in project finance. The average credit facility size that is made available to businesses is likewise impacted by this general decline in risk appetite for project financing. In order to increase their earnings, financial institutions often seek out shorter time horizons with rapid rewards. For project financiers who may be quite risk-averse, short-term changes in cashflows might cause serious problems. Given their concern over losing out to rival investments if the project is unsuccessful, creditors may resort to default measures in response to low or negative cashflows.

Instead of being perceived as a partnership, such funding is seen as a typical debtor-creditor relationship, [21].

The Islamic economic system seeks to balance economic growth and fairness, and the Shariah provides special potential. Additionally, it will encourage prosperity and the development of jobs in addition to the acceptance of Islamic financial and economic principles. While conventional financing is mostly focused on financial factors, Islamic finance strongly emphasizes assets as its foundation, [22].

In Islamic economies, money serves only as a transaction means and has no intrinsic value. This means that money, such as interest, cannot produce value on its own. The fundamental tenet of Islamic finance is to develop tangible assets and inventories to trade non-liquid assets. This has included various Ijara, Istisna, Murabaha, and Sukuk forms, [23].

The most advantageous forms of Islamic finance are musharaka and mudaraba, which include collaboration and the exchange of experience. This makes it possible to cooperatively develop the project while sharing the risk. This presents a problem because many Islamic banks favor Murabaha, which carries minimal risk to the bank.

According to this agreement, the financial institution buys and takes control of the asset. After that, it resells the asset to the client for a profit over and above the original cost. The need in such a contract for the financier to be the owner of the good justifies the markup fee since it establishes the financier's legal duty. The bank may designate a customer to act as an agent for acquiring the commodity if the direct purchase is deemed unreasonable. A Sukuk that is backed by Murabaha debt is necessary since Murabaha debt cannot be securitized in some countries. This results from the fact that a paper representing money is assessed using the same criteria as exchanging money, which is against the riba principle.

According to particular perspectives, if the underlying receivable is related to a genuine trade transaction or commercial transfer of non-monetary interest, then such receivables may be exchanged at will in accordance with Shariah principles, [24].

Regarding musharaka, they have the right to participate in company management, but the agent's compensation is separate from the investor returns. This suggests that, although a certain amount of notice must be provided to the other partners, a partner has the right to terminate a musharaka agreement at any time. An initial agreement may enable the partners to sell the ownership to other partners without the musharaka expiring to lessen the harm caused by a partner leaving the musharaka in its early stages. This is used in home financing and is particularly crucial for syndicated deals. Additionally, among the Organization of the Islamic Conference member nations, natural resource development has become a pillar of musharaka investments, [25].

Sukuks are asset-backed securities that grant beneficial ownership interests in the underlying asset. The sukuk is neither debt nor equity, despite having the appearance of a regular bond or asset-backed investment. Sukuk are generally integrated with other types of Islamic finance, such musharaka, and are seen as a way to raise money from a range of investors rather than as a distinct financing type. Technically, a sukuk backed by real assets is entitled to a part of the underlying asset, [26].

The main need for shariah-compliant project finance is for the lender to have legal access to the project's operational assets. This is consistent with murabaha practice and results from the fact that the financier must share in the transaction's gains and losses. The projects may need to be structured in order to guarantee that the assets' title is preserved. This retention makes it easier for outside investors to get involved in the project. It makes it possible for Shariah-based finance to be used in a variety of investment industries. Consideration of title retention is a crucial element that goes beyond just assessing the predicted cash flows to determine the possibility of payback.

To lower the risk of default, traditional financing just holds a security interest in the project rather than keeping the title. Such a security interest gives the lender the right to acquire or sell the projects' assets in order to pay off the obligations in the case of failure. Even while a security interest of this kind might not completely cover the loan, it might offer some level of protection in the case of a default. Particularly, any unsecured claim is superseded by the bank's claim to the assets. This suggests that if the project defaults, the Islamic lender already owns the project, allowing the lender to sell the property or use the assets to pay off the existing debt. A Rahn-Adl arrangement may allow both the traditional lenders to have a security interest in the project and retain the title in the project asset. The distinction between title and securitization may be relatively complex and challenging, given that most resource projects have numerous lenders, [27].

With restricted recourse lending, money can be lent to organizations, but the creditor's claims against the loan are severely constrained. The majority of Sukuk offerings in the Middle East are

centered on assets, with the investor structuring the acquisition to buy the asset. Sukuk offerings are quite common in this region. This can be planned or redeemed in advance. Transferring assets from the originator to a trust or special purpose vehicle (SPV) is another kind of securitization. After that, the SPV issues the sukuk and receives the proceeds from the transferred assets. There is a fractional undivided ownership stake in an asset or a pool of assets for these asset-backed sukuk holders. Once combined, these create a partial title to the underlying asset. In general, asset securitization has encountered difficulties since it is difficult to get credit ratings; nonetheless, proxy ratings have been used more frequently to approximate ratings, [28].

Due to the ability to transfer the mineral estate without having to transfer the property, joint ownership of mineral rights has become quite attractive. This suggests that the passive interest gets its revenue from production, and the operational interest is distinct. Such precision in the investment agreement is greatly encouraged by Shariah and would make it possible to define the rights and interests within this area clearly. Mineral estates and the royalties that flow from them are considered real property in many countries, and as such, they are simple to transfer in whole or in part. Mineral leases can also be terminated, subleased, transferred, or encumbered without changing their status as property. Furthermore, some rights to a portion of an ownership interest may be transferred. This might result in one party being able to control the working interest and manage the lease while the other party just has passive royalty interests, [18].

This suggests that the ownership structure may be changed to best suit the project's investors and enable the formation of an indirect beneficial ownership stake. Islamic investors can then own this and have some bankruptcy protections. In order to maintain the collateral in the event of a contract violation, these mineral assets may be mortgaged, or the investors may have security interests. This suggests that the legal framework of natural resource development creates enormous collaboration potential, [29].

Ijara agreements are a type of Islamic financing lease used to purchase property, machinery, or a facility. The lessor leases the asset for a certain time at a predetermined rental cost. The asset is either returned to the lessor after the lease expires or purchased by the lessee. What's most crucial is that neither the sales price nor the lessee's obligation to buy the asset at the end of the term can be specified. In addition, the financier must continue to insure the asset. As a result, Ijara resembles an operational lease rather than a capital lease.

For lease financing of capital equipment, such as the purchase of processing facilities, trucks, deepwater platforms, and drill ships, Ijara is the best option. The value of the equipment should not total a sizable fraction of the total amount to be funded if a sukuk is given. Ijara agreements are now used quite sparingly in the resource industry. They make an excellent legal substitute for a standard lease or sale-leaseback arrangement that complies with Shariah. Istisna is most frequently used to finance significant infrastructure projects and is chosen for long-term project financing that complies with Islamic law. Assets created for the project under Istisna agreements may include processing plants, rail, and port infrastructure, as well as related refineries and petrochemical plants, [30].

Despite the difficulties presented by these factors, several possibilities also present themselves. The East Cameron Gas Company's (ECGC) financing of oil and gas production activities is one of the most well-known sukuk offers in the resource sector. The 166 million USD was raised through a Sukuk sale, allowing for the financing of both the capital and operating expenses associated with drilling and running the wells. The money was also used to settle outstanding traditional debt. Because the sukuk offering was non-recourse to the ECGC, the ECGC was not required to pay the sukuk holders if the royalties did not generate enough money. This suggests that ECGC accepted the risk of both declining oil and gas prices and restricted oil and gas output. Due to the risk-sharing among the holders of sukuk and the classification of the royalty interest as real property, the shariah compliance was kept intact. According to Louisiana local law, the holders had undivided beneficial ownership. Islamic scholars gave their blessing to the agreement, and the undivided beneficial ownership is to be regarded as a partial title in the royalty interest. For purposes of sharing project risks and collecting rental payments from the production, it was necessary for compliance that investors maintain ownership of the asset. The ECGC project was a high-risk endeavor that ultimately went into default. Still, it served as a landmark example of how diverse Islamic finance practices might be used to project financing in the resource industry. A contrasting illustration from the non-resource sector is the Jimah Energy Venture, which collected more than US$1.6 billion for the development of an independent, 1400 MW Greenfield power plant. The majority of the money was raised through sukuk, but the deal also included traditional financing in the form of a standby letter of credit and a bank guarantee facility. The Rabigh

IPP in Saudi Arabia and the Shuweihat 2 project in Abu Dhabi are two other examples with investment horizons of more than 20 years, [31].

Even while many arrangements for project finance could be regarded as high risk, there are those that have a low cost of financial hardship. These resource projects can include financially independent yet material assets whose value might be minimally affected by a default or reorganization. An effective restructuring is more likely than an inefficient liquidation since the assets have few other options. Due to the projects' continued worth, top claimants and subordinates are encouraged to quickly restructure, which is advantageous to Islamic financiers, [32].

The absence of a broad venue for discussing matters about Shariah compliance is a significant obstacle for Islamic finance. While the Islamic Financial Services Board produces technical standards for financial institutions, these do not establish regulations that apply to all financial enterprises in general. Other organizations, such as the International Islamic Financial Market, the Liquidity Management Center, and the International Islamic Rating Agency, have supported efforts to make Islamic financing concepts more widely used. However, this is far from the case. This suggests that Islamic financial structures vary greatly depending on the country they are used to or even the Shariah board that regulates their operations, [33].

This calls for implementing a more uniform regulatory strategy that is accepted by an organization that is widely acknowledged for upholding Shariah. This will enable the issues to be resolved and the Shariah-compliant funding possibilities to be enhanced.

Another barrier to Islamic financing is the extent and level of regulation around Islamic banking and financial operations. Furthermore, legislative measures that promote these behaviors are crucial, and they are contingent upon the individual politicians' activities. There is disagreement over which laws apply to deep-sea resource initiatives. This creates a new level of uncertainty.

4 Conclusion

Islamic finance has been shown to offer a number of essential advantages to project financing. Due to this, it is incredibly encouraging when a particular group of assets is to be held by Islamic financiers without substantially impacting the upholding of the rights. Another crucial aspect is that the Islamic financier's assets must be detachable and have a separate economic worth. These requirements are typically met by the global resource industry, which suggests that it would be a good fit.

Shariah-compliant project finance needs to ensure the lender has legal access to a project's operational assets, aligning with the principle that financiers share in both gains and losses. Title retention is critical, allowing Shariah-based finance to be applied across industries beyond just cash flow analysis for repayment potential. Unlike traditional financing, which holds security interest, Islamic financing often requires project ownership, allowing for asset sale or usage in case of default. Even in intricate projects with several lenders, a Rahn-Adl structure can support the retention

of asset titles and security interests.

Joint ownership of mineral rights has gained popularity in the natural resource industries because it enables passive production income without direct operational involvement, promoting cooperation and transparency in Shariah-compliant investment agreements.

With safeguards like security interests or mortgages on mineral assets, investors can keep their ownership stakes, which improves the chances of cooperation in natural resource ventures. Ijara agreements, a form of Islamic leasing, finance equipment including processing plants and drilling ships in a manner akin to operational leases. These contracts are not commonly used in the resource industry, but they offer a Shariah-compliant alternative to traditional leases. However, long-term infrastructure projects like refineries and petrochemical plants that mesh well with Islamic financing systems are more likely to have Istisna agreements.

While many resource projects are high-risk, some have financially independent assets that encourage effective restructuring in case of default, benefiting Islamic financiers. However, a lack of standardized regulations for Shariah-compliant finance presents challenges. Organizations like the Islamic Financial Services Board have achieved strong impact in setting standards. However, there is still a lot of effort to be done to achieve universal adoption. A more standardized regulatory approach is necessary for the growth of Shariah-compliant finance in a variety of industries, including resource development, particularly in fields with unclear legal frameworks like deep-sea projects.

The Islamic financier's preservation of the title to the project's assets is one of the crucial components of Shariah compliance for resource projects. This suggests that the financier is

compelled to accept the risks and any profits associated with the asset by having an entitlement to it. This is true for project finance since they are often large-scale infrastructure or industrial projects that avoid gharar and have projectable cash flows. This suggests that the project is Shariah-compatible so long as it does not conflict with any actions regarded as haram.

This enables Islamic financiers to encourage economic diversification and infrastructure development for general projects, which may also help developers raise more money.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

During the preparation of this work the authors used Chat GTP in order to in order to briefly clarify joint concepts. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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