Review Article

INTERNATIONALIZATION STRATEGIES IN THE ENERGY SECTOR: FROM LOCAL PLAYERS TO GLOBAL GIANTS.

Abstract

This research discusses the application of internationalization within the energy sector, with a focus on its relevance to businesses seeking to conduct activities beyond national boundaries. Furthermore, this research discusses theoretical frameworks, including the Uppsala model, Eclectic paradigm, and Internalization theory, emphasizing strategic drivers that guide internationalization. Through the assessment of primary approaches adopted by energy firms, this research offers pertinent information regarding diverse methodologies applied in global market maneuvering. Case studies are also given to provide examples of the successful application of these strategies by energy firms in real-life contexts. The results demonstrate the multifaceted difficulties and potential advantages associated with the process of internationalization, highlighting the essential role of strategic planning, flexibility, and responsiveness to deal with the ever-changing status of the global energy sector.

Keywords: Internationalization strategies, energy sector, case studies, Upsala model, Eclectic paradigm, OLI, Internalization theory.

1. Introduction

The energy sector is a critical driver of global economic progress and sustainability, and presents distinct challenges and possibilities for companies embarking on the quest for international expansion. Internationalization, or the process of expanding operations geographically across countries, has been an increasing priority among energy corporations with an interest in leveraging opportunities in international markets, resources, and technological innovations (Koch & Meckl, 2014). The aim here is to make the importance of internationalization in the energy industry clear and to outline the objectives and the structure of this paper.

The energy sector involves a broad spectrum of industries, including oil and gas, clean energy resources, electricity generation, and its distribution. Due to the ever-rising demand for energy across the globe, fueled by demographic expansion, urbanization, and industry growth, energy companies are forced to explore new markets and possibilities beyond their native territories. Internationalization provides such firms with an opportunity to tap into new sources of revenue, reduce exposure to risks of changes in local demand and supply, and take advantage of their know-how and competencies globally (Luo & Tung, 2007).

Global expansion is essential for energy companies to remain competitive and resilient in an increasingly interconnected world. By diversifying their geographic footprint, energy companies can reduce dependence on a single market or region, thus spreading risk and enhancing long-term sustainability. Moreover, internationalization allows companies to tap into emerging markets with high growth potential, capitalize on advancements in technology and innovation, and forge strategic partnerships with local stakeholders to drive mutual growth and development (Dominguez, 2018).

The **main objective** of this study is to investigate the different internationalization strategies undertaken by energy firms and the ensuing effects on their global competitiveness and sustainability.

By conducting a thorough examination of case studies alongside comparative evaluations, this research seeks to:

- Identify the most important internationalization strategies used in the energy industry.

- Discuss the driving forces, issues, and results related to each strategy.

- Compare the performance of various internationalization strategies in promoting the competitive standing of energy firms.

The organization of the paper is as follows: following this Introduction, Chapter 2 provides a literature review on internationalization in the energy sector, focusing on theoretical approaches. Chapter 3 provides various internationalization approaches practiced by energy companies, with case studies. Chapter 4 provides conclusions and recommendations for further study in this area.

2. Literature Review

Internationalization in the energy sector has been the subject of broad-based research, drawing upon various theoretical concepts and empirical findings to describe the processes of international expansion strategies followed by energy companies (Gómez-Bolaños et al., 2020, Yusta & Lacal-Arántegui, 2020, Asemokha et al., 2019, etc.). This section provides a review of relevant theories and frameworks.

Theoretical approaches to examining the internationalization process.

To begin, **the Uppsala Model** (Johanson & Vahlne, 2009) is a key theoretical framework to the explanation of the process of internationalization with its focus on the incremental and experiential character of international growth. Theoretical foundations underlying the Uppsala Model are relevant to investigation of the internationalization process within the energy sector founded on the following principles: *incremental market entry, experiential learning in international markets, gradual market penetration, and adaptation to the local context.*

Incremental market entry. In the energy industry, companies often follow a gradual approach to international growth, starting with geographically and culturally proximate markets to their home country. For example, an oil and gas company may start its operations by selling its products to neighboring countries or by forming strategic partnerships with local distributors. Similarly, a renewable energy company could begin by entering markets that have favorable regulatory environments and infrastructure in place for implementing renewable energy, and then move into more challenging markets.

ExxonMobil began its international expansion by entering regions with mature oil and gas reserves and favorable investment climates, such as the Middle East and Southeast Asia (Global Operations, n.d.).ExxonMobil is in partnership with Qatar Petroleum in the development of the world's largest non-associated natural gas field, North Field, and has participated in various LNG projects and infrastructure projects worldwide. ExxonMobil is also part of local gas projects in Qatar (as the sole foreign player), including Al Khaleej Gas and Barzan Gas, providing technical and management

expertise to Qatar Petroleum and Nakilat through employee secondment. Over time, the company diversified its operations into exploration, production, refining, and distribution operations in various markets across the globe.

Experiential learning in foreign markets. As energy companies carry out international operations, they acquire phenomenal knowledge and experience regarding worldwide markets. For example, an oil and gas company learns about the geological conditions and regulatory environments of various oil-producing countries through its exploration and production activities. In the same way, a renewable energy company can learn about project execution, financial structuring, and stakeholder collaboration by involving itself in renewable energy projects in various markets. This type of experiential learning enables energy firms to adapt their strategies, mitigate risks, and capture opportunities in the course of their international growth.

Enel, originally "Ente Nazionale per l'Energia Elettrica," is a multinational Italian energy company that has put the idea of experiential learning into action in its expansion of renewable energy projects in foreign markets (Our Story, n.d.). For instance, in the early 2000s, Enel started investing in wind energy projects in Spain through the takeover of Endesa, while leveraging its expertise in project development and renewable energy technologies.

From its experience in developing, building, and operating wind farms in Spain, Enel gained valuable experience and knowledge of the regulatory, technical, and market conditions of the renewable energy sector. Leveraging this experience, Enel diversified its renewable energy business to other markets, including Italy, the United States, and Latin America, where it is today a leading developer and operator of wind, solar, and hydroelectric plants.

Graduate market penetration. Energy companies tend to follow a graduate market penetration strategy, slowly building up their presence and investment in international markets over a period of time. For example, an oil and gas company may initially open a representative office or a sales office in an emerging market prior to committing resources to the development of infrastructure to support exploration, production, and distribution activities. Similarly, a renewable energy firm may initially pilot small-scale projects or pilot programs to show the viability and usefulness of renewable energy technologies prior to expanding their activities.

Total, a French multinational company dealing with the oil and gas industry, adopted a systematic approach to enter the solar energy business in Africa (TotalEnergies TotalEnergies in South Africa, n.d.). Instead of investing huge amounts of capital upfront, Total mostly focused on undertaking pilot projects and strategic partnerships to test the viability of solar energy solutions in several African countries. In 2011, Total Solar International, a Total subsidiary, teamed up with Bboxx, a provider of solar home systems, to start a pilot project in Rwanda to supply off-grid solar power to rural populations. After the success of this pilot initiative, Total proceeded to build its solar energy business in Africa through acquisitions, investments, and partnerships, further growing its presence and market share in the continent. Today, Total is one of the top suppliers of solar energy in Africa with a wide portfolio of solar projects from large utility-scale projects to off-grid solutions, thereby propelling the continent towards sustainable energy and electrification activities.

Adaptation to local context. The Uppsala Model has one of its fundamental principles rooted in the aspect of adhering to local environments in foreign markets. This is most relevant in the energy sector, where regulatory policies, environmental settings, and customer preferences differ in various

regions. Energy businesses must tailor their products, services, and business models to respond to local stakeholders' unique needs and desires. For example, an oil and gas company may need to follow stringent environmental policies and engage with the local population in order to mitigate concerns surrounding air and water pollution. In the same way, a firm dealing with renewable energy must consider parameters like solar irradiance, wind speed, and the structural capacity of the grid when planning and developing renewable energy projects in various geographical areas.

BP, a British multinational oil and gas company, is a prime example of adapting to local circumstances in its development of the Brazilian offshore oil fields. In Brazil, BP has modified its exploration and production strategies to comply with local regulations, meet environmental issues, and connect with local stakeholders. For example, BP has entered into strategic alliances with Petrobras, the Brazilian state oil company, to jointly produce offshore oil and gas reservoirs located in the pre-salt area, leveraging Petrobras' regional experience and infrastructure (BP and Petrobras Form Strategic Alliance, n.d.). BP has also made investments in research and development efforts aimed at creating novel technologies and methods specifically tailored to Brazil's offshore production environments, including deepwater drilling operations and subsea production systems. By localizing, BP has been able to overcome the challenges of Brazil's offshore petroleum sector and become a key operator in Brazil's energy market.

The principles of the Uppsala model are highly relevant to the internationalization process in the energy sector, and they guide energy companies to adopt an incremental, experiential, and adaptive approach to international expansion. By adhering to these principles, energy companies are able to cope with the complexities of foreign markets, mitigate risks, and capitalize on opportunities to achieve sustainable growth and competitiveness in the global energy market.

Second conceptual model is the **Eclectic Paradigm or Ownership-Location-Internalization (OLI) approach** (Dunning, 1988) provides accounts of the strategic forces behind internationalization decisions: ownership advantages, location advantages, and internalization advantages.

Ownership advantages. The investment firm possesses distinguishing competitive capabilities that allow it to capitalize on opportunities in international markets. Ownership advantages may comprise a range of attributes that include technological prowess, brand identity, managerial talent, access to resources, and proprietary information. In the energy industry, these ownership advantages may encompass detailed knowledge of exploration and production technology, cutting-edge renewable energy technology, sophisticated refining techniques, or access rights to privileged reserves and intellectual property pertaining to energy extraction, storage, or transmission. The organizations within the energy sector with significant ownership strengths are more capable of competing on an international level based on their own strengths to obtain new markets, gain access to quality resources, and realize comparative advantages against competitors.

Siemens Gamesa Renewable Energy, one of the leaders among companies producing renewable energy, utilises its strengths in the form of technical knowledge ownership to expand globally (The Leader in Renewable Energy I Siemens Gamesa, n.d.). Siemens Gamesa, having decades of experience in the design, manufacturing, and installation of wind turbines, offers advanced technology and pioneering solutions for generating renewable energy. The ownership advantage granted to Siemens Gamesa enables it to compete in the international market with reliable, efficient,

and economically viable wind energy solutions, thereby addressing the increasing global demand for green energy.

Location advantages refer to the specific features of the host nation or region that make it a favorable place for inward foreign investment. Advantages of a location may comprise factors such as the market size, prospects for economic development, political stability, regulatory environment, infrastructure, labor force skills, and proximity to large markets or resources. Location advantages within an energy sector may include access to abundant natural resources (e.g., oil and gas reserves, sunlight for solar energy, wind for wind energy), supportive government policies and incentives for renewable energy development, well-established energy infrastructure (e.g., pipelines, refineries, power grids), and growing demand for energy products and services. Energy companies seek locations with favorable regulatory frameworks, stable political environments, and supportive policies for energy investment to mitigate risks and maximize returns on investment (Foxon et al., 2005).

ExxonMobil's investment in Guyana's offshore oil fields is the epitome of the significance of location advantages for the energy industry (Guyana Project Overview, n.d.). Guyana provides major location advantages in the form of immense untapped oil reserves, favorable regulatory environments, and political stability. ExxonMobil's operations through exploration and production in Guyana are advantaged by exposure to such bountiful natural resources as well as friendly government policies, setting the company up for long-term profitability and growth in the country.

Internalization advantages. The advantages derived from the internalization of foreign operations in the multinational firm, as opposed to dependence on foreign market transactions or collaborations, are explained below.

Internalization advantages include cost reduction, enhanced control over operations, protection of proprietary assets, and knowledge transfer and innovation facilitation. Internalization advantages can include vertical integration along the energy value chain (e.g., exploration, production, refining, distribution) to capture value at different stages, economies of scale in project operation and development, and the improved coordination and alignment of activities across geographically spread operations. Energy firms internalize their operations to more effectively manage key assets, intellectual property, and supply chains, and to leverage synergies and efficiencies generated by combining various lines of business within a common corporate entity (Teece, 2014).

Shell, as a multinational energy corporation, is the poster child for the benefits of internalization with its vertical integration of the liquefied natural gas (LNG) value chain (LNG Supply Projects and Regasification Plants | Shell Global, n.d.). Shell has and runs liquefied natural gas (LNG) production plants across the globe, such as in Qatar (Qatargas 4), Australia (North West Shelf Venture), and Nigeria (Nigeria Liquefied Natural Gas Company Ltd), among others. With the in-house monitoring of exploration and production activities, Shell ensures a stable and reliable supply of natural gas for liquefaction. Further, Shell invests in LNG liquefaction plants, such as the Prelude FLNG facility located in Australia, which is the world's largest floating LNG production plant. By owning and operating these liquefaction plants, Shell can improve production processes, maintain product quality, and reduce supply chain risks. Through vertical integration along the LNG value chain, Shell internalizes key activities and functions, allowing the firm to realize synergies, optimize operations, and stay competitive in the international LNG market. Internalization through this strategy allows

Shell to adapt to market forces, mitigate risks, and create value for shareholders and stakeholders along the LNG value chain.

The OLI framework offers a thought-provoking perspective on how energy firms assess foreign investment prospects, prioritize the attractiveness of alternative locations, and leverage their proprietary advantages to attain strategic goals in foreign markets (Mbalyohere et al., 2017). Through an examination of the interdependencies among ownership, location, and internalization advantages, energy firms are strongly positioned to make informed decisions on how and where to internationalize their operations to enhance value creation and competitiveness excellence in the global energy sector.

The third framework, **Internalization theory,** was developed by Buckley and Casson (Buckley & Casson, 2009) and later built upon by Rugman and Verbeke (Rugman & Verbeke, 2003). The theory focuses on the reasons why firms decide to internalize certain activities rather than relying on market transactions. It suggests that firms internalize operations in an effort to capture value, protect proprietary assets, and minimize transaction costs associated with outsourcing to external partners.

Capturing value. Total, a large multinational energy corporation, illustrates internalization theory by pursuing vertical integration in the liquefied natural gas (LNG) value chain. Rather than depending exclusively on market transactions with third-party suppliers or partners, Total internalizes key activities to capture value at several points of the LNG value chain. Over the past several years, Total has invested strategically in LNG liquefaction plants, shipping, and distribution infrastructure across the globe (Gnana & Saadi, 2022).

For instance, Total has investments in LNG projects in Qatar (North Field East project) or Australia (Gladstone LNG and Ichthys LNG projects), where it operates and owns liquefaction facilities and production facilities. With vertical integration of upstream activities, Total can integrate production processes, manage costs, and ensure a stable supply of LNG to meet global demand. Besides, Total has invested in LNG shipping by owning LNG carriers and ships (Total Realizes France's First Ship-to-Containership LNG Bunkering Operation, after Inaugural Loading at Dunkirk LNG Terminal, 2021), enabling the company to ship LNG from the production plants to receiving terminals and end-consumers on a global scale.

With internalizing shipping operations, Total is able to manage logistics, control risks, and streamline transport costs involved in LNG delivery. Through vertical integration along the LNG value chain, Total can capture value at various points of production, liquefaction, transportation, and distribution, which improves its competitive edge as well as profitability in the international LNG market.

Protecting proprietary assets. ExxonMobil demonstrates internalization theory by internalizing critical technologies and expertise in offshore operations to protect proprietary assets and maintain competitive advantages. In recent offshore drilling projects, such as those in the Guyana-Suriname Basin (OilNOW, 2024), ExxonMobil has internalized key technologies and operational capabilities, including advanced drilling techniques, reservoir management, and subsea infrastructure. By keeping these activities in-house, ExxonMobil is able to safeguard proprietary technology, trade secrets, and expert experience from would-be competitors, thereby sustaining itself as a frontrunner in offshore exploration and production.

Besides, the combination of technology and talent enables ExxonMobil to have control over its business processes, uphold quality standards, and react responsively to shifting market pressures or regulatory demands. This business model not only guards ExxonMobil's proprietary investments but also facilitates its operational flexibility and resilience in the competitive offshore energy sector (Garcia et al., 2014).

Mitigating transaction costs. BP provides a good example of internalization theory via vertical integration of downstream operations to negate transaction costs associated with market transactions and outsourcing to third parties (Al-Obaidan & Scully, 1993). BP has invested in downstream operations such as refining, marketing, and distribution of petroleum products in the past few years. Through refinery and storage terminal ownership and operation, as well as retail outlets, BP internalizes its downstream operations and reduces transaction costs associated with using external suppliers or intermediaries (BP Annual Report, 2018).

For instance, BP ownership of refinery facilities facilitates the corporation in refining production efficiencies, managing inventory control, and making rapid responses to changes in market demand. In the same way, BP's control over retail outlets allows the company to build direct relations with customers, manage price policy, and increase brand loyalty. By internalizing downstream operations, BP will be able to increase value capture, streamline supply chain processes, and lower transaction costs, thereby increasing its competitive advantage and profitability in the downstream energy business (Liao & Kuo, 2014).

Internalization theory provides detailed explanations as to why energy firms choose to internalize certain activities, such as value capture, protection of proprietary assets, and transactional cost reduction, via vertical integration and internalization of key functions. Recent case studies from energy majors such as Total, ExxonMobil, and BP demonstrate how internalization theory is being applied in practice to enhance competitiveness and create value in the rapidly evolving energy sector.

In essence, the utilization of these theoretical models in the energy sector underscores the significance of strategic choice, market awareness, and organizational competences in facilitating successful international growth. By using an integrated and informed strategy towards internationalization, energy businesses can effectively deal with the dynamics of global markets, seize unfolding possibilities, and facilitate sustainable development and growth in the dynamic energy environment.

3. Internationalization strategies

Internationalization in the energy sector entails a broad array of methods for expanding operations beyond boundaries (Bohnsack et al., 2021). This section distinguishes between the different approaches taken by energy firms, presents case studies for each to exemplify them, and examines their respective advantages, challenges, and risks.

Market diversification

Market diversification involves spreading out into new geographical markets that were not previously exploited to reduce reliance on one single market or region (Wiersema & Bowen, 2008). Energy companies practice diversification strategies to mitigate risks associated with market changes and regulatory adjustments while taking advantage of new growth opportunities (Wang et al., 2023).

Saudi Aramco's strategic thrust in the markets of Asia—i.e., China, Japan, South Korea, and India—exhibits a classic instance of the company's effort to diversify its clientele and reduce reliance on conventional markets (Yamada, 2011). By expanding quickly into high-growth Asian markets, Aramco has the benefit of spreading risk across numerous diverse economies, accessing new consumer markets, and benefiting from new opportunities for growth. Nevertheless, this growth also poses considerable obstacles, including the need to navigate cultural and regulatory disparities, address geopolitical uncertainties, and manage the inherent market volatility associated with unfamiliar regions.

In addition, the successful acquisition of S-Oil in Korea by Saudi Aramco (Young-Eun Park, 2020) is a classic case of a strategic approach to overcoming the difficulties of foreignness while gaining a strong presence in Asian markets. Through localization and building cooperation with S-Oil, Aramco skillfully overcame cultural nuances and regulatory complexities, highlighting the importance of strategic partnerships in international expansion.

This case study emphasizes the value of examining the entry and internationalization strategies employed by large international firms, providing important lessons for decision-makers who are interested in expanding their operations abroad, with strategic implications for any prospective expansion plans. In spite of such obstacles, Aramco's ambitious internationalization drive demonstrates its determination to ensure long-term sustainability and responsiveness in the global energy industry.

Partnerships and alliances

Partnerships and alliances entail teaming up with local businesses or entering into alliances to gain access to local knowledge, resources, and networks (Todeva & Knoke, 2005). Energy firms employ the alliances for market penetration, risk sharing, and reciprocal development.

A seminal case study of strategic alliances in the energy sector is the alliance between Shell and PetroChina for the development of shale gas in China (Zhang, 2015). Shell formed a joint venture with PetroChina to develop and explore shale gas resources in the Sichuan Basin by leveraging PetroChina's extensive experience and knowledge of the local geology and regulatory landscape. This partnership allowed Shell to tap into China's immense shale gas reserves, and PetroChina benefited from Shell's expertise in shale gas extraction technology and best practices.

The strategic partnership enabled the two companies to share costs and risks, accelerate the development of China's shale gas reserves, and capitalize on China's growing demand for natural gas. Despite facing challenges such as regulatory uncertainties and technical difficulties, the partnership between Shell and PetroChina represents the best example of the power of strategic partnerships in unlocking the potential of emerging energy markets and achieving sustainable growth.

Mergers and acquisitions (M&A)

Mergers and acquisitions (M&A) are strategic maneuvers for energy companies, entailing the acquisition or merger with existing organizations to bolster market position, expand operational capabilities, or gain entry into new markets (Andriuškeviius & Štreimikienė, 2021).

A good example is Chevron's acquisition of Noble Energy, which was aimed at consolidating its position in the Permian Basin and Eastern Mediterranean regions (Bahnemann et al., 2022). The

benefits of such transactions are numerous, from expedited access to markets, taking advantage of assets and infrastructure already in place, to synergies generated from consolidation of operations. Nonetheless, mergers and acquisitions do not come easily, as they involve managing intricate integration processes, obtaining necessary regulatory approvals, and facing valuation risks. Energy companies have often employed M&A as a means of achieving speedy growth and fulfilling strategic objectives, such as accessing new technologies and consolidating market share (Deng, 2012).

For example, Total SA's $8.8 billion acquisition of Anadarko's African assets significantly expanded its foothold in the energy sector across Africa, especially in Mozambique's liquefied natural gas (LNG) market (Total Agrees with Occidental to Contingent Acquisition of Anadarko's Assets in Africa, 2019). The strategic maneuver enabled Total to penetrate and grow rapidly in the market, with access to established infrastructure and assets, and the creation of synergies and scale economies. Nonetheless, M&A activities present notable challenges and risks, including integration complexities stemming from cultural differences, navigating regulatory approvals and compliance, and managing the financial risks associated with large-scale acquisitions. Despite these issues, M&A remains a prominent strategy for energy companies seeking to augment their market presence and strategic capabilities in an ever-evolving global energy landscape.

Licensing and franchising

Licensing and franchising involve granting permission for the use of proprietary technologies, trademarks, or business models to local partners (Hoy & Stanworth, 2003). Licensing and franchising are utilized by energy companies as methods of increasing their market extension with fewer massive capital investments.

A suitable illustration of this approach is Shell's licensing agreements with retail partners in emerging markets, enabling expansion of its fuel retail network and brand visibility (Boyle, 1999). Through licensing or franchising to local partners, energy firms are capable of tapping into local expertise and distribution networks, thereby accelerating the scaling up of their operations.

Another example is Siemens Gamesa Renewable Energy licensing its wind turbine technology to Taiwanese local partners, thereby promoting the establishment of offshore wind farms in the area (Gao et al., 2021).

The benefits associated with franchising and licensing are minimal capital outlay, obtaining knowledge of the local market, and rapid market entry. But these methods carry with them concerns about quality control, brand reputation, and conflict resolution with franchisees or licensees (Hadfield, 1990). In spite of these dangers, franchising and licensing are still feasible for energy businesses that want to expand their territory and secure a presence in a variety of global markets.

Strategic alliances

Strategic alliances entail entering into collaborative partnerships with government, industry associations, or non-governmental organizations (NGOs) with a view to resolving effectively regulatory challenges, securing funding, and reducing geopolitical risks. Energy firms establish strategic partnerships to establish long-term alliances and further build their competitive advantage.

A case in point is the partnership between ExxonMobil and FuelCell Energy, a major provider of fuel cell technologies, with a view to facilitating the development and market introduction of carbon

capture technology (European Commission. Joint Research Centre., 2019). With this partnership, ExxonMobil plans to use FuelCell Energy's experience in fuel cell technology to create economically viable methods of capturing carbon dioxide emissions from industrial facilities and power plants. FuelCell Energy's emerging fuel cell platforms can provide efficient and scalable carbon capture solutions in reducing greenhouse gas emissions and mitigating climate change. ExxonMobil contributes its vast experience in energy production, project management, and scale implementation to the collaborative process.

The partnership enables both organizations to merge their respective resources and capabilities to fast-track the development and implementation of carbon capture technology on a commercial level. The benefits associated with this strategic partnership are access to complementary knowledge and technologies, sharing research and development expenses, and the possibility of establishing new revenue streams in the carbon capture market. Through its partnership with FuelCell Energy, ExxonMobil positions itself as a front-runner in resolving environmental issues while further diversifying its portfolio of energy solutions.

The collaboration can be subject to various challenges, such as balancing development and research requirements, addressing regulatory demands that are pertinent to carbon capture initiatives, and streamlining the rollout of technologies to address the needs of the market. However, through their joint efforts, ExxonMobil and FuelCell Energy aim to surmount the challenges and provide innovative solutions that enable a cleaner energy future.

Exporting and Importing

Exporting excess energy resources or technology to overseas markets, or importing essential resources, is an obvious entry strategy for energy firms enjoying competitive production or technological advantages (Roemer, 1979).

The United States has become a prominent liquefied natural gas (LNG) exporter to global markets, with firms such as Cheniere Energy, ExxonMobil, and Dominion Energy investing in liquefied natural gas export facilities along the United States' Gulf Coast (Flower, 2021). ExxonMobil benefited from the United States' shale gas boom by taking advantage of the possibility of selling liquefied natural gas (LNG) to Asian and European countries. Leveraging its massive investments in LNG infrastructure and natural gas production and liquefaction experience, ExxonMobil perceived an opportunity to meet the growing demand for cleaner energy resources in international markets. ExxonMobil, via its affiliate ExxonMobil Gas & Power Marketing Company, capitalized by investing in LNG export terminals on the U.S. Gulf Coast, such as the Golden Pass LNG terminal in Texas (Paul, 2023).

Through exporting U.S. LNG to Asia and Europe, ExxonMobil expanded its customer base, reached new markets, and maximized its production capacity. ExxonMobil utilized its global logistics network and supply chain strength to safely and efficiently ship LNG to markets around the globe, providing customers with reliable delivery and satisfaction. The benefits of ExxonMobil's LNG export policy are access to high-demand markets in Asia, especially in Japan, South Korea, and China, where LNG plays a core role in energy generation for power and industrial purposes (Exxon to Double LNG Business by 2030 with Eye on Asia, n.d.). Moreover, exporting LNG allowed ExxonMobil to make use of surplus U.S. production capacity and to generate new revenue streams from its natural gas reserves.

But this policy of export was fraught with risks and challenges such as complicated infrastructure and logistical challenges of transporting LNG across long distances, adherence to international trade law and environmental regulations, and exposure to commodity price and exchange rate fluctuations (Oladipo Olugbenga Adekoya et al., 2024). In spite of these difficulties, ExxonMobil's long-term strategy for LNG exportation from the United States is the best reflection of the company's dedication to capitalizing on market opportunities, driving growth, and delivering value to stakeholders and shareholders in the evolving global energy market.

Vertical integration

Vertical integration involves ownership or control of different levels of the energy supply chain, from production to delivery (Aoun et al., 2021). Energy companies use vertical integration to enhance competitiveness, extract value, and gain greater control over business.

Equinor, previously Statoil, is a Norwegian multinational energy corporation that has vertically integrated along the energy value chain by intent. Showing an aggressive interest in offshore oil and gas production, Equinor has ventured into refining and investments in renewable energy, as seen in a grand-scale vertical integration plan (Mailhol, 2022).

In the early production phase, Equinor is among the leading operators in offshore oil and gas production, playing an active role in key areas like the Norwegian Continental Shelf, the North Sea, and the Gulf of Mexico (Herrera Anchustegui & Glapiak, 2023). Through ownership and operation of offshore platforms and production facilities, Equinor has direct control over upstream activities, facilitating the enhancement of production efficiency, cost management, and adherence to safety and environmental regulations.

Besides upstream operations, Equinor has also invested in downstream operations strategically, including refining and petrochemical businesses (Midttun et al., 2022). In its refining operations, Equinor processes crude oil into different petroleum products like gasoline, diesel, and jet fuel for domestic and foreign markets. Through vertical integration of its downstream refining operations, Equinor is able to create additional value for its crude oil products and improve its competitive advantage in the downstream business.

Advantages of Equinor's vertical integration strategy include capturing value across the energy value chain, optimizing operational efficiency, and enhancing control over the supply chain. By owning and controlling multiple stages of the energy value chain, Equinor can mitigate risks, capitalize on synergies between different business segments, and adapt to changing market dynamics more effectively. Yet, this strategy of vertical integration has a few pitfalls in that it requires huge sums of money to be invested in technology and infrastructure, increased regulatory attention from antitrust regulators, and exposure to price volatility in commodities and energy consumption (Demir, 2020). Despite these pitfalls, Equinor's strategic priority of vertical integration has positioned the company as a robust and competitive force in the global energy market, fostering sustainable development and stakeholder value.

Greenfield investments

Greenfield investments involve the setup of wholly owned facilities or subsidiaries in foreign markets (Alon et al., 2020). Greenfield investments are used by energy companies to maintain complete control over their business and strategic decision-making.

Ørsted, a Danish green energy company previously called DONG Energy, has made greenfield investment in offshore wind farms a strategic priority to drive its international growth in renewable energy (Market Expansion, n.d.). Driven by a vision to make the world run entirely on clean energy, Ørsted has become a market-leading company in the offshore wind sector by drawing on its experience in project development, construction, and operations management.

One of the biggest instances of Ørsted's greenfield investments is its construction of offshore wind farms in the United States (Press, 2024). Identifying the massive offshore wind energy potential along the U.S. coasts, Ørsted initiated a chain of greenfield ventures to harness this potential and facilitate the nation's evolution towards clean energy. In Massachusetts, New Jersey, and Virginia, Ørsted has started developing offshore wind projects by acquiring lease agreements for specific sites and securing regulatory approvals necessary to develop projects (Jost & Xydis, 2023). By building new businesses and facilities from scratch, Ørsted gains end-to-end control over the full project life cycle, including site selection, design, construction, and operational phases.

Advantages of Ørsted's greenfield investments are the ability to shape operations based on the needs of the local market, gain full control over assets and decision-making, and create brand awareness as a reliable partner in developing renewable energy. Through its investments in greenfield projects, Ørsted demonstrates its commitment to long-term development and sustainability, making it a key contributor to the global energy transition. Greenfield investments, though, involve a lot of risks like high up-front capital investments, federal and state regulatory approval, and project execution risks including delays, cost overruns, and supply chain disruptions. Nevertheless, Ørsted's disciplined greenfield investment strategy has allowed the company to gain a firm presence in the U.S. offshore wind sector and drive the world's shift to improved renewable energy infrastructure.

Technology transfer

Technology transfer involves the movement of technology, expertise, and best practices to foreign markets for purposes of market penetration and local capacity development (Kruger & Steyn, 2020).

The International Energy Agency (IEA) plays a crucial role in facilitating the transfer of technology and cooperation among its member countries through various programs aimed at improving the development of clean energy technologies and practices. One of the key mechanisms used by the International Energy Agency (IEA) to achieve the transfer of technology is the Clean Energy Ministerial (CEM), a high-level forum bringing together energy ministers and other stakeholders worldwide to promote the deployment and innovation of clean energy technologies (Towards an Impactful Mitigation Work Programme under the UNFCCC, 2023).

In the frame of the Clean Energy Ministerial (CEM), the International Energy Agency (IEA) supports knowledge sharing, capacity building, and collective research and development activities that have the objective to accelerate the incorporation of clean energy technologies. Through activities like the Technology Collaboration Programmes (TCPs), the IEA stimulates cooperation among the member countries in focused technological areas, such as renewable energy, energy efficiency, and carbon capture and storage, through the spread of best practices, collaborative research efforts, and the development of standardised frameworks (Hattori & Nam, 2020).

The advantages of the technology transfer programs of the IEA are the facilitation of easy market entry and expansion for clean energy technologies, helping to build and enhance local capability, and long-term partnership and goodwill among member countries. By transferring knowledge, experience, and best practices, the IEA assists in fostering the world towards a sustainable and resilient energy future. However, technology transfer activities also entail risks and challenges, including the protection of intellectual property rights, ensuring technology compatibility and adaptation with the local environment, and overcoming cultural and organizational barriers that may impede effective technology adoption and implementation. Despite these risks and challenges, the IEA's function in promoting technology transfer and collaboration remains important in accelerating innovation and advancing clean energy solutions globally.

In summary, the implementation of internationalization strategies is a significant milestone for energy firms looking to succeed in the competitive global market. These strategies are critical instruments for firms to not only expand their geographical presence but also enhance their operational capacity and promote sustainable energy transitions globally.

Extending operations beyond national boundaries enables energy firms to access new markets and consumer bases, diversifying their revenue streams and reducing exposure to volatile or saturated markets. Further, such extension enables access to new resources and investment possibilities, permitting firms to leverage emerging trends and technological breakthroughs in the energy industry.

In the context of sustainable energy transitions, internationalization strategies play a critical role in driving innovation and scaling up renewable energy solutions worldwide. By expanding their presence in renewable energy markets and investing in clean technologies, energy companies can contribute to the reduction of greenhouse gas emissions, the diversification of energy sources, and the promotion of environmental sustainability on a global scale.

In brief, through the adoption of internationalization strategies and the development of strategic alliances, energy firms can become pioneers in driving the shift towards a more sustainable and resilient energy future. By following collaboration, innovation, and commitment to corporate social responsibility practices, these companies are capable of managing global markets' complexity while generating sustainable value for their shareholders, stakeholders, and broader society.

4. Conclusion

In summary, this study has presented an in-depth examination of internationalization strategies employed in the energy sector, emphasizing the importance of international expansion for energy companies and discussing the challenges, opportunities, and best practices involved in the process of internationalization.

The exploration of three prominent theories—the Upsala model, the Eclectic paradigm (OLI framework), and Internalization theory—has provided a comprehensive framework for understanding the dynamics of international growth in the energy industry.

Furthermore, the examination of nine different internationalization strategies, each backed up by practical examples from major energy firms, highlights the various options open to organizations wishing to increase their international presence. From diversification of markets to vertical integration, and from partnerships and alliances to technology transfer, each approach has its own

benefits and drawbacks that must be carefully weighed in light of a firm's particular goals and market context.

By integrating theoretical concepts and applied applications, this research enriches the knowledge about the strategic imperatives that influence the internationalization behavior of energy firms. It highlights the role of strategic fit, market responsiveness, and organizational flexibility in addressing the dynamic global energy environment.

The blend of conceptual theory and practical application enables energy businesses to engage in well-informed decision-making, take advantage of new opportunities, and foster sustainable growth and development in the dynamic energy industry. By employing strategic foresight, developing cooperative partnerships, and maintaining a commitment to innovation, energy businesses can create beneficial change and define the future of energy worldwide.

Future research directions

Future research on international expansion of the energy sector must focus on identifying specific problems of significance. One key area of research is the impact of geopolitical events—i.e., energy geopolitics, trade wars, and geopolitical conflicts—on global expansion strategies and operations of energy firms. The other topic of interest to investigate is the application of digitalization, automation, and artificial intelligence in driving operational efficiency, lowering costs, and generating innovation in global energy markets. Additionally, research can investigate the effects of climate change mitigation efforts, the move towards renewable energy, and sustainability practices on the internationalization strategies and business models adopted by energy firms. Furthermore, scholars can analyze how new business models and market designs, including energy-as-a-service, decentralized energy platforms, and energy transition finance, emerge and affect internationalization.

Filling the current research gaps and discussing the future trends and challenges, subsequent studies can provide insightful understanding of the underlying drivers of internationalization in the energy industry. The research findings could act as a guideline for strategic decision-making in energy firms competing in the global marketplace, thereby enabling them to manage complexities and achieve sustainable growth and development.

COMPETING INTERESTS DISCLAIMER:
Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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