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HISTORY OF EXPLORATION & PRODUCTION AND THE OIL COMPANIES

ZhiHao Zhu
Kings' School Al Barsha, Dubai 38199, United Arab Emirates.
Corresponding Email: ray.zhuzhihao@gmail.com

Abstract: This paper provides a comprehensive historical analysis of the oil exploration and production industry, examining its evolution through the intertwined lenses of corporate strategy, geopolitical conflict, and technological innovation. It argues that the sector's development has been a powerful force in shaping the modern global economy and international relations, while simultaneously being profoundly shaped by external political, economic, and environmental pressures. The study employs a dual-case framework for in-depth illustration: the corporate history of BP serves to trace the strategic adaptations and challenges of a major international oil company, from its imperial origins to its contemporary engagement with the energy transition. Concurrently, the Rumaila oil field in Iraq is analyzed as a microcosm of the industry's technical, operational, and geopolitical dimensions, highlighting its enduring significance and modernization. The analysis spans key historical phases, including the formative early discoveries, the rise of OPEC and the use of oil as a geopolitical weapon, and the persistent link between hydrocarbon resources and regional conflicts. It then investigates the contemporary pressures compelling transformation, particularly the dual imperatives of technological efficiency and climate responsibility. The discussion projects into the future of upstream operations, evaluating how digital technologies like artificial intelligence are revolutionizing exploration and production, and how climate-responsive strategies—including carbon management and investments in cleaner energies—are redefining corporate missions. Ultimately, this paper presents the oil industry not as a static entity, but as a dynamic and adaptive sector navigating an irreversible shift toward a lower-carbon global energy system.
Keywords: Oil exploration; BP; Rumaila; OPEC; Upstream technology; Climate change; Energy transition

1 INTRODUCTION

The discovery and exploitation of oil have fundamentally reconfigured the contours of global civilization, serving as a primary catalyst for economic modernization, geopolitical realignment, and profound social change. As the lifeblood of industrialization and a strategic commodity of unparalleled influence, oil has not only powered engines and economies but has also shaped international alliances, triggered conflicts, and defined the fortunes of nations and corporations alike. This paper provides a comprehensive analytical overview of the oil industry's dynamic evolution, tracing its trajectory from the pioneering discoveries of the early 20th century to the complex challenges and technological innovations that characterize the contemporary era[1]. By integrating historical narrative with structural analysis, the study illuminates how the sector has been shaped by—and has in turn shaped—key historical milestones, transformative corporate strategies, decisive geopolitical events, and successive waves of technological advancement. Through this multidisciplinary lens, the paper seeks to offer a coherent framework for understanding the oil industry not merely as an economic sector, but as a central force in the making of the modern world, while critically examining its ongoing adaptation in an age defined by climate imperatives and energy transition[2].

2 HISTORICAL DEVELOPMENT OF OIL EXPLORATION & PRODUCTION

2.1 Brief BP History

1908: British-controlled Anglo-Persian Oil Company (APOC) (later known as BP) is formed after British geologists find the first significant oil well in Persia, modern-day Iran.
1913: British Navy switched from coal production to oil production under Winston Churchill's suggestion.
1953: BP, as part of Iraq Petroleum Company (IPC), discovered oil in the Rumaila prospect of Southern Iraq.
1979: BP lost 40% of its global crude oil supplies after Iranian Islamic Revolution.
2005: 15 BP workers were killed with more than 170 injured in Texas City Refinery explosion.
2010: The Deepwater Horizon oil spill killed 11 people & leaked about 4.9 million barrels of oil into Gulf of Mexico.
2017: BP announced acquiring a 43% stake in the solar energy developer Lightsource Renewable Energy, renamed Lightsource BP.

3 GENERAL HISTORY OF OIL PRODUCTION & EXPLORATION

1908: British-controlled Anglo-Persian Oil Company (APOC) (later known as BP) finds the first significant oil well in Persia, modern-day Iran-> Western countries would start their own respective exploitations of the resource

1913: British Navy switched from coal production to oil production under Winston Churchill's suggestion, making global powers recognize that oil could be a strategic weapon in terms of military importance.
Post WWI: immense oil reserves discovered in countries like Saudi Arabia (1938), Kuwait (1938), and Iraq (1927) underscore Middle East's importance in global energy.
WWII: The resource's importance was underscored in this time with oil being used in modern warfare e.g. powering tanks, ships, aircrafts. Further could be seen in Germany's decision in attempting to invade Russia being partly due to its intention of gaining the massive oil reserves in the Caucasus region.
1950s: Middle East supplied over 50% of the world's oil reserves-> brought power and wealth to those countries yet also brought exploitation from Seven Sisters which controlled majority of the oil production there so they took most profits whilst unethically leaving local population with little benefit.
Suez Crisis 1956:
-Egypt's President Gamal Abdel Nasser in July nationalized the Suez Canal—then controlled by British and French interests—to finance the Aswan High Dam, provoking outrage in Europe (history.state.gov) due to it being a key oil transportation route
-late October, Israel invaded Sinai and advanced toward the canal, followed by coordinated British and French military intervention, aiming to regain control (britannica.com).
-However, international pressure from US (due to its fear invasion would push Arab nations in general to the Soviet Union) and Soviet Union made above nations withdraw forces.
1960s: OPEC (made up Iran, Iraq, Saudi Arabia, Kuwait) created to take back control of oil pricing from Western Corporations, proved to be effective in 1973 when in response to US support for Israel during Yum Kipur War, an oil embargo was imposed upon-> oil prices quadrupled within months-> global economic crisis with shortages & inflation in European countries
1970-1980: Saudi Arabia oil revenues increased from $1.3 billion-110 billion, allowing it to fund social projects, military expansions etc. during prices soaring but when prices crashed (e.g. mid 1980s) there was social unrest, political instability etc.(example of a country fallen under the resource curse)
1991 Gulf War: after Saddam Hussein invaded and annexed Kuwait in August 1990 to gain oil reserves, making him own 20% of world's oil reserves-> U.S.-led coalition of 35 nations, backed by a UN mandate to have an air and ground campaign to liberate Kuwait but also not let those oil reserves fall into Saddam Hussein's hands. War ended in February 1991 (millercenter.org).
Also fueled internal conflicts within Middle East: e.g. Iraq disputes over oil revenue sharing between central government and Kurdish Regional government.
Recently global demand for oil decreases due to increased awareness of negative externalities on environment-> middle eastern countries need to shift to other industries for economic wellbeing e.g. Saudi Arabia's Vision 2030 aim to reduce reliance on the resource by investing in technology, tourism and renewable energy[3-4].

4 RUMAILA OIL FIELD – KEY FACTS

1. Has massive impact: Rumaila is one of the largest onshore oil fields in the world, produces around 1.5 million barrels of oil every day = one-third of all the oil Iraq makes.
2. Long History: Discovered in 1953, oil has been pumped from the ground since 1954. yet there are still around 17 billion barrels of oil left underground today.
3. Modern Advancements: A special group called the Rumaila Operating Organisation (a partnership between Iraq's oil company, BP, and PetroChina) took charge in 2010, drilling over 300 new wells, installed new equipment with smarter digital technology-> increase daily production by around 40%, making the field much more efficient

5 TECHNOLOGICAL INNOVATION AND THE FUTURE OF UPSTREAM OPERATIONS

5.1 The Role of Artificial Intelligence

Reduces exploration costs: AI algorithm can analyse geological data and identify potential oil and gas reserves more efficiently, reducing the time-consuming and expensive process of finding such reserves where machines equipped with infrasound technology are used[5].
Optimize Production: It can predict equipment failures, suggest when and where maintenance is needed-> reduces downtime
Improve Safety: It can help detect potential safety hazards and alert workers to take corrective action. It also makes drilling for oil more safe as well as effective with autonomous drilling systems.

5.2 Climate Change and Industry Responsibility

Acknowledging Responsibility: Oil and gas companies, especially those in the Oil and Gas Climate Initiative (OGCI), openly recognize their role in contributing to climate change. These companies produce about 30% of the world's oil and gas, so their emissions are a big part of the problem—and they understand they must be part of the solution.

Setting Measurable Climate Goals: OGCI companies have set clear climate targets. One major goal is to reduce one gigaton of CO_2 emissions by 2025, mainly through better technology and cooperation. Some member companies are even setting net-zero emissions targets for their operations[6-8].
Using Smart Technologies: To meet these goals, oil and gas firms are using tools like:
- Carbon Capture and Storage (CCS): Captures CO_2 from industrial sites and stores it underground.
- Methane Detection & Reduction: Using satellites and sensors to find and fix methane leaks (methane is a powerful GHG).
- Energy Efficiency: Improving how energy is used during exploration and drilling.
- Switching to Hydrogen and Cleaner Fuels: Investing in future fuels that emit less or no carbon.

6 THE OIL PRODUCTION PROCESS: FROM EXPLORATION TO REFINEMENT

6.1 Exploration & Drilling (Upstream)

- Geologists use seismic surveys to locate oil and natural gas trapped deep underground.
- Once a promising site is found, drilling rigs are set up to bore through rock layers to reach the reservoir.
- The drilled well is fitted with steel casing and a valve system (called a Christmas tree) to safely control the flow of oil—and often natural gas—to the surface.

6.2. Separation and the LNG Process

- At the surface, crude oil is separated from natural gas, water, and sand [9].
- The natural gas is cleaned by removing water, CO_2, and impurities [10].
- Then, it's cooled to -162°C in a special facility, turning it into a liquid (LNG) for easier transport and storage [11].
- This LNG is then shipped around the world in insulated tankers and turned back into gas at its destination—used in homes, power stations, and factories.

6.3 Transport & Refining

- The separated oil is stored and moved through pipelines, trucks, or oil tankers to refineries.
- At the refinery, with the help of fractional distillation it's processed into everyday products such as petrol, diesel, jet fuel, heating oil, and plastics, using techniques like distillation and cracking.

7 CONCLUSION

The oil industry continues to serve as a fundamental pillar of the global energy system, supplying the bulk of the world's transportation, industrial, and chemical feedstock needs. Nevertheless, it currently navigates a period of profound transformation, driven by three intersecting forces: escalating environmental imperatives, volatile geopolitical landscapes, and rapid technological disruption. Mounting climate change evidence and international accords such as the Paris Agreement have intensified scrutiny on carbon emissions, compelling the sector to reconcile its operational legacy with the urgent need for decarbonization. Simultaneously, geopolitical tensions—from regional conflicts to shifting energy alliances—continue to threaten supply stability and influence market dynamics, reminding the world of oil's enduring strategic significance.
Major integrated companies like BP embody this dual reality: they are inheritors of a century-old hydrocarbon economy, yet increasingly signal a strategic pivot toward sustainable energy and digital innovation. Their evolving portfolios—spanning upstream oil, natural gas, renewables, and carbon management technologies—reflect an industry in transition, albeit at a pace debated by stakeholders. Looking ahead, the future of upstream operations will be shaped by the integration of smarter technologies such as AI, IoT, and advanced data analytics, which enhance efficiency, safety, and predictive capabilities. Furthermore, stricter climate regulations and growing investor pressure for ESG compliance will drive greater transparency, emission reductions, and investment in low-carbon solutions.
Ultimately, the industry's trajectory will depend on its ability to adapt within an increasingly carbon-conscious global framework. While oil will remain relevant in the medium term, its role is gradually being redefined—from a dominant energy source to one component of a more diversified, resilient, and sustainable energy mix. The challenge and opportunity for oil companies lie in balancing legacy assets with forward-looking innovation, ensuring energy security while contributing meaningfully to a cleaner energy future.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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