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AI In Oil And Gas - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2024 - 2029)

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Abstracts

The AI In Oil And Gas Market size is estimated at USD 3.14 billion in 2024, and is expected to reach USD 5.70 billion by 2029, growing at a CAGR of 12.61% during the forecast period (2024-2029).

The increasing application of AI in reservoir analysis, drilling optimization, anomaly detection in pipelines, safety monitoring, emissions reduction, revolutionizing exploration, production, and environmental sustainability in the oil and gas industries is expected to fuel the growth of the market.

Key Highlights

The emergence of predictive maintenance powered by artificial intelligence in the oil and gas market is transforming companies in the sector's asset management. This ensures better reliability and reduces operational risks, which is expected to drive the growth of the market in the future.

For instance, in October 2023, C3 AI, the Enterprise AI application software company, announced that the C3 AI reliability application would include predictive maintenance software developed by Shell. This would strengthen the use of C3AI's AI ecosystem to maintain the oil company's critical equipment. This shows the increasing adoption of AI platforms in the oil and gas sector, supporting market growth.

AI technologies present the potential for increased efficiency in oil and gas operations to find patterns, streamline workflows, automate decision-making, and examine enormous amounts of data from sensors, machinery, and industrial processes. Predictive maintenance solutions, equipped with artificial intelligence (AI), can forecast equipment

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breakdowns beforehand, allowing oil & gas businesses to plan maintenance tasks in advance, save downtime, and maximize asset usage.

The global AI in the oil and gas market is driven largely by the growing trend of lower production costs. In the face of fluctuating oil prices and shifting market dynamics, oil and gas businesses increasingly seek artificial intelligence (AI) technologies to optimize operations, streamline procedures, and alleviate costs.

AI adoption is accelerating across industries, including the oil & gas sector, as it processes massive datasets across the value chain. AI can extract more value from data through machine learning that uncovers hidden insights. Optimizing complex operations enables oil & gas companies to reduce costs and enhance productivity.

The International Energy Agency (IEA) reported that after Russia invaded Ukraine, Russia cut 80 billion cubic meters (BCM) of pipeline gas supplies to Europe, which caused an energy crisis in the region. This impacted the operations of midstream and downstream companies in the oil and gas industry, restricting market growth.

The European Union's objective to become self-sufficient in energy production with the emergence of renewable source-based energy initiatives can potentially hinder the growth of the oil and gas industry in the European region. This indirectly impacts market growth by limiting the implementation scope of AI solutions and services in the oil and gas industry.

The COVID-19 pandemic led to a global shutdown and decreased economic activity worldwide, restricting the demand for oil used for industrial activity, travel, and other applications. The international crude oil price also fell during the COVID-19 pandemic, reducing production exploration activities in the oil and gas industries worldwide and impacting AI technology adoption in the market studied.

AI in Oil and Gas Market Trends

Upstream Operations Segment Expected to Witness Significant Growth

Upstream operations refer to the oil and gas industry's exploration activities, which include conducting geological surveys, obtaining land rights, and producing with onshore and offshore drilling. In upstream operations, businesses face challenges when geologists and exploration teams search for new oil reserves and seeps.

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The adoption of AI in oil and gas operations, such as oil exploration, becomes easy as advanced AI algorithms can analyze larger datasets of seismic surveys, geological formations, historical well logs, and satellite imagery to pinpoint potential oil reservoirs on the land and ocean accurately.

For instance, the oil and gas company ExxonMobil is leveraging AI for oil exploration. It uses AI models to analyze real-time seismic data, historical drilling data, and many other factors to accurately detect natural oil seeps in the ocean.

Global oil and gas corporations are trying to enhance the effectiveness and efficiency of their oil exploration procedures. AI helps companies with their operations activity. Using different AI tools to digitize records and automate the analysis of geological data and charts, oil and gas companies can identify possible problems like corrosion in pipelines or increased equipment usage.

Huawei built a dedicated oil and gas exploration cloud and used AI and Big Data capabilities to re-analyze 10 PB of the customer's historical exploration data, mine new value from it, and support extraction decision-making. This brought substantial additional value to the oilfield and switched the seismic data collection operation modes.

Recent advancements in cloud-based data analytics and the advent of digital twins in oil and gas operations have been expanding the boundaries of predictive maintenance technologies, making them a valuable tool for monitoring asset integrity. Companies in the oil and gas industry, including BP, ExxonMobil, and Shell, have been using predictive maintenance to evaluate the condition of their operational equipment and predict maintenance requirements.

According to data published by OPEC in April 2024, the demand for crude oil has been increasing and following a growth trend, showing the increasing production demand in the oil and gas industries, which would support the market's growth during the forecast period.

The increasing priority on the environment-friendly production process in the oil and gas industry would increase the application of AI technology in the early detection of potential environmental hazards through analyzing aerial photos, satellite imagery, and remote sensing data to identify the oil spills in offshore locations and leakages in pipelines. This enables companies to mitigate the environmental impact and prevent the spread of pollutants. All the above-mentioned factors are expected to drive the growth of the market studied.

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North America Holds Largest Market Share

North America stands as a leading and highly developed market for AI. The region's strong economy, widespread adoption of AI technologies among oilfield operators and service providers, the significant presence of top AI software and system suppliers, as well as the joint investments made by government and private entities to support research and development activities are all factors that will fuel the demand for AI in the oil and gas sector. The expanding oil and gas production capacities and rising investments in the industry are expected to further enhance market opportunities.

The region's share is expected to be dominated by the United States due to its extensive oil and gas sector and the increasing adoption of AI within the sector. As per the US EIA, the United States has consistently produced more crude oil than any other nation for the past six years. In 2023, the average daily crude oil production, including condensate, reached 12.9 million barrels, surpassing the previous United States and global record of 12.3 million barrels set in 2019. The country's abundant oil and gas supply has led to lower energy costs, supporting private-sector investments and contributing to further economic growth in the United States.

AI offers significant advantages throughout the entire value chain, considering the ever-changing energy production landscape. It assists oil and gas companies in evaluating the worth of reservoirs, tailoring drilling and completion strategies based on geological conditions, and evaluating risks associated with each well. This region is expected to lead the global market in the foreseeable future due to its well-established infrastructure, which can provide cutting-edge solutions to the oil and gas industry. The growing influx of investments in AI implementation for startups is expected to bolster market growth in the coming years.

The integration of AI into oil and gas exploration has brought about a fresh era of effectiveness and precision, revolutionizing the methods employed by companies to locate and uncover hydrocarbon resources. Consequently, the growing investments in oil exploration activities are anticipated to bolster the utilization of AI in this industry.

Notably, prominent US-based oil companies such as Exxon Mobil and Occidental Petroleum allocate billions of dollars for diverse oil exploration endeavors while directing substantial funds into their fossil fuel enterprises through significant mergers and

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acquisitions.

In March 2024, a cutting-edge Artificial Intelligence (AI) program assumed control of the remote Nabors Industries Ltd rig. Utilizing satellite communication, this program, developed by Corva LLC, flawlessly executed split-second decisions to drill through the rock formations. By doing so, it is estimated that the AI program will reduce the number of commands issued by the human operator by approximately 5,000 while also enhancing drilling speed by a minimum of 30%. The primary goal behind this innovative technology is to reduce expenses and maximize oil extraction from the earth's surface. Such significant adoption of AI technology in oil exploration activities by US companies is expected to positively influence market growth.

AI in Oil and Gas Industry Overview

The AI in oil and gas market is extremely fragmented due to the presence of both global players and small and medium-sized enterprises. Some of the major players in the market are IBM Corporation, Fugenx Technologies, C3.AI Inc., Microsoft Corporation, and Intel Corporation. Key players in the market are adopting strategies such as partnerships and acquisitions to enhance their product offerings and gain sustainable competitive advantage.

In January 2023, C3 AI, an AI application software company, launched the C3 Generative AI Product Suite, which was the release of its initial product, C3 Generative AI for Enterprise Search. C3 AI's pre-built AI applications in the C3 Generative AI Product Suite include advanced transformer models, making it easier for customers to use them throughout their value chains. Transformation efforts across business functions and industries, including the oil and gas sector, would be accelerated by C3 Generative AI.

In August 2023, Wintershall Dea, a prominent independent natural gas and oil company in Europe that is transitioning into a key player in gas and carbon management, announced its collaboration with IBM Consulting to form an AI Center of Competence (CoC). This partnership aims to advance various AI use cases that enhance energy production. Both companies have solid ties with Microsoft as a technology ally.

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