Digital Transformation In The Oil And Gas Industry - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

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Report description:

The Digital Transformation Market In The Oil And Gas Industry is expected to grow from USD 72.23 billion in 2025 to USD 124.94 billion by 2030, at a CAGR of 11.58% during the forecast period (2025-2030).

Over the past decade, the global oil and gas industry has undergone a significant digital transformation. This transformation enables companies to utilize advanced digital technologies like AI, IoT, and big data to improve operational efficiencies and identify new opportunities. Digital twins have emerged as a key technology, enhancing predictive maintenance for critical assets and reducing worker exposure to hazardous tasks.

Key Highlights
- The oil and gas industry's adoption of digital twin technology is driven by benefits, including reduced operational costs, decreased downtime, and fewer maintenance interventions. Major companies are actively developing digital twin solutions. In May 2024, BP implemented its APEX System digital twin software to enhance global operations, mapping production cycles and oil and gas production in the North Sea, with plans for gradual worldwide deployment.
- Major industry players, including ADNOC, BP, Equinor, ExxonMobil, Eni, Shell, and TotalEnergies, use digital twins to optimize asset performance, reduce unplanned outages, and decrease their carbon footprint. These systems support project lifecycles from design to commissioning while monitoring performance, predicting failures, and enhancing safety.
- Software solutions are at the forefront of digital transformation, driving process automation, real-time data analysis, predictive maintenance, and improved decision-making. These solutions find applications in areas like Enterprise Resource Planning (ERP), Asset Management, Predictive Maintenance, Data Analytics, Digital Twin Software, and AI & Machine Learning. The growing adoption of cloud-based, AI-driven software, combined with the demand for scalable global solutions, is fueling this segment's growth in the market.

- One of the key challenges hindering the Digital Transformation in the Oil and Gas Market is the shortage of technical skills. Implementing and operating communication solutions in this sector demands specialized knowledge and expertise. The complexity of these solutions often requires a workforce with advanced technical training, which is currently lacking in many organizations within the industry.
- Post-pandemic, heavy industries, notably stakeholders across the oil and gas spectrum, upstream, midstream, and downstream, are placing a premium on sustainable practices. This shift, driven by AI systems that swiftly identify compliance gaps with new environmental regulations, propels market growth.

Digital Transformation in Oil & Gas Market Trends

Software Sector is Expected to Witness Major Market Share

- Disruptive technologies, such as Artificial Intelligence (AI), blockchain, and the Internet of Things (IoT), are reshaping the oil and gas sector. The software segment encompasses a range of solutions, including cloud-based monitoring, asset performance management, AI surveillance, and simulation models.
- As the oil and gas sector, especially offshore operations embraces digitization, strides are being made to cut production costs and mitigate environmental impacts. AI stands out as a pivotal technology, driving down the cost of hydrocarbon production per barrel. Forward-thinking energy firms are channeling investments into AI innovations, aiming to streamline operations, reduce operational and capital expenditures, bolster sustainability efforts, and hasten the energy transition.
- According to DNV's Energy Transition Outlook 2024 report, the United States (US) is poised to install approximately 10 GW of fixed offshore wind annually from 2040 to 2050. This is underscored by vigorous financing activities, with DNV assessing offshore wind projects collectively representing a 13 GW clean energy capacity boost, nearly a 9% increase to the US's total wind power. The International Energy Agency (IEA) highlights that the US, the world's second-largest economy, commands 15% of global clean energy investments, is a significant player in oil and gas, and leads in the sector's digital transformation.
- In the United Kingdom (UK), as per BDO Global's 2024 Oil and Gas Annual Report, Serica Energy has integrated OPEX.AI, a cloud-centric artificial intelligence (AI) tool that directly pulls data from turbine meters, offering real-time emissions calculations, facilitating the scrutiny of any anomalies. Furthermore, Serica Energy has also adopted Siemens' Predictive Emissions Monitoring System (PEMS) and benefits from its predictive maintenance alerts and its capability to remotely oversee gas turbine emissions.

Asia Pacific to Register Major Growth

- As demonstrated by PTT Exploration and Production Public Company Limited's (PTTEP) "DigitalX" project, recognized as the "Digital Transformation Initiative of the Year - Thailand" at the Asian Oil & Gas Awards 2024, companies are leveraging technologies like artificial intelligence (AI) and machine learning (ML) to achieve rapid and precise data analysis. This integrated approach spans all aspects of the business, from exploration and production to supply chain management, enabling data-driven decision-making and optimizing processes for improved performance.
- The establishment of "Digital Centers of Excellence," as seen with PTTEP, further underscores this trend, demonstrating a commitment to developing internal digital expertise and fostering a culture of digital innovation within organizations. This integrated and strategic focus on digitalization is becoming increasingly prevalent across the Asia Pacific oil and gas sector as companies strive to remain competitive and resilient in a dynamic market.
- Furthermore, the adoption of advanced data analytics and machine learning for optimizing asset integrity management and minimizing operational risks is growing in the region. For instance, Petroliam Nasional Berhad (PETRONAS), a petroleum refinery recognized in 2024 for its OPTIMUS Smart Data Optimization Solution, integrates diverse data sources, including HSE data, RBI

metrics, operational data, and maintenance records, to develop and implement optimal integrity strategies. In this way, companies are moving beyond traditional, complex, and unstructured data analysis methods.
- Rising investments in O&G pipeline projects are driving the adoption of digital solutions in the region, as these projects require advanced technologies for project management, pipeline condition monitoring, and operational safety. Digital tools such as digital twins, IoT sensors, and AI-powered analytics facilitate real-time monitoring of pipeline construction progress and enable predictive maintenance to prevent leaks and failures. The need for improved safety, efficiency, and cost-effectiveness throughout the pipeline lifecycle is accelerating the digitalization of the oil and gas industry in the region.
- For instance, in May 2024, Russia and China revealed plans to finalize an agreement regarding the Power of Siberia-2 gas pipeline to transport Russian gas to China. Discussions have been ongoing for an extended period concerning the construction of the Power of Siberia-2 pipeline, which aims to transport 50 billion cubic meters of natural gas annually from the Yamal region in northern Russia to China through Mongolia. Such factors will enhance the applications of AI technology.

Digital Transformation in Oil & Gas Industry Overview

The digital transformation market in the oil and gas industry is highly competitive and consists of several major players. The players with a prominent share in the market are focusing on expanding their customer base across foreign countries. These companies leverage strategic collaborative initiatives and acquisitions to increase their market share and profitability.

In the oil and gas sector, artificial intelligence (AI) is revolutionizing security measures. By utilizing predictive maintenance systems, these AI tools can anticipate machinery breakdowns. This foresight allows for timely repairs, minimizing accidents, and reinforcing safety protocols. Furthermore, AI-enhanced monitoring and surveillance systems are fortifying security at oil and gas facilities and overseeing transportation and employee activities.

Some of the major market players are Cognizant Technology Solutions Corporation, IBM Corporation, Microsoft Corporation, Hewlett Packard Enterprise Company, and SAP SE, among others.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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