AI Journey Of Chevron Upstream in Thailand: From Data to Business Value

How Chevron Thailand Leveraged Data Science and Generative AI To Improve Our Operational Efficiency and Drive Business Value

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Abstract

OBJECTIVE/SCOPE:

Chevron Thailand is a leading oil and gas producer in Thailand with a rich history spanning over 60 years. We have drilled more than 8,000 wells cumulatively since 1971, producing an average of 500 million cubic feet of natural gas and 16,000 barrels of crude oil per day. To sustainably and safely meet the country's energy demands, we embrace the challenge of managing and utilizing huge amounts of data from various sources, transforming it to opportunities for operational efficiency and business value through data science and AI applications.

METHODS, PROCEDURES, PROCESS:

Our AI journey encompasses the following steps:

1) **Data management and scalable data architecture,**

This step involves establishing a robust data management framework and designing scalable data architecture. The goal is to ensure that data is efficiently stored, processed, and accessed, enabling seamless integration and scalability as data volumes grow.

2) **Data quality and reliability,**

Ensuring the quality and reliability of data is crucial. This involves implementing rigorous data validation and cleansing processes to maintain high data integrity. Reliable data forms the foundation for accurate and meaningful AI insights.

3) **Workflow lookback to identify gaps and opportunities for improvement in new processes**

This step focuses on reviewing existing workflows to identify gaps and areas for improvement. By analyzing past processes, we can pinpoint inefficiencies and opportunities to enhance new workflows, ensuring continuous improvement and optimization.

4) **Data science and AI applications** for:
- **Surveillance:** We use data science to monitor and track the performance and health of our wells, reservoirs, and facilities. Techniques such as anomaly detection, fault diagnosis, and predictive maintenance enable us to proactively prevent and address issues.

- **Analysis:** Data science enhances our data analysis efforts. We utilize techniques such as data mining, statistical modeling, and machine learning to predict future trends and behaviors. This includes forecasting well performance, reservoir behavior, and facility health using techniques such as regression analysis, time series analysis, and predictive modeling. This enables us to make decisions and implement preventive measures, thereby improving efficiency and reducing risks.
- **Optimization:** Data science plays an important role in optimizing decision-making and actions. We leverage techniques such as optimization algorithms, reinforcement learning, and decision support systems. We also used data science to improve our workflows and processes, using techniques such as automation, orchestration, and integration.

RESULTS, OBSERVATIONS, CONCLUSIONS:

By leveraging data science, machine learning, and AI applications, we have significantly shortened cycle times, enhanced accuracy, increased value, optimized resources, improved efficiency, and mitigated risks in our operations. Over the past six years, our major digital transformation program has delivered exponential growth. We have introduced data science and analytics, robotic automations, Industrial Internet of Things (IIoT), and other advanced technologies across various value streams.

Our efforts have resulted in over 100 digital initiatives, realizing benefits exceeding $200 million from a total estimated benefit of over $300 million in our current portfolio.

NOVEL/ADDITIVE INFORMATION:

Chevron Thailand has embarked on an AI journey, spanning from data management and quality to workflow analysis and action plan development. Our goal is to achieve greater efficiency and business value. We demonstrate how data science serves as both a foundation and a tool for enhancing operational excellence and gaining competitive advantage. We showcase how data science can be applied across various domains and challenges, including surveillance, analysis, and optimization.

Our AI journey is an ongoing and evolving process. We continuously explore new data sources, techniques, and methods, to extract fresh insights and value from our data. Additionally, we recognize the potential of generative AI as a focal point for generating even higher value.