



Let's Solve

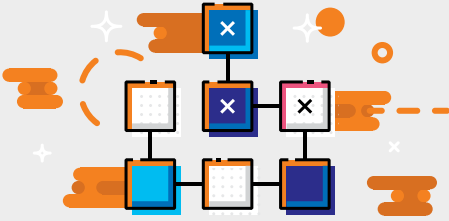


A Larsen & Toubro  
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# How Exponential Technologies Can Drill Insights for O&G Industry

From upstream to midstream to downstream operations, the O&G industry is highly regulated. There are tons of documents and data that get generated internally or are received from external sources. Emerging technologies like automation, blockchain etc are being leveraged in many ways to help O&G companies operate more efficiently, comply with rules and regulations, reduce costs and enhance safety. Automating repetitive processes can help O&G players better manage their resources and data, improve collaboration and increase productivity. Blockchain can help ensure transparent and efficient processes that minimize potential losses due to non-compliance, financial or safety issues. The key here is to leverage emerging technologies to increase operational efficiency in all the functions. Let's take a look at some of these technologies and what they can do for the O&G industry.

# Blockchain



Blockchain, a distributed ledger technology built on a shared network infrastructure and public key encryption, can be used for tankers/ships/barrages ownership record transfer/maintenance, while they are in process of movement/transit from one place to another. The bill of lading is the document that verifies ownership of a commodity that could be worth more than USD 120 million per ship. Without it, buyers and sellers

who trade USD 2.7 bn of crude daily won't be able to operate in an ocean-bound tanker market that supplies almost half of the oil consumed globally. Use of online ledgers would mean cutting down hundreds of back office manual processes who manage OTC trades documentation. Moreover, since transactions are cleared instantaneously using the chosen digital currency, there is no settlement risk or any paperwork or middleman fees beyond set up and running costs.

The introduction of smart contracts, i.e. data stored on blockchain, will enable automation of transactions that are typically performed manually. Commodity exchanges on blockchain, can support O&G trading directly between parties anywhere in the world, thus eliminating the role played by banks, brokerage firms or other intermediaries. The industry will see reductions in cost of managing complex financial agreements, improvement in supply chain transparency, reduction in trade finance costs, and ultimately greater responsiveness to changing market conditions. In fact, BP and Shell are internally experimenting with blockchain based exchange and digital contracts.

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# Industrial Internet of Things

Accurate tracking and just-in-time feed stock arrival at refinery locations can help reduce inventory levels and free up significant amount of capital. Industrial Internet of Things (IIoT) can help locate the exact location of tankers/ships during transit. Accurate weather forecasts with the help of analytics, combined with the condition of tankers/ships and precise location can help in accurately predicting the expected arrival date/time at destination.



Unplanned breakdowns can be very costly and time-consuming affairs. Embedding machines with Artificial Intelligence (AI) allows them to learn from their past experiences. The components service life data and past breakdown analysis in the similar refinery/ plants can help in predicting components next likely failure. This likely failure data can be used for planning predictive maintenance which can help in reducing the refinery downtime and associated maintenance and operations costs. The overall automation of refineries helps plant managers minimize downtime and provide better returns on investment for the owners.

## AI/Analytics



At its core, AI facilitates the ability of machines to learn from experience, adjust to new inputs and perform human-like tasks. Processing plants are complex structures that use a variety of chemical components to give consumers their desired products. One of the best uses of AI is enabling computers to optimize plant operations based on historical trends. Accurate demand and supply forecasting not only helps the O&G organization bring down the overall operational cost but also ensures uninterrupted operations. AI can help improve the accuracy of forecasts by comparing the past actual and forecasted data, calibrating the model and repeating the forecasting and actual data comparison steps.

Once a refinery/plant is represented with accurate mathematical equation, analytics can be used to arrive at theoretically optimal operational level. Use of AI and market driven demand forecasting combined with automated changes in the plant's operational parameters can lead to optimum resource utilization and profit maximization. By utilizing software that uses neural networks to make efficient decisions, the company can prepare the right compositions of output as per their clients' requirements. These benefits help companies stay ahead of their competition.

Introduction of VA (virtual assistants) is great example of how AI can reduce the workload on company staff. VAs can speak in multiple languages; they can learn from their experiences with customers and optimize their systems to cater to future clients. Some of the tasks that these VAs can perform include giving directions to local stores and providing technical data sheets. VAs can also reduce call volumes to live support agents significantly.

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## Robotic Process Automation

Robotic Process Automation (RPA) can be used to automate various repetitive tasks performed within the ETRM application. Some of these tasks are:

- Counterparty creation/approval and limits setup
- Trade confirmations and inventory transfer documents preparations
- Reading and entry of payable invoices
- Reconciliation, netting and posting of payable and receivables invoicing
- Payment processing



Take the example of a publicly traded O&G company based in the US with a few thousand employees and over USD 10 billion in yearly revenue. Faced with slow operational processes, inefficient relationship management with partners and customers, and little digital optimization in the back office, the company could use the automation capabilities of RPA to:

### Analyze data patterns

RPA software can monitor and record its own actions while collecting volumes of data related to internal and external business operations. RPA bots can record the order processing time and number of outstanding transactions, as well as the processes that require human intervention for exceptions. The process data generated by RPA can be analyzed for process efficiency improvements. For example, RPA can help an oil

exploration company identify data patterns among sensor information and drilling data present in drilling reports. Through analytical properties of RPA, the oil company can make informed decisions for drilling wells while reducing the process bottlenecks. This would increase resource utilization, and improve operational efficiency and productivity.

### **Accounting Processes Improvement**

Accounting processes consume a lot of employee time as they are repetitive in nature and require higher involvement. In addition to daily accounts payable/receivables process, RPA can be implemented during monthly book closures to automate and provide analytical insights on fundamental and financial accounting processes. It can be used to monitor expense reports, revenue accounts, journal entries, financial statement preparation as well as balance sheet reconciliations. With the addition of automated exception alerts, organizations can gain better end-to-end visibility on finances, while executives can focus more on value-added responsibilities.

According to a research report, an organization typically takes between four to 16 days for invoice processing (from receipts through payments approvals). Usually, half of the process requires at least 70-100% manual inputs. RPA can reduce the processing time significantly for repetitive, non-cognitive and routine tasks.

Price volatility, rising production costs and diminishing skilled labor resources have created serious operational challenges for petroleum companies. The lack of timely, continuous information has many players struggling to effectively leverage their people and material assets, which is negatively impacting their bottom lines. IIoT, Blockchain and RPA have the potential to transform tasks and processes that were until now considered a burden and fixed. The gradual introduction of emerging technologies represents significant additional business potential for the O&G industry and that's why organizations are planning significant investments in the coming years.

## **Author's Profile**



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Naveen leads the Energy Trading and Risk Management (ETRM) Practice at LTI. He has overall 27+ years of experience in conceptualizing and implementing ETRM/CTRM/E-gov solutions. He has worked extensively in Energy/Commodity Trading and Risk Management markets across the globe. He has been part of business analysis, product management and implementation teams. As a domain expert, he has worked extensively with natural gas, crude oil and power customers across the globe.

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