

F R O S T & S U L L I V A N

50 Years of Growth, Innovation and Leadership

Oil and Gas Information Technology

Enabling Operational Excellence

A
Whitepaper
by
Frost & Sullivan

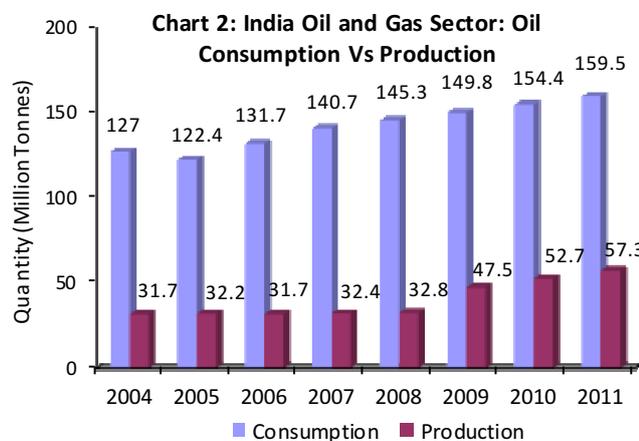
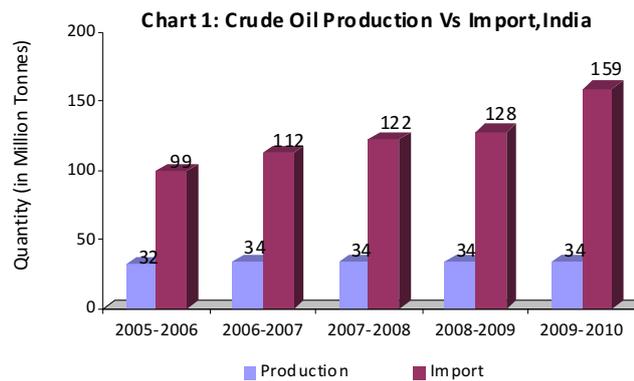


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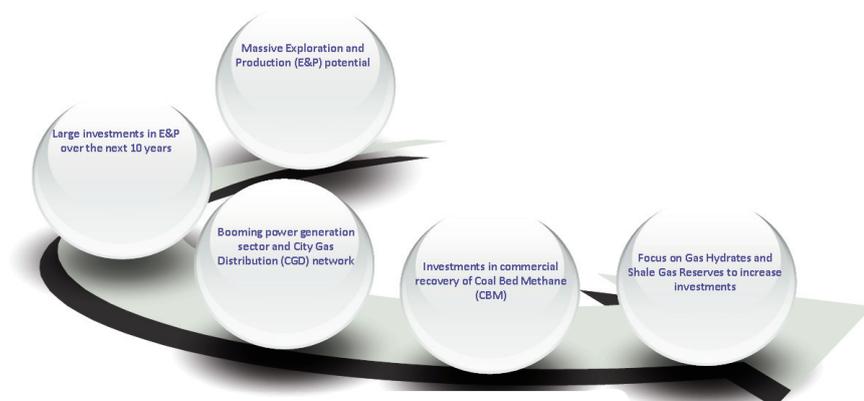
INDIAN OIL AND GAS SECTOR EVOLVING MARKET DYNAMICS

India has emerged as one of the fastest-growing economies in the world, with economic growth in excess of 7.5 percent over the last five years. While the services sector has been the major driver of growth, significant growth has been witnessed in the industrial sector (including utility supplies). With a soaring GDP, the Indian energy demand has grown at an annual rate of over 4 percent over the past decade, against the global growth rate of around 2.5 percent. India is the fourth-largest consumer of petroleum in the world after the U.S., China, and Japan. The country’s crude oil consumption has grown at an average rate of over 6 percent between 2001 and 2010, against the world average of less than 2 percent. Growth in domestic demand for petroleum products has been at the rate of 3.7 percent during this period, driven mostly by the industrial and transportation sector growth. The additional growth in crude oil consumption in India has been driven by significant additions to domestic refining capacities, which have also helped enhance product exports. On the supply side, domestic production of crude oil has practically remained unchanged over the past five years. In 2009-10, India’s domestic oil produce was able to meet only 17.6 percent of the demand. Requirement of imported crude oil has grown at a rate in excess of 7 percent between 2001 and 2010, which reflects the widening domestic demand-supply gap.



KEY INDUSTRY DRIVERS

Chart 3: Oil and Gas Industry



Massive Exploration and Production (E&P) potential

Seventy-eight percent of India's sedimentary area remains unexplored, providing huge opportunities for E&P investments. A total of 80 deep sea blocks were awarded in the eight rounds of New Exploration Licensing Policy (NELP) bidding. In the ninth round of NELP bidding, 33 offshore and onshore blocks were awarded. This created considerable investment opportunities for domestic and global upstream companies.

Large investments in E&P over the next 10 years

Over the next 7-10 years, E&P investments alone are expected to be in the range of US \$90-110 billion, with expected investments worth over US \$40 billion under the Eleventh Five-Year Plan (2007-2012) across the oil and gas value chain, creating a sustained demand for oil and gas products and services.

Booming power generation sector and City Gas Distribution (CGD) network to drive growth of gas pipelines

The CGD network and the booming power generation sector are expected to drive the demand for natural gas production in India. GAIL is in the process of constructing a national-level gas grid, under which gas from various sources, such as domestic gas fields, LNG terminals, and the proposed transnational pipelines can be transferred to various parts of the country. CGD, with an estimated investment of INR 3-5 billion per city, is expected to be one of the fastest-growing segments in the pipeline segment.

Investments in commercial recovery of Coal Bed Methane (CBM)

India holds significant prospects for commercial recovery of CBM. Being the third largest in coal reserves and fourth largest in coal production in the world, India is estimated to have about 4.6 trillion cubic meters of CBM resources. Investments in CBM recovery are expected to increase over the next five years.

Gas Hydrates and Shale Gas reserves to witness increasing investments

Setting up of the National Gas Hydrate Program (NGHP) is expected to drive investments to harness the potential of methane hydrates. India’s Memorandum of Understanding with the U.S. for technical cooperation for shale gas production is another initiative, which is expected to increase investments in this sector. India is expected to launch its first-ever offer of shale gas areas for exploration by the end of 2011.

KEY INDUSTRY RESTRAINTS

Despite the positive outlook of the industry, several factors are expected to restrain the growth of the industry in the short and medium term. Capacity additions in other regional oil and gas hubs and environmental regulations are expected to considerably influence companies to revisit their refinery expansion and capital expenditure plans over the next five years.

Chart 4: Oil and Gas Industry



Excess regional refining capacities

Substantial additional capacities expected in the Middle East are likely to restrain growth of the Indian downstream sector in the medium-to-long term. Refiners across the Asian and Middle Eastern regions will be targeting common export markets to absorb surplus productions. The ability for global markets to absorb these excess capacities is limited due to fluctuating oil markets.

Taxation policies to affect returns on E&P investments

Tax holidays for companies involved in E&P will not be applicable for blocks licensed under contracts awarded after March 31st, 2011. This could have a negative impact on commercial hydrocarbon discovery projects, as it will lead to a reduction in return on investments.

Substitution of petroleum with natural gas and other alternative energy sources to impact demand

Substitution of petroleum products with natural gas in a number of key areas is favored by economics as well as environmental considerations. The market impact

of such substitution will be guided mainly by the availability of inexpensive domestic gas supply and alternative sources of energy.

Growing environmental concerns and constantly-evolving regulations

Environmental regulations have an adverse impact on the growth of petroleum product markets and could limit the greenfield and brownfield oil and gas projects in India. Environmental concerns also press for the increased usage of natural gas, a relatively cleaner fuel, to fulfill energy requirements.

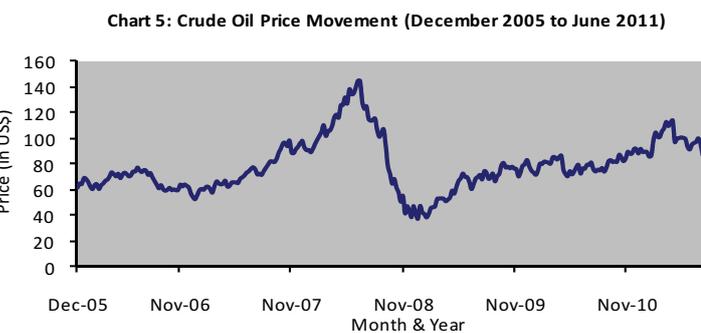
INDUSTRY CHALLENGES

External socio-economic and political factors influencing the oil and gas industry poses significant challenges on a day to day basis. The diversity of the technological capabilities and human resources required for the industry makes business operations highly demanding. As majority of the crude oil is imported, uncertainties in global economic conditions and internal tax structures greatly influence the profit margins of downstream companies in India. Leveraging advanced technology can be critical for the companies to address the following challenges as it can enable operations to become extremely adaptable to changing market dynamics.

Global crude oil price volatility impact refining margins

Increasing price volatilities have affected the profits of oil and gas companies. The downstream sector has to constantly deal with uncertainties caused by volatile crude prices, credit crunch, falling refining margins, and cautious markets. In such a scenario, a high degree of supply chain integration is often necessary to reduce capital and operational expenditure.

Inconsistent tax on petroleum products among Indian states



Currently, the taxes levied on petroleum goods in India vary from state to state and hence there exists a differential pricing on petroleum products. Oil and

gas companies face extreme complexities related to the quantum of tax to be charged and consistency in billing information across the industry value chain.

Geographically separated assets hamper sufficient operational visibility

Ensuring sufficient access to oil and gas reserves at a reasonable cost remains a significant challenge for oil and gas companies in the upstream sector. Many reserves are located in harsh environments, where E&P costs are huge and the risk

of making new investments is enormous. The high project complexities while operating in frontier areas cause lack of visibility and integrated data due to geographically-separated assets.

Frequent changes in regulations increase capital expenditure

Implementation of Euro norms to improve the quality of India's petroleum products, making them environment- friendly and globally-competitive, has become a challenge. Periodic upgrades of the ageing physical infrastructure and implementation of emerging technologies to adhere to these norms require significant capital expenditure, making it difficult for companies to manage expenses.

Scattered and ageing workforce reduces productivity and slows decision-making

Scattered workforce is an important issue, which the E&P segment is gearing up to address. The workforce is displaced across the exploration regions and at various administrative offices, resulting in slower decision-making. Significant fractions of the workforce are also expected to retire in the next ten years. As the industry grows, without sufficient increase in human resources, the industry is likely to face project delays, cancelled projects, lower productivity, and higher operational costs.

Customer loyalty to a single brand is limited

In the retail sector, customers consider fuel to be a commoditized product and are usually not loyal to a single brand during purchase. Companies are striving hard to retain their regular customers, to increase commitment from occasional customers and acquire new ones through loyalty card programs.

TECHNOLOGY: THE GROWTH ENABLER

The oil and gas industry has been at the forefront of adopting technology, driven by a need for low manual intervention due to the complexity and hazardous nature of operations. The industry has, over the past few decades, determined the design and specifications of several industrial capital goods such as compressors, field instruments, distillation units, process-piping and automation solutions such as the Distributed Control System (DCS), Safety Systems and Advanced Process Control (APC). Adoption of technology in the industry has also been driven by Project Management Consultants (PMC) and Engineering Procurement Construction (EPC) contractors as they hold a significant influence on plant design and performance.

Until the mid-1990s, IT in the oil and gas industry had been largely plant-centric applications, with extensive usage of DCS and Programmable Logic Controllers (PLCs) to control refinery and plant operations. As the global IT revolution took center stage during the 1990s, the oil and gas industry became one of the fastest adopters of IT solutions. Increasing competition in the oil and gas industry, fluctuating crude oil prices, and a need to optimize performance and plant assets compelled oil and gas companies to look for IT solutions to streamline business operations.

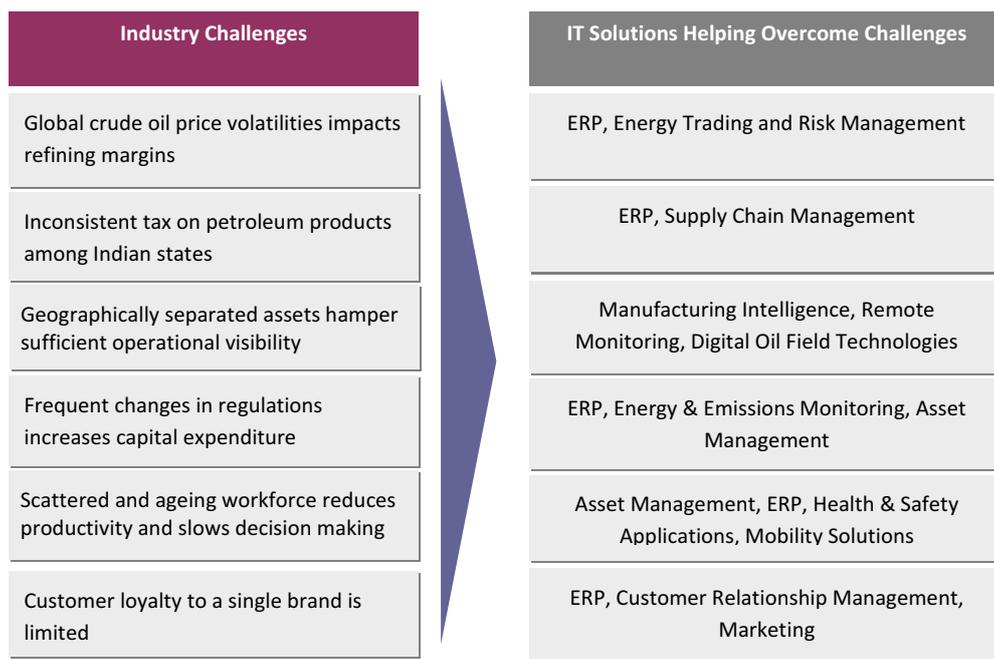


Chart 6 : Oil and Gas Industry Challenges Addressed by Various IT

Enterprise Solutions

The ever-increasing scale of operations of public-sector oil and gas companies further necessitated the integration of various business functions within the company using enterprise-wide business applications. The industry began implementing ERP with a standard set of modules such as Financial Accounting, Project Management, and Sales and Distribution. With end users deriving significant benefits post ERP implementations, ERP now forms the backbone of IT applications in the industry. ERP is no longer considered just as a support-based function, but has become an integral part of developing competitive distinction. Currently, oil and gas companies are looking at advanced domain-specific modules such as Production Revenue Accounting, Mobile Asset Management, Risk Compliance, and Governance. Supply chain management solutions have helped create a seamless information flow from the consumption point to the refinery, enabling streamlined movement of products across the value chain. The solutions have dramatically improved operational efficiencies of midstream companies by delivering complex functional capabilities that help speed mission-critical business processes.

On the marketing side, oil-retailing companies have leveraged the use of IT to improve customer loyalty in the downstream sector. Majority of the companies have invested in initiatives such as “Petro card” — a loyalty card program, which empowers customers to get the most out of every drop of fuel bought. Companies are also investing in CRM and marketing modules within ERP to drive down costs and improve service delivery. There is a rising demand for solutions to manage retail petroleum stocks as it directly impacts brand perception.

Service Oriented Architecture (SOA) based applications have assisted companies to operate with greater agility and respond to changing operational dynamics faster. With assets and resources dispersed across geographies in the oil and gas sector,

SOA provides interoperable interfaces for collaboration with distributed platforms and significantly improves interaction between systems. Integration and testing of new applications and functionalities also becomes relatively simplified. With cloud computing being recommended as the future, companies using SOA would be in a better position to integrate cloud based applications with existing business systems.

Engineering Applications

Engineering solutions involving geological and simulation applications are being increasingly used in the industry, particularly in the upstream segment. An exploration portfolio contains several data sets on potential hydrocarbon accumulations in the well region. Geospatial Information Systems (GIS) are being extensively used to manage geological data for audits and technical analysis. Simulations for fluid and gas flows along the process pipelines and for thermodynamic analysis have now become necessary across all segments of the

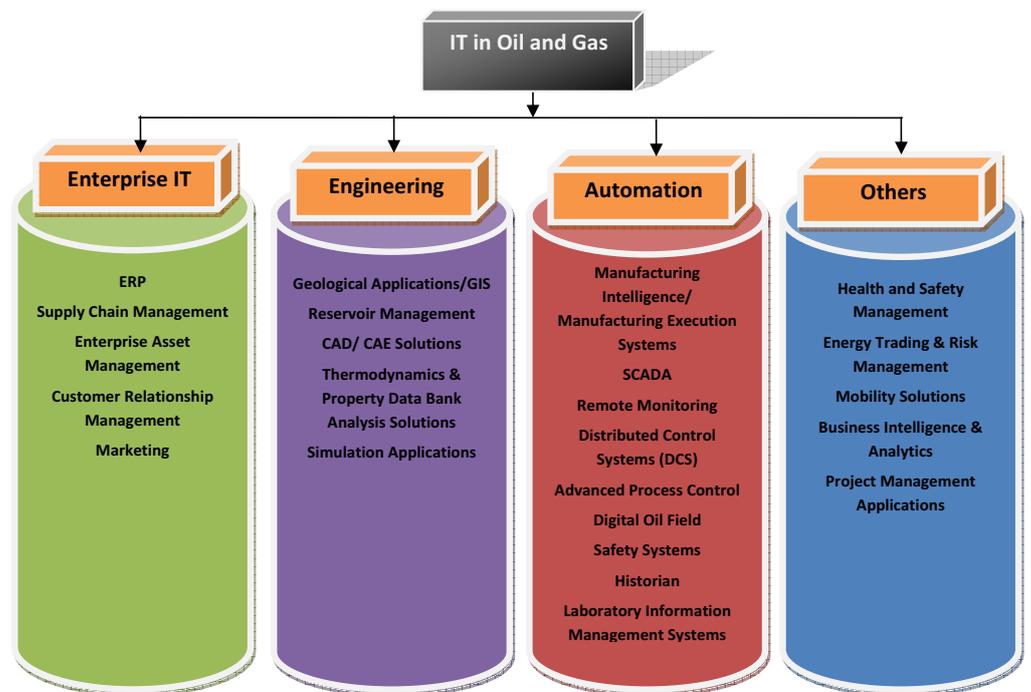


Chart 7 : Classification of Key IT Solutions Used in the Oil and Gas Industrys

industry. Computer-Aided Design and Engineering tools are being used by both the end users and the PMC and EPC contractors for plant and pipeline design and flow analysis.

Automation Solutions

Automation solutions continue to be a strong focus area for the oil and gas sector. Companies have now shifted focus to APC and Manufacturing Execution Systems (MES) to efficiently schedule production operations, while constantly updating their critical DCS systems. Majority of the Indian oil refineries currently have full-fledged MES suite installed. In the petroleum product distribution network, end users are

gradually beginning to adopt Enterprise Manufacturing Intelligence (EMI) solutions to integrate their storage and distribution network with ERP.

Historian and data loggers have now become critical components of process systems in the oil and gas sector, allowing engineers to constantly acquire data for plant performance analysis. With increasing emphasis on refining product quality and behavior of additives and catalysts on product performance, Laboratory Information Management Systems (LIMS) are being used extensively in the downstream sector to test blends and to study the performance of individual compounds. Advancement in data acquisition technologies such as sensors and transmitters, along with high-speed wired and wireless communication devices are enabling upstream assets to be, for the most part, digitized. Digital oil field technologies are witnessing widespread acceptance among Indian end users. Public sector E&P companies have already begun the first phase of digital oil field implementation, integrating upstream assets spread across the region.

Supervisory Control and Data Acquisition (SCADA) still remains the dominant automation application in the midstream segment. SCADA usage in the upstream and downstream sectors is limited to utilities and pipelines, as majority DCS products available in the market have in-built SCADA functionalities. Awareness regarding energy consumption and related environmental impact has increased the demand for energy and emissions monitoring solutions. End users are not just limiting themselves to energy audits, but utilizing energy dashboards to pin-point high energy loss areas. Advanced communication equipment and wireless mobility technologies are enabling plant and business operations to be monitored remotely. Future developments in remote monitoring solutions would almost make day-to-day operations in the production area relatively free from direct human supervision.

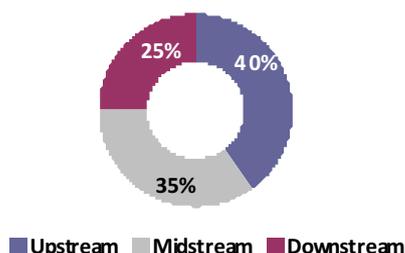
Other Solutions

The increasing dependence on IT has also generated mountains of data, which calls for appropriate data management in order to remove bottlenecks in the decision-making process. Dash-boarding, business intelligence, and analytical solutions are increasingly being considered to continuously monitor business operations. There is also a steady rise in the demand for health and safety-oriented IT solutions, keeping in mind the need to monitor ecological hazards in the environment. Companies are now inclined towards Corporate Social Responsibility (CSR) initiatives and have also established stand-alone CSR departments with necessary IT tools to track and manage CSR initiatives.

IT INVESTMENTS: EXTRACTING THE REAL VALUE

The Indian oil and gas industry is catching up with its Western counterparts in implementing IT solutions. The companies are continuously upgrading their IT skills

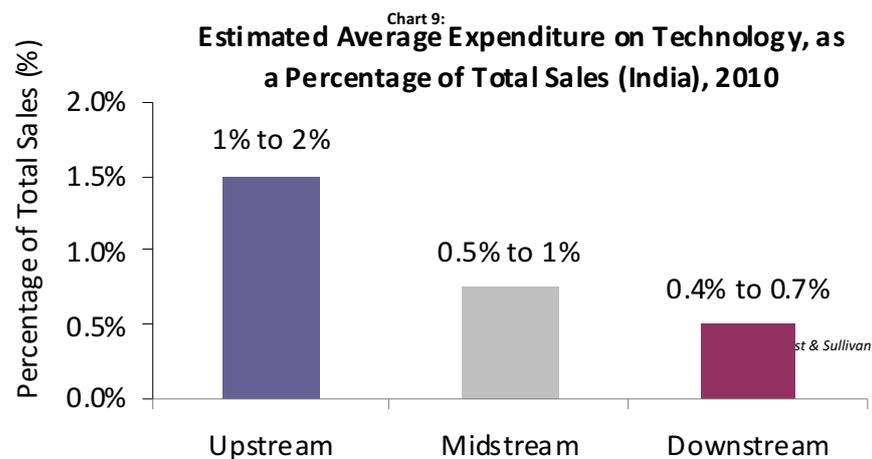
Chart 8: IT Expenditure By Segments, India, 2010



USD 1160 Million

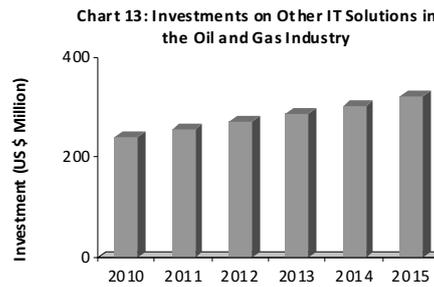
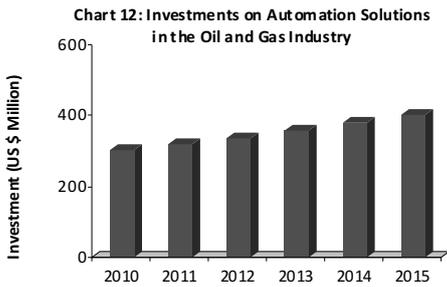
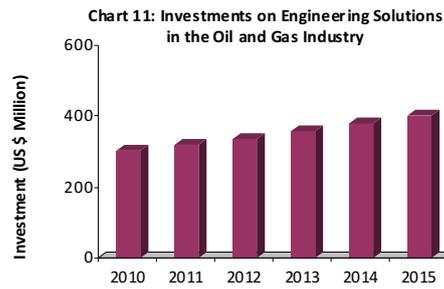
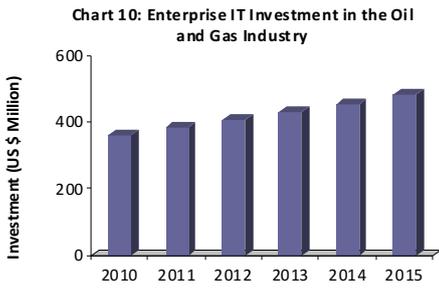
and technology, consistently striving to improve organizational performance. The companies are positioning themselves as I² Enterprises —“Informationalized” and “Integrated” in every aspect, with a strong focus on tangible and high returns.

The IT budgets in the oil and gas companies are allocated on a need basis. The size of the budget may vary with the demand for applications. Earlier, the demand for IT solutions by the industry was restricted to the implementation of ERP systems across the organization. However, today most companies have an ERP system in place and are looking at domain-centric applications, which would eventually be integrated with the ERP.



Due to the technologically-intensive nature of operations, the upstream sector spends the maximum on IT, as a percentage of total sales. The level of IT spending in the upstream segment is likely to increase, as there exists a high demand for niche solutions catering to specific work processes. Low complexity of technologies and the limited scope for IT applications in the midstream sector necessitates lower IT budgetary requirements compared to the upstream segment. However, the increasing focus on wireless mobility solutions within the plant, need for advanced plant control and analytics, and energy management is expected to drive the downstream sector to invest in state-of-the-art IT applications. The sector is also showing growing focus on retail and logistics-related IT applications, primarily to improve operating margins.

In 2010, the upstream segment in the oil and gas industry utilized the maximum share of IT, with 40 percent of the overall usage. The majority of expenditure has been constituted by applications related to Digital oil field technologies. ERP applications dominate the application spends by companies in India. Majority of the public sector companies have implemented the entire suite of ERP applications, whereas a few private sector companies have implementation of selected modules of ERP.



Source: Frost & Sullivan

A NEW PORTFOLIO OF CIO CHALLENGES

The adoption of IT has not been a smooth ride, with high product and licensing costs being the key restraining factors for adoption. The dismantling of the Administered Pricing Mechanism (APM) by the Indian Government has also not helped, as the margins of Oil Marketing Companies (OMC) have been affected due to competitive pricing pressures. The returns on investments have thus been difficult to accurately quantify resulting in apprehensions over the benefits of increased IT investments in the industry. Lack of skilled manpower to handle complex engineering, automation, and enterprise IT solutions have also dampened the rapid adoption of IT.

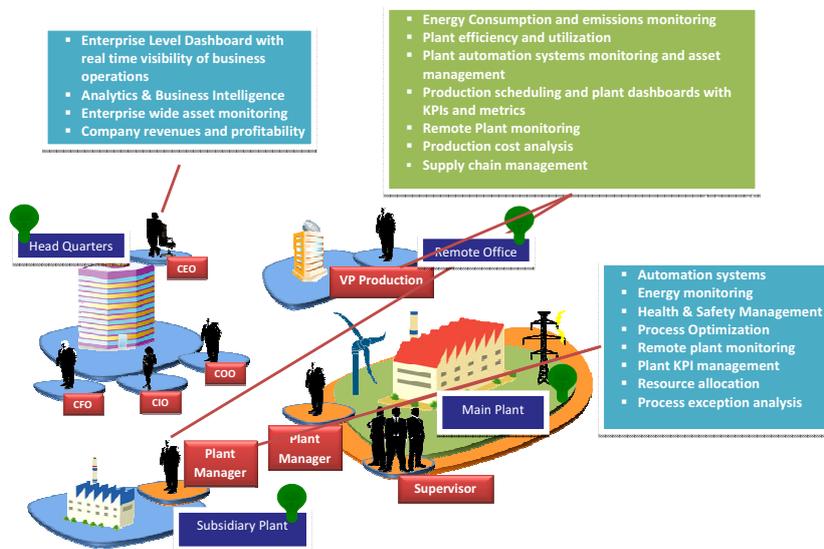


Chart 14: Stakeholders and their requirements of IT Solutions

With myriad applications being used for various business functions in the oil and gas industry, the overall architecture of the software systems have become extremely complex. End-users have to deal with multiple software platforms and vendors. Systems are functioning independently as silos with minimal data integration between each other. Although end-users utilize best of breed solutions for their respective functions, a constant lack of real-time data exchange and integration has resulted in very little visibility in the business operations. Each stakeholder within the company requires different metrics and analysis to track their business unit operations.

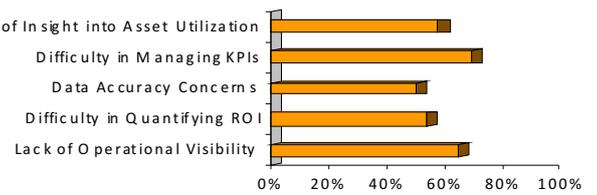
A survey of the CIOs of the top oil and gas companies revealed key IT-related challenges and issues that companies need to re-evaluate in their IT strategy, and move towards seeking optimal levels of operational efficiency and superior asset utilization.

Lack of Operational Visibility

Decision-makers/stakeholders do not get real-time visualization of plant information and its corresponding impact on the company’s operations. At present, the CXO does not have a single window platform to visualize the entire business operations in real-time including the plant, supply

chain, finance, human resources, and customer metrics. Integrating applications related to various business functions into the day-to-day operations and analyzing their impact on profitability remains a challenge.

Chart 15: CIO Challenges Survey



Source: Frost & Sullivan

Difficulty in Managing Key Performance Indicators (KPIs)

The oil and gas industry involves multitude production processes, assets, human resources, and administrative functions among others. Tracking the performance of each of these business processes and their impact on the overall performance of the company remains a challenge. Currently, most KPIs are defined and managed individually by each business unit within the company. However, a complete integration of KPIs across all business functions to define the overall performance of the company is unavailable with the current bunch of enterprise IT solutions.

Data Accuracy and Validity Concerns

Concerns with data accuracy exists as multiple data sit on various systems, often being redundant and causing apprehensions over the accuracy and validity of the data. For example, on a plant level, the DCS systems may be storing their data in process Historians, while a Plant Information Management Systems (PIMS) application may store its data on a another database. The manufacturing modules within ERP may acquire data from either of these systems or through a manual

update. In this scenario, if a CIO or a Production Head were in need of accurate data to take a key business decision, there will be uncertainty regarding ‘what data to be pulled from which system’ and also on the accuracy and validity of the information.

Difficulty in Quantifying Return on Investments (ROI)

ROI on IT solutions is difficult to quantify. Software integration and services costs have been increasing; however, the value in terms of revenue, for these solutions have gone down. Over the past few years, increasing pressure on profit margins have compelled the managements of oil and gas companies to increasingly consider detailed assessment of tangible short and medium-term returns of IT solutions prior to investment.

Lack of Insight into Asset and Resource Utilization

Lack of insight into plant and enterprise assets on a real-time basis continues to be a key challenge for CXOs. Information regarding the availability and utilization trends of raw materials, feedstock, and catalysts needs to be monitored regularly. Asset performance, equipment maintenance requirements, and plant lifecycle management are important parameters that need to be managed for lower capital expenditure and production costs.

THE WAY FORWARD

A comprehensive integration of business and plant IT systems with a layer of analysis and reporting tools built over them enables oil and gas companies to deliver proactive responses to dynamic market requirements. Monitoring KPIs and performance metrics on a real-time basis can explicitly pin-point areas of inefficiencies and perform necessary root cause analysis and amendments to address them.



Chart 16 : The Way Forward on Technology

The need of the hour is to adopt:

An application providing an integrated view from all key business functions enabling seamless cross functional visibility

A platform that can effectively leverage real-time data from various sources and bring in operational excellence for competitive differentiation

A tool to provide the role-based analytics for effective decision making

A system that links the organization’s strategic goals and helps in translation and monitoring of operational KPIs



Chart 17: Oil and Gas Enterprise of the Future

Rolta OneView™ Enterprise Suite is one such solution that enables oil and gas companies globally achieve operational excellence. Solutions such as the OneView™ will play a critical role in transforming the plant management and drive growth.

ANNEXURE



Realizing Operational Excellence through Rolta OneView™ Enterprise Suite

Shift towards a transparent information ecosystem that effectively leverages data and information regardless of its source will be a key differentiator for manufacturing companies striving for Operational Excellence through:

- Managing Risk and Compliance
- On-time Decisions with Actionable intelligence
- Optimizing Utilization, Avoiding Failures thereby Lowering Expenditure
- Innovation and Value Maximization
- Proactive Culture
- Knowledge Management
- Customer Satisfaction

Rolta offers an integrated Operational Excellence solution Rolta OneView™ Enterprise BI suite that provides consistent information with actionable intelligence to all stakeholders across the enterprise.

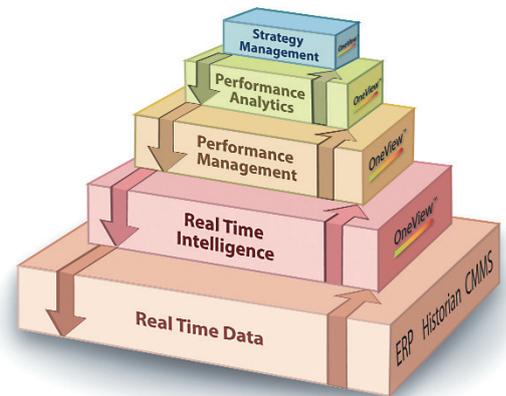
Rolta OneView™ Enterprise BI Suite

Rolta OneView™ is a productized solution providing business insights for operational excellence combining the core capabilities of Information Technology with Engineering and Geo-spatial Information Systems. It provides a framework to achieve goals sustainably, integrating mission critical information seamlessly across business Functions. The solution is designed by domain experts from different functions within the process industry to address inherent inefficiencies and expose potential hazards before they affect operations thus averting impending threats.

Rolta OneView™ builds on the organization's Real Time Data layer to provide Real-Time Intelligence, Performance Management, Performance Analytics and Strategy Management. Information seamlessly percolates across each level in either direction. Rolta OneView™ comes with pre-built connectors to most often used source systems like SAP, Oracle EBS, Aspen, LIMS, etc.

Rolta OneView™ provides deeper insights across the core and supporting functions within an organization. Different modules focus on key processes with seamless integration allowing organizations to manage cross-functional visibility.

The enterprise suite collates information across facilities for strategists and decision makers. Rolta OneView™ features pre-built powerful insights for different functions like operation and maintenance, assets, HSE, supply chain, projects, finance, human resources, sales, marketing, trading and benchmarking. These Pre-built insights are based on the Best Business Practices in the Oil and Gas Industry and leverages Rolta's experience in working with many large Oil and Gas customers globally.

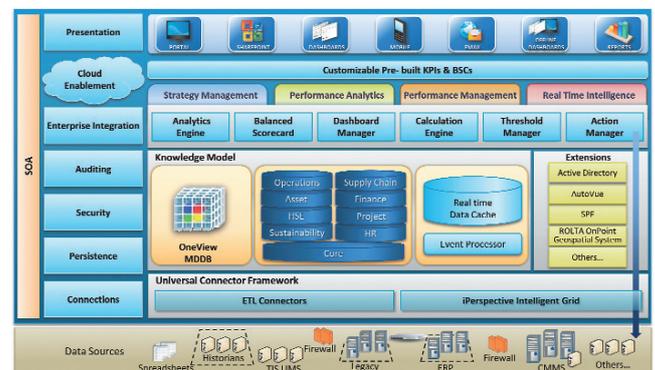


Rolta OneView™ Technology Framework

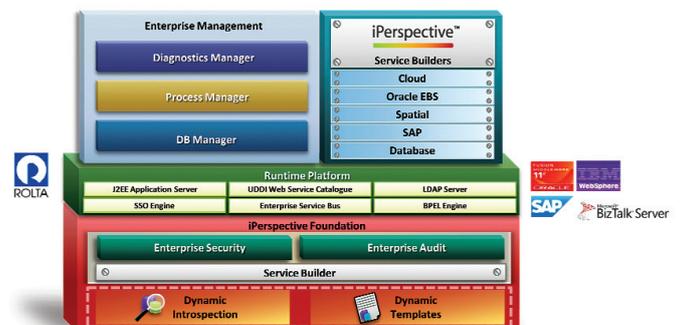
Rolta OneView™ is engineered for scalability and extensibility to address specific organization needs. It is available on industry leading platforms. It leverages state of art SOA framework to provide Real-Time Integration with different source systems and is ready for cloud-based computing.

The Technology Framework features the following key components:

- ISA 95 compliant knowledge model
- Real-Time Data Cache
- Multidimensional Database for What-If/ Scenario Analysis
- KPI, Threshold and Action Manager with calculation Engine
- Collaboration
- Presentation Manager
- Universal Connector Framework



A unique feature of the Rolta OneView™ Enterprise suite is the Universal Connector Framework, which leverages Rolta's iPerspective™ product. iPerspective™ utilizes SOA to retrieve data in real-time from varied data



sources. Change data capture and push mechanisms minimize load on source systems and network traffic. Data retrieval job schedules and sequences, including source data objects, are completely configurable.

The full iPerspective™ product suite can also be used for process level enterprise integration across different systems in the organization to reap benefits from the Flexibility provided by SOA technology.

Rolta OneView™ enterprise suite is unique because it combines the knowledge of Oil and Gas domain experts with state of art technology enabling organizations to achieve operational excellence. The productized solution can be implemented in months rather than years accelerating RoI.

CASE STUDY

Customer Challenges

In late 2006, a Global energy company faced major challenges in sustaining its competitive advantage and improving operating efficiencies. Based on a detailed analysis, it made the decision to increase the overall reliability of its refineries and plants. Borrowing from cross-industry best practices, it embarked on developing a standardized and integrated operational excellence practice across all refineries.

Leaders at eight wholly-owned refineries quickly found that timely integration of key data elements was critical to effectively achieve their goals. Although critical data existed within the company, it was isolated in disparate sources. Each refinery had its own software solution for tracking asset maintenance, another for tracking reliability and still another for project planning.

Rolta Solution

Rolta was engaged as the partner to overcome these challenges. Working closely with the customer, Rolta experts quickly mapped requirements. Rolta provided the technology blueprint and suggested a detailed enterprise integration architecture. Rolta proposed a solution that would seamlessly integrate various disparate data sources and applications, and provide deep business insights. Powerful technologies, which form the heart of Rolta OneView™ enterprise suite and Rolta iPerspective™, were effectively leveraged to ensure a comprehensive solution within stringent deadlines.

Within months, Rolta delivered an entire business intelligence platform, integrating 28 different data sources of reliability, maintenance and project data that existed throughout the refinery. This effort required Rolta to work with key business owners to build a state-of-the-art decision-support solution with dashboards, analytics, management of change, workflow, data input screens and correction actions, with follow-up actions as specified in their processes. This application is updated daily, in some cases in real-time, giving managers and executives access to information that in the past took weeks to assemble and usually resulted in missing reliability improvement opportunities.

Customer Value

Senior customer leadership received a single-window access to much-needed cross-functional insights, for easy reinforcement of threat identification, mitigation and elimination. Business managers can make commitments regarding implementation of action plans to address key threats and vulnerabilities, along with managing accountability for reliability processes. Additionally, operations can now identify, prioritize and mitigate threats and vulnerabilities, and assign action item ownership as appropriate. Metric and functional owners can raise exceptions and generate corrective actions in a timely fashion because of visibility and data transparency.

Customer Feedback - Performance Actual Results

- A large number of reliability threats identified and resolved
- Environmental reportable events at historical lows
- Reduced cost of incidents
- Run lengths of operating units steadily increasing
- Declining condition monitoring and surveillance exceptions reporting (Operator routine duties exceptions, critical reliability variables exceptions, PMs and surveillance exceptions, etc) improved
- Reliability is becoming part of the culture
 - Collective view of individual refinery performance maintains focus on causes and corrective actions associated with plant shutdown events.
 - Common cause and repetitive events are more readily apparent including those causes applicable to other refineries
- Through the implementation of a uniform reliability practice, performance at the refineries is steadily improving
 - Teams are focused on identifying, prioritizing, mitigating and eliminating reliability threats and vulnerabilities

A belief is now established that responsibility for reliability has to be shared across business units. Rolta's solution enables this cultural change because it measures and reinforces the new business processes.

Most notably, from inception in December 2007, one refinery experienced no unplanned shutdowns due to reliability-related incidents for more than 15 months far exceeding the refinery's previous historical average. In addition the company estimates that it has saved millions in costs at this refinery in the first year itself.

ABOUT FROST & SULLIVAN

Frost & Sullivan enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best-practice models to drive the generation, evaluation, and implementation of powerful growth strategies. We leverage 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from over 40 offices on six continents.

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