WIPRO logo with "Applying Thought"
Oil & Gas
Upstream Data and Information Management Survey
Conducted for WIPRO by the Oil & Gas Journal Online Research Center
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Industry overview:

The upstream Oil & Gas industry is witnessing an explosion of data. The volume of data is predicted to grow exponentially due to the development of digital oilfields. A multitude of sensors, higher frequency of data collection, integration with operational, financial, human resource and supply chain data is further adding to the complexity of data management. The challenge is to effectively capture, store, manage, analyze and deploy the data for upstream assets.

While the economy recovers, oil and gas prices continue to move upwards, O&G companies are expected to make significant investment in improving their data management to create better decision making and add to higher efficiencies.

The two key areas that O&G companies must address are Real Time Data Management (RTDM) and Business Analytics. Consumers of data will demand greater emphasis on access, clean-up, and the preparation of data for activities like analysis, analytics, and interpretation. The most immediate outcome of the growth in data volume and the speed with which it needs to be consumed and acted upon across the enterprise is on how data is captured, adoption of standards, processes, governance models, collaboration and communication across the enterprise.

It is imperative that the O&G industry, which is largely broken into silos, recognize the need to raise the bar on data management assets, systems, tools and processes.

Recent developments:

With the growth in digital oilfields and a multitude of sensors the industry's reluctance to invest in technology and data management is changing. Newer geographies, regulatory requirements and competition mean that the O&G industry will be compelled to make renewed investments in processes and technology to increase efficiency and profitability.

As operations within the O&G industry get integrated, the accuracy of data and the provisioning of standards will be the key to success

Understanding the need for data management:

The Oil & Gas Journal Online Research Center (http://ogjresearch.stores.yahoo.net) and WIPRO (www.wipro.com) conducted a survey among PennWell Petroleum's (www.pennenergy.com) database and other industry sources. The purpose of the survey was to develop industry insight on the current state of upstream data management practices and to identify leading practices that can be shared with the industry.

The survey specifically seeks to understand the issues around the following:

- Is the quality of data available sufficient to make good business decisions?

- Where is the upstream organization in relation to the adoption of dependable IT standards?

- How do Data Stewards impact the delivery of reliable, high quality data across the organization?

- What is the impact of data management processes on timeliness of access and quality of data?

- What data type is of the highest quality and what is of the lowest quality?

- Is upstream data managed successfully?

- What is the extent of concern over (the lack of) alignment between IT and business?

- Is there a co-relationship between good data management, leadership, the IT organization and the business organization?

- How do organizations perceive the lack of naming standards, KPIs, enterprise master data and the inability to integrate data?

- What percentage of the industry is adopting IT Standards? Have organizations realized the success of upstream data management related initiatives?

Survey Methodology:

Survey questions were submitted by WIPRO and their representatives. The survey was posted on an online survey site. Those in the sample group were sent an e-mail invitation to participate, with a link to the survey. A reminder e-mail was sent approximately 10 days after the first mailing.

Responses were received from 191 individuals. The number who answered each individual question varied.
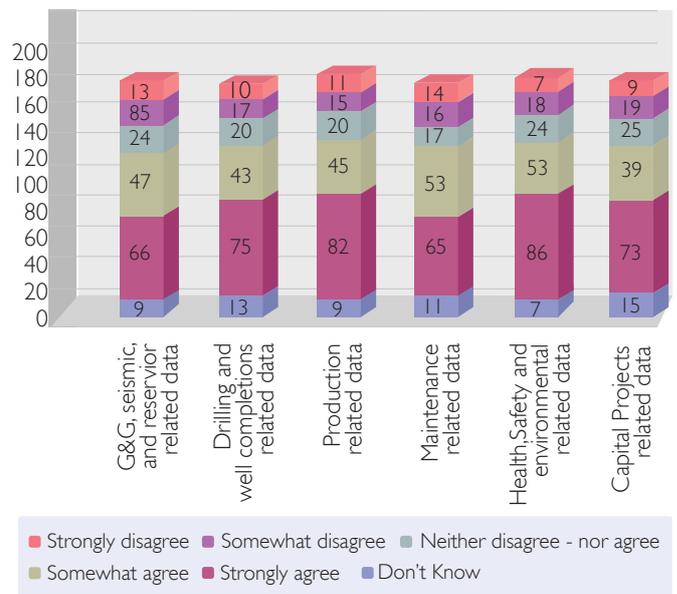
Detailed survey findings:

1. Organizationally, are you more aligned with the business or the IT function?

Legend:
- Upstream operations/business (80.0%)
- Upstream IT function (20.0%)
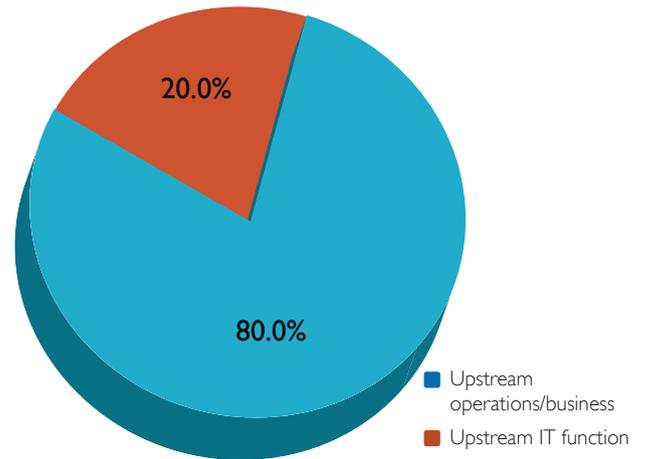
Key insights:

- Survey has a fair representation from business and operations (80%): Survey results can be expected to reflect business concerns.

2. Please comment on the quality of the following data types: "My organization's data is of sufficient quality to effectively manage our business and make sound business decisions"
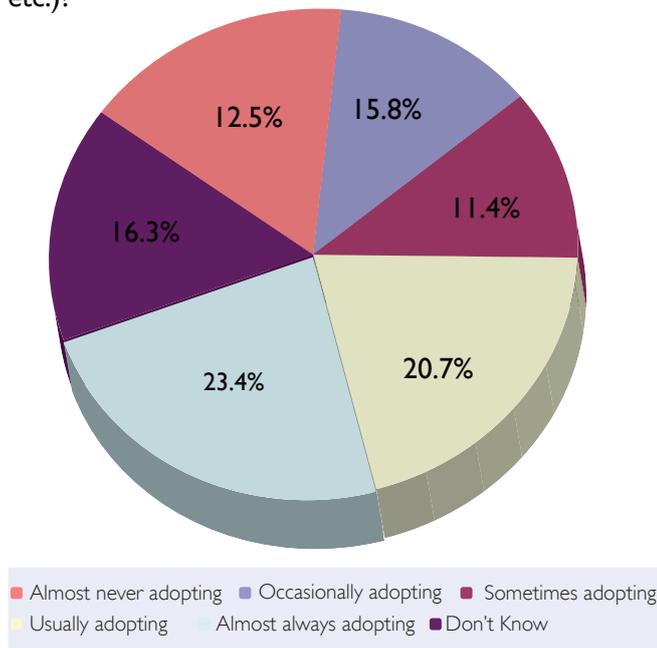

	G&G, seismic, and reservior related data	Drilling and well completions related data	Production related data	Maintenance related data	Health,Safety and environmental related data	Capital Projects related data
Strongly disagree	13	10	11	14	7	9
Somewhat disagree	85	17	15	16	18	19
Neither disagree - nor agree	24	20	20	17	24	25
Somewhat agree	47	43	45	53	53	39
Strongly agree	66	75	82	65	86	73
Don't Know	9	13	9	11	7	15

Key insights:

- **Production related data is of the highest quality:** This is directly related to the fact that production data is largely automated and captured at source; there is considerable process around production data with constant reviews and functional areas (around production) using the data on a regular basis.

- **Health, Safety and Environment data is of high quality:** This is because of regulatory requirements that are of paramount importance to O&G companies.

- **G&G, seismic and reservoir related data being poor comes as a surprise:** G&G is a future growth engine; the score could be low because processing this data may be expensive.

3. How aggressive is your organization in moving towards the adoption of upstream industry IT standards (e.g. Energistics WITSML, Energistics PRODML, Open-Spirit, PPDM, Microsoft MURA, etc.)?

- ● Almost never adopting ● Occasionally adopting ● Sometimes adopting
- ● Usually adopting ● Almost always adopting ● Don't Know

Key insights:

- **Significant percentage not adopting industry standards on a regular basis:** 44.6% almost never, occasionally and sometimes adopting standards (not regular).

- **1 out of 6 not sure if IT Standards are being adopted:** 16.3% respondent said "Don't know", implying there is opportunity for creating IT Standards within the organization or for creating awareness around data standards in the organization.

- **Definite opportunity to educate community and co-workers:** Benefits of adopting IT Standards need to be communicated.
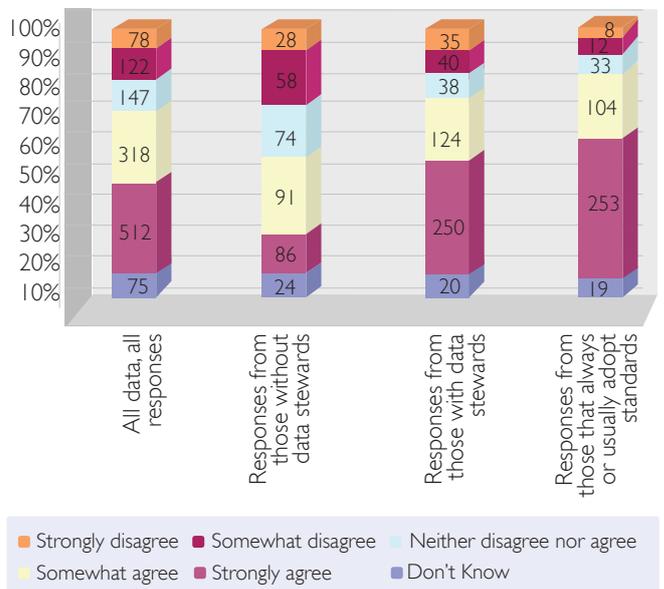
4. Does your organization have named Data Stewards (data owners) for "important" upstream data?
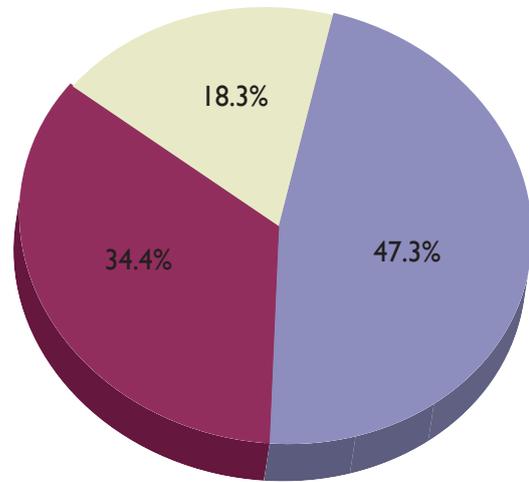
- ● Yes ● No ● Don't Know
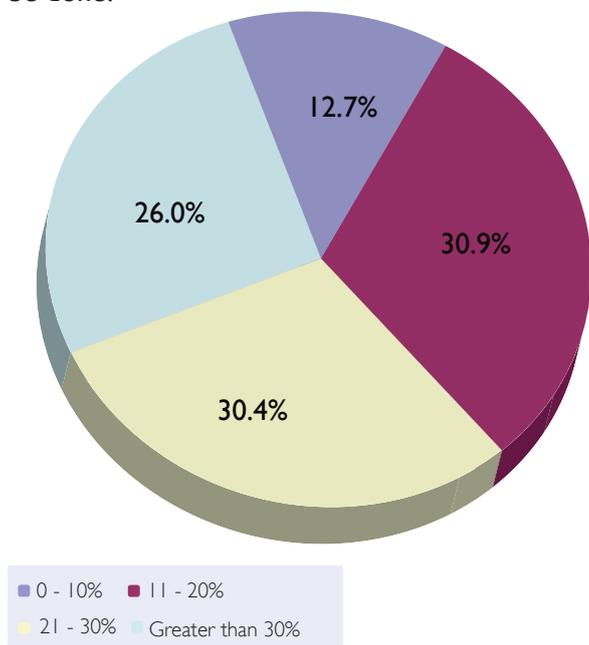
Key insights:

- **half the organizations surveyed either did not have Data Stewards or were not aware of having them:** 52.7% say "No" or "Don't know"

- **Data Stewards should be more vocal about their role:** Awareness of Data Steward's role in maintaining quality of data should rise; organizations that do have Data Stewards need to create awareness around the role.

- ● Strongly disagree ● Somewhat disagree ● Neither disagree nor agree
- ● Somewhat agree ● Strongly agree ● Don't Know

Key insights:

- Clear co-relation observed between Data Stewards/adoption of IT Standards and data quality: High positive response from those organizations with Data Stewards and those who have adopted IT Standards.

- Ability to make good business decisions can depend on Data Stewards: Data Stewards can resolve problems related to different taxonomies and practices across the organiza-

6. Within your organization, how much time does a "high-end" consumer of upstream data spend on "lower value" activities like looking for, accessing, cleaning-up, or preparing data before "higher value" activities like analysis, analytics, and interpretation can be done?

Legend:
- 0 - 10%
- 11 - 20%
- 21 - 30%
- Greater than 30%

Pie values: 12.7%, 30.9%, 30.4%, 26.0%

Key insights:

- Significant time spent on low value activity by data consumers: Data cleaning and processing can translate into one work day of each week for high-end consumers of data.

- Indicative of resource constraints: High-end consumers of data can do with some "help" from specialists/ automation/ standards to free up time.

- Indicative of organizations operating in complex environments: Data cleaning and processing could be more intensive activity in environments like deep water, new geographies etc where organization may not have enough resources to manage the data.

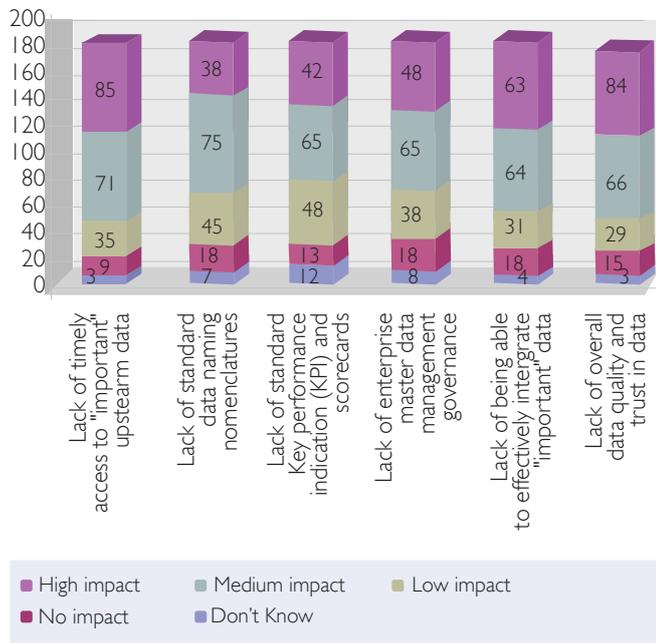- Indicative of need for systemic inadequacies in data management and processes

7. What percent of your overall data needs, reside outside of your particular functional area or discipline?

Pie values: 4.3%, 21.2%, 28.3%, 27.7%, 18.5%

Legend:
- 0-20%
- 21-40%
- 41-60%
- 61-80%
- 81-100%
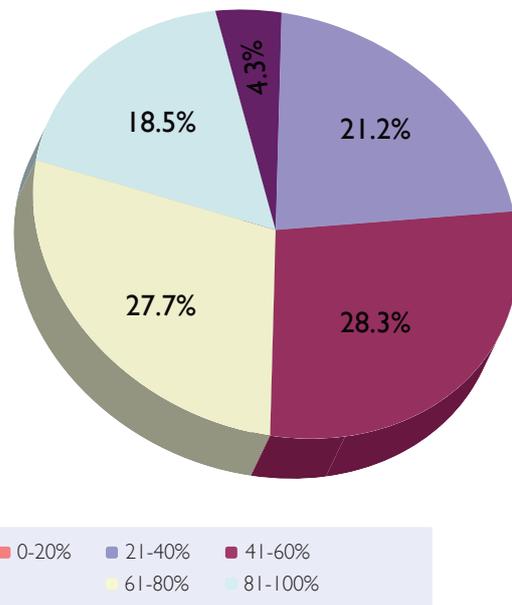
Key insights:

- Significant amount of data residing outside functional area: Acute need for accurate data capture at source; need to deploy Data Steward responsible for cleaning up data and ensuring data path through the organization is clearly communicated; need for greater collaboration across organization.

- Data residing in silos in industry: Not a healthy indicator for an industry that is data rich; data needs to be of very high quality when it moves from one silo or functional area to the next.

- Need for avoiding low-value activity like data cleansing, validation etc: Adoption of data cleansing tools, documented processes, etc necessary to improve reliability of data and eliminate low-value activity.
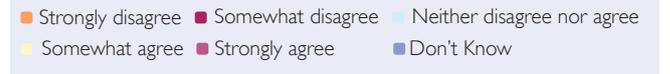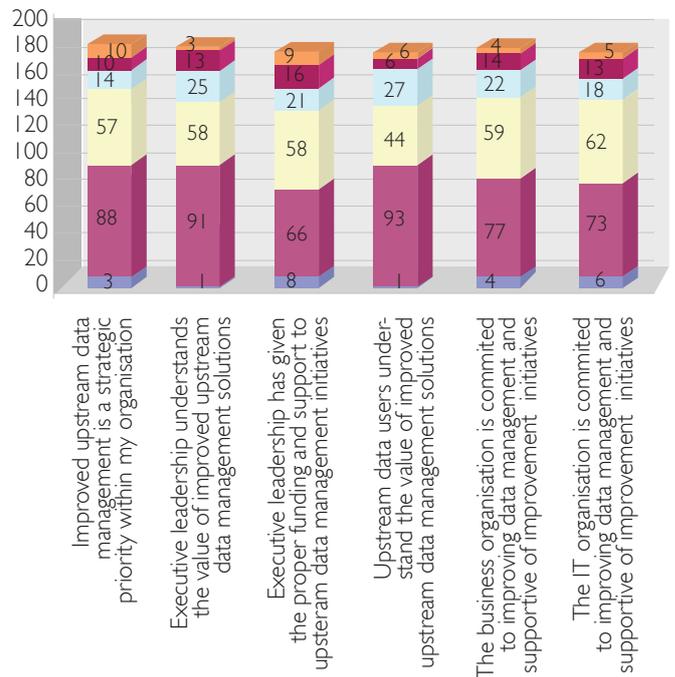
8. Rate the following upstream data management issues in terms of the impact they are having on your organization today:

Legend:
- High impact
- Medium impact
- Low impact
- No impact
- Don't Know

Chart values by category:

	High impact	Medium impact	Low impact	No impact	Don't Know
Lack of timely access to "important" upstream data	85	71	35	9	3
Lack of standard data naming nomenclatures	38	75	45	18	7
Lack of standard Key performance indication (KPI) and scorecards	42	65	48	13	12
Lack of enterprise master data management governance	48	65	38	18	8
Lack of being able to effectively integrate "important" data	63	64	31	18	4
Lack of overall data quality and trust in data	84	66	29	15	3

Key insights:

- Highest impact of data management issues is on timeliness of access and quality of data: Has very high impact across the organization.

- Lack of naming standards, lack of KPIs, lack of enterprise master data, lack of ability to integrate data are key process and governance dependencies: All have an impact on timeliness and quality of data.

- Lack of process and effective governance can raise costs.

9. As it relates to upstream data and information management within your organization today, please comment on the following statements:

Legend:
- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree
- Don't Know

Chart values by category:

	Strongly disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree	Don't Know
Improved upstream data management is a strategic priority within my organisation	10	10	14	57	88	3
Executive leadership understands the value of improved upstream data management solutions	3	13	25	58	91	1
Executive leadership has given the proper funding and support to upstream data management initiatives	9	16	21	58	66	8
Upstream data users understand the value of improved upstream data management solutions	6	6	27	44	93	1
The business organisation is commited to improving data management and supportive of improvement initiatives	4	14	22	59	77	4
The IT organisation is commited to improving data management and supportive of improvement initiatives	5	13	18	62	73	6

Key insights:

- Clear correlations between good data management and leadership.

- Clear correlations between good data management and IT organization.

- Clear correlations between good data management and business organization.

- Leadership needs to fund data management.

10. How well would you describe the alignment of the upstream IT function and the upstream operations/business working together to address the upstream data needs of the organization:
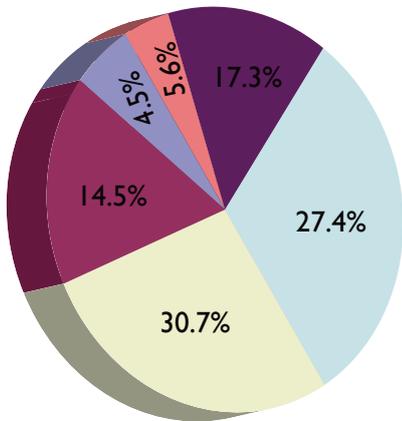

- Almost never aligned
- Occasionally aligned
- Sometime aligned
- Usually aligned
- Almost always aligned
- Don't Know

Key insights:

- IT and business need closer alignment: 58.1% say "sometimes" and "usually" aligned; project success depends on complete alignment.

- Indicative of need for tools, process, communication, governance and master plans.

- Alignment is topic of discussion within organization: about 85% have an opinion, indicating that IT and business alignment is a concern.

11. Within the past 2-years, how would you describe the success of all the upstream data management related initiatives sanctioned by your organization:
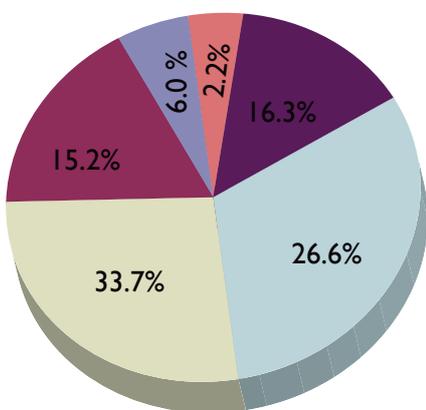
- Almost never Successful
- Occasionally Successful
- Sometime Successful
- Usually Successful
- Almost always Successful
- Don't Know

Key insights:

- Very high percentage indicating poor success related to management of upstream data: 16.3% responded with "Occasionally successful", 26.6% responded with "Sometimes successful".

- Further emphasizes the need for alignment between IT and business: adoption of standards and creating owners of data (Data Stewards) key to success.

- Indicative of opportunity for improvement: Only 15.2% said "Almost always successful."

- Indicative of need for strategy, governance, adoption of industry standards, planning, creating roadmaps, better communication, improved change management, funding: Champions needed to create momentum (within the organization) around data management to deliver success.

- Need to create quick wins that can excite the organization: Look at identifying data types and data sources to achieve wins.

12. State your agreement with the following with regard to major upstream information systems and data stores at your organization:
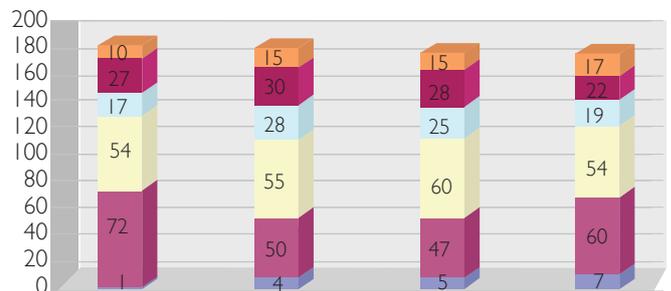
- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree
- Don't Know

Key insights:

- Divergent responses indicate opportunity for areas of improvement within organization.

Conclusions:

The O&G upstream sector is likely to witness unprecedented data proliferation driven by new technologies and new geographies. Organizations that are equipped to manage, analyze and share the data rapidly and accurately across functions will demonstrate an edge over competition.

Business, IT and operations need to be aligned to meet the future challenges presented by the growth in data. The challenge can be addressed through the adoption of IT standards, processes, technology and the active sponsorship from leadership.

Key areas to address for future success:

- Adopt industry data standards and processes.

- Communicate the benefits of adopting data standards across the organization.

- Define role of Data Stewards and educate the organization about the role (of Data Steward) to improve the quality and reliability of data.

- Use technology, automation and industry standards for data cleansing, processing and sharing -- to free valuable time of high-end data consumers and improve efficiency.

- Improve collaboration across organization.

- Raise standards of governance to impact quality and availability of data and reduce cost.

- Create momentum within organization around data management to deliver success.

About the Authors

Jim Lawnin has spent over 30 years in the oil and gas industry. He started his career as a petroleum engineer before getting his MBA. He has worked for several large management consulting firms. He currently leads Wipro's global energy consulting practice.

Mark Allen has spent over 25 years in the oil and gas industry. He started his career as a production accountant before getting his MBA. Over the last decade Mark has been leading many global data management initiatives. He currently leads Wipro's upstream energy consulting practice.

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About The Oil & Gas Journal Research Center:

The Oil & Gas Journal Research Center is part of PennEnergy Research.

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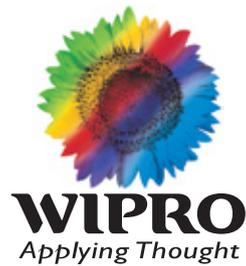
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