

E&P Data Assessments - Are They Worth the Cost?

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Over the last five years two contrasting strategies have been applied to Information Management (IM) in different oil companies. Some Exploration & Production (E&P) companies have invested significant time and resources to create a comprehensive picture of the way information flows, the processes involved and the impact on the business. In contrast other E&P companies have rejected this approach as being too academic, preferring to use their own intuitive understanding to select the projects that can deliver the greatest benefit.

The “Information Management Assessments” described here involve employing specialists to go through an intensive discovery process that delves into many areas of the business. This delivers a report that provides an independent insight and a foundation for future development. However, measuring the total financial impact that understanding the information flows has in an organisation is a challenging task, and on its own cannot normally justify the costs of an assessment project.

All E&P companies rely on their technical information being timely, accurate and relevant. In order to remain competitive companies must undertake a continual “IM improvement programme” consisting of focused projects, each striving to improve some part of the overall process. These are often coordinated by a visionary group that balances the expected benefits, urgency, disruption and costs to select the portfolio of projects that will proceed. These groups can either rely on an intuitive feel for the candidate projects, or take a formal approach to documenting their landscapes.

Where formal IM assessments have been treated as an integral part of an organised IM improvement programme they have resulted in a wider, better quantified selection of projects that have delivered measurable increases in effectiveness.

The E&P industry is information based

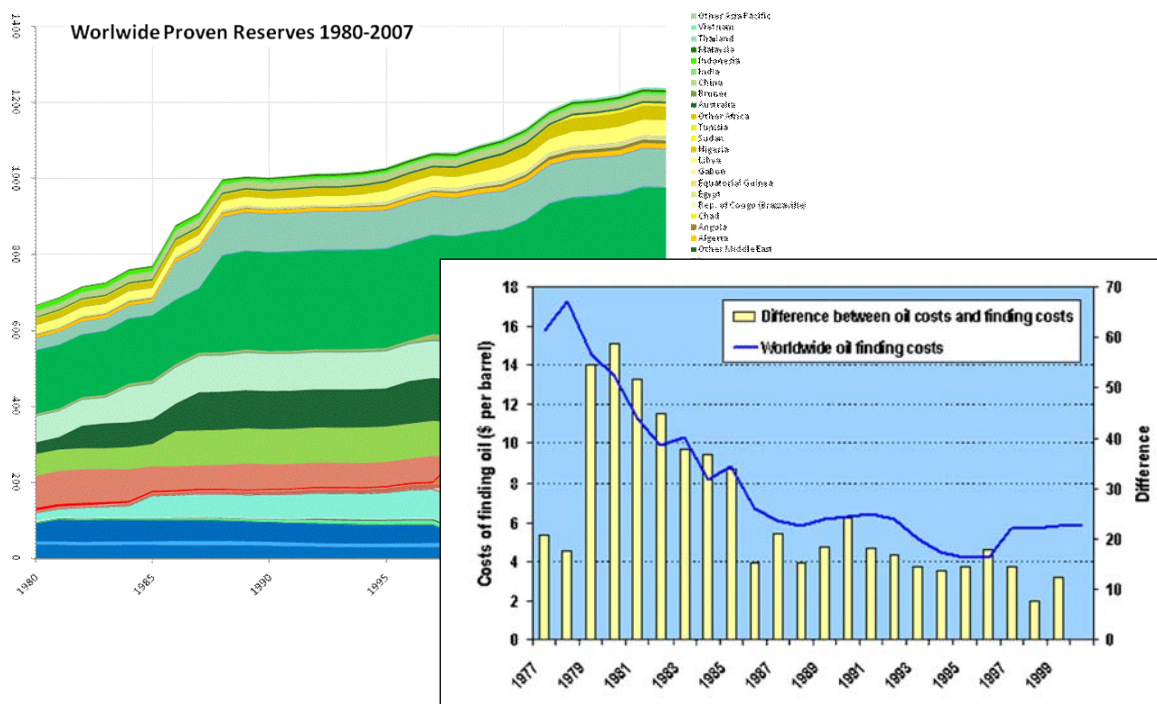


Figure 1: Historical Oil Industry Indicators¹

The history of the oil industry has some apparently counter-intuitive features. Over the last twenty years the volume of proven reserves has increased, despite the fact that production levels have grown dramatically over the same period. The cost of finding new fields has dropped, despite the fact that each one found must make finding the next more of a challenge. This behaviour has been widely explained by the fact that the oil industry is based on information.

Since the early beginnings of oil exploration information has been the key asset of every oil company. The most successful companies are those that have been more efficient at distilling business value out of raw measurements. But no company can afford to stand still. All E&P companies are continually striving to reduce costs and to gain more value from ever growing volumes of data. Increasing complexity makes data management an ever more crucial factor.



“Here, you see, it takes all the running you can do, to keep in the same place”

Figure 2: The Red Queen’s Struggle

To remain competitive every oil company continually strives to improve the efficiency of its data handling. But since all their peers are also running the same race this effort just holds them in the same relative position. Anyone who is not improving persistently is falling behind. This type of situation is well known in biology, for example predators competing with prey or diseases attacking the immune system and is often referred to² as a “Red Queen” situation after one of the characters in Lewis Carroll’s book “Alice through the looking glass”.

¹ From the “Statistical Energy Review” published by BP on www.bp.com and the US Energy Information Agency

² For example it is the theme of the book “The Red Queen” by Matt Ridley

The IM improvement programme

In any E&P company there are always more potential projects to improve IM than the available funding allows. The organisation must pick a portfolio of projects that balances the costs, benefits, resource requirements, strategic goals and schedule constraints.

Project	Benefit Type					Total
	A	B	C	D	E	
1			20			20
2	5		5	10		20
3	5		5			10
4			20		20	40
5		10		5		15
6		5	5	5	5	20
7	10					10
8		20	20	10		50
Total	20	35	75	30	25	185

Key: A – customer satisfaction
 B – cycle time reduction
 C – data quality improvement
 D – process improvement
 E – decision quality improvement

Figure 3: Comparing the various business benefits of potential projects

Some companies select a set of stakeholders to assess the potential projects, for example by combining documented estimates of their properties. Other companies leave this to the intuition of a single experienced individual. In either case a related set of IM focused projects is selected within the context of the current data handling processes, the resources available and the most immediate needs.

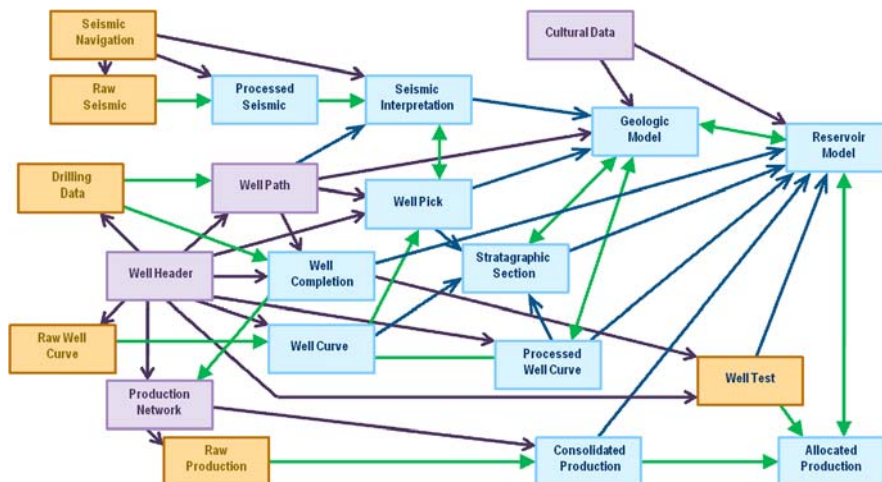


Figure 4: Simplified picture of typical relationships between E&P data categories

The handling of subsurface data is always complex, in all but the smallest of companies a complete understanding of all the process is beyond any single individual. Often processes have evolved over the lifetime of the organisation, have being modified as different regions were explored, new processes have been added as different disciplines rose in importance, and new procedures were acquiring as part of the merger with other companies. It is not surprising therefore that understanding the impact of any particular proposed project is a difficult task.

Estimates of the business impacts of projects are of little value if they are not based on a realistic understanding of the way that E&P data is actually handled within the organisation. The business processes involved in Exploration and Production cover such a wide range of different disciplines and small details can potentially have significant. For a description of the information environment to be valuable it must take all of the “IM Landscape” into account.

A shared picture, the Define step

There are a variety of ways to document the way information flows within an E&P organisation. The most effective approaches employ a wide range of visual techniques to bring together the most important elements of the overall information management architecture.

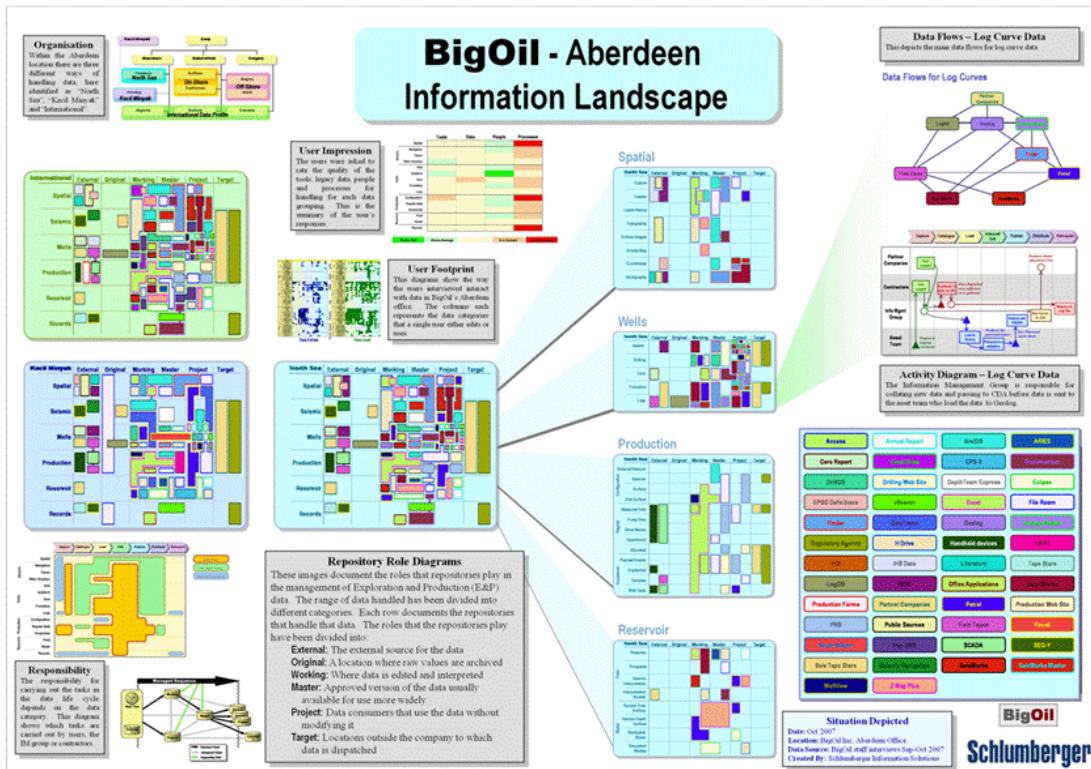


Figure 5: Example assessment output for a fictional company

The fictional example above illustrates some typical outputs from an “IM Landscape Assessment”. Each element incorporated is based on an example from a real assessment. This poster uses a variety of graphical forms to convey information about:

- Streams:** how different categories of data are handled
- Workflows:** what needs doing and when
- Data flow:** how information moves and is transformed
- Repository roles:** which categories of data are held where
- Exceptions:** how IM varies from one location to another within the organisation
- Organisation:** relationships between groups manipulating information

As the figure shows, it is possible to graphically summarise complex interactions between information users even within a relatively large E&P Company. In this particular case these outputs have been created by a number of specialised tools and techniques tailored specifically to the analysis of client information flows. This type of picture would normally be created as part of a formal IM site assessment and accompanied by a detailed report that fully explored the topics raised, related them to the business impact of information handling, and described the most effective way to improve data flows.

Defining the scope

This simple logic appears quite compelling: in order to remain competitive an effective programme of IM focused projects must be managed; in order to maintain a balance these projects must be related to each other; this requires a high level understanding of the complex interactions between information handling processes; and the most efficient way to gain this understanding is by performing a formal assessment of the information flows within the organisation.

Despite this apparently clear logic there are many E&P companies that have decided not to take this type of formal approach. Over the last five years different arguments against conducting a formal assessment have been put forward, these normally fall into one of two groups. The most easily answered objections come in pairs.

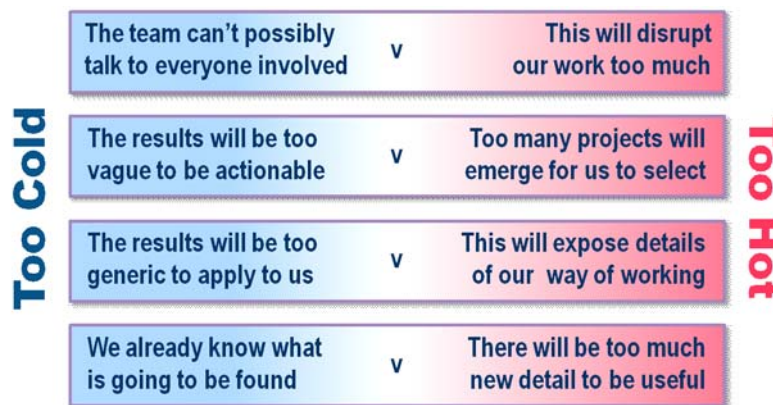


Figure 6: Questions of balance for IM assessments

Every assessment project has to balance between doing too little and doing too much. For example, involve too few personnel and the results will not reveal the level of detail needed; too many and the disruption to normal working will cost the organisation more than the business value of the report. Often assessments will be split into phases, the initial ones focused on particular categories of data and limited sets of locations in order to prove the value of the approach before expanding to a more comprehensive review.

The key question

Will the cost of an assessment
be justified by the benefit it will deliver?

Figure 7: The only important question

The other commonly encountered objection is rooted in doubts that sufficient benefit will be delivered for the cost. This is, of course, a fundamental issue that no amount of scope adjustment can ever address.

When reviewing the costs of performing an assessment it is important to take into account the disruption to normal operations. The overall cost is usually minimised by selecting an assessment team that already has a methodology to capture the key aspects, the experience to uncover analogues and the tools to present the results. Calculating the total cost is relatively straightforward, estimating the measurable benefits is much more challenging.

Many groups have tried to create a consistent and objective methodology for comparing the efficiency of data management across different E&P organizations. Indeed, there are a number of efforts currently underway³ to define exactly these types of benchmarks, but so far none are available. If such a benchmark existed it will be possible to objectively measure the impact of performing an assessment. The absence of this type of objective measurement means that we must employ a less direct approach.

The last five years have shown that assessments **always** deliver significant benefits. Quite apart from the intrinsic value of the picture that an assessment delivers, there are also the benefits that arise because the project encourages a general awareness of the potential value of improved Information Management. This leads to more systematic use of data, more precise descriptions of processes and a wider discussion of the best approaches. Schlumberger's experience has been that this hidden benefit has a value at least 10 times the obvious financial impact, this estimate has been also been demonstrated in other independent projects⁴. However accurately proving these benefits is a time consuming and complex task, so they do not form a good basis for demonstrating the financial impact.

In addition to these general improvements even a cursory assessment, if performed correctly, will reveal many specific opportunities to smooth the operation of the data handling processes. It is not unusual for an assessment to document individual "information sticking points" that, if corrected, would save the company 100 times the assessment cost. The systematic review of the data handling processes, because it consolidates inputs from a wide range of data users, makes it possible to identify common themes and select the issues that have the largest financial impact.

Of course identifying the issues and defining projects to address them is not enough, the company has to actually implement them. Where the recommendations in an assessment report are acted on the assessment will have had a significant impact. If the assessment report

³ At the time of writing (Feb 2009) there were active projects being conducted by SPE, ECIM and PPDM each of which has been described as intending to deliver a methodology for benchmarking "E&P Data Management"

⁴ For example in "Improving Technology Investment Planning with Metering" by Debbie Garcia & Dan Shearer that was presented at PNEC 2006 the improvement to overall productivity was shown to deliver a financial benefit that was 25 times the savings the project delivered

does not initiate any improvement projects it is difficult to prove that it has delivered any value.

In the cases when organizations have failed to implement the recommendations of an assessment they have been asked for the reasons, most responses to this question have fallen into two groups:

The intention is still to go ahead with the projects, however arranging to start the IM improvement programme is taking longer than anticipated

The company went through a change of ownership or management team and the new executives have decided to adopt a different approach

In the locations where proposed projects have gone forward this has always been driven by a well defined group that oversees all the company's IM improvement projects. Some of these groups have a formal structure, for example as an "IM programme board", while others have a less formal approach. Some of these groups existed prior to the assessment, while others were set up only after the assessment's results were delivered. In all cases, however, there has been an easily identified group, with a remit to coordinate information management projects and the budgetary control to direct them.

Conclusion

In summary then doing an information management assessment will almost always be worthwhile. Not only does it document the existing complex interactions involved in managing sub-surface data it will also raise the profile of IM and provide a framework for future discussion. However the difficulties of proving the financial impact of these benefits makes it hard to create a business case for such a project based solely on these improvements.

Organisations that perform an assessment as an integral element of an IM improvement programme will see a significant increase in the pool of potential projects which will lead to noticeable improvements in the efficiency of data handling. Those that employ a formal approach to selecting and measuring a portfolio of projects will find it easiest to demonstrate the financial impacts.